TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 160-21079-1

Job Description: HDP RFP-CBA-022 (21 DAY TAT)

For:
Westinghouse Electric Company LLC
3300 State Road P
Festus, MO 63028

Attention: Mr. Martin Swanson

Approved for release.
Ivan H Vania
Project Manager II
3/8/2017 4:35 PM

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03/08/2017

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

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Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Rad

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

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, 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: Westinghouse Electric Company LLC

Project: HDP RFP-CBA-022 (21 DAY TAT)

Report Number: 160-21079-1

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."

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

RECEIPT

The samples were received on 2/16/2017 12:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.1º C and 19.0º C.

VOLATILE ORGANIC COMPOUNDS (GC/MS)

Samples TB-021517 (160-21079-1), GW-BR05RB-021517 (160-21079-2), GW-BR11JC-021517 (160-21079-3), GW-BR02JC-021517 (160-21079-4), GW-BR02RB-021517 (160-21079-5), GW-NB71-021517 (160-21079-6), GW-BR04RB-021517 (160-21079-7), GW-BR04RB-021517-FD (160-21079-8), GW-NB80-021517 (160-21079-9), GW-NB50-021517 (160-21079-10) and GW-NB57A-021517 (160-21079-11) were analyzed for Volatile Organic Compounds (GC/MS) in accordance with EPA SW-846 Method 8260C. The samples were analyzed on 02/20/2017.

The continuing calibration verification (CCV) associated with batch analytical batch 160-293176 recovered above the upper control limit for Vinyl acetate. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following sample is impacted: (CCVIS 160-293176/4).

The following compounds did not meet the minimum relative response factor limits in the continuing calibration verification (CCV) associated with batch analytical batch 160-293176 : Acetone, 2-Hexanone, 2-Butanone, n-Butanol, and 4-Methyl-2-pentanone. A low level CCV was analyzed at the base reporting limit of 1ug/L and the affected analytes were detected. Affected target analytes recovering above the reporting limit will be qualified and reported. (CCVIS 160-293176/4)

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

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples GW-NB71-021517 (160-21079-6), GW-BR04RB-021517 (160-21079-7), GW-BR04RB-021517-FD (160-21079-8) and GW-NB80-021517 (160-21079-9) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with DOE. The samples were prepared on 02/21/2017 and analyzed on 02/27/2017 and 02/28/2017.

Preparation Batch 160-293762:
Due to historical high activity, reduced aliquots were prepared. GW-NB71-021517 (160-21079-6), GW-BR04RB-021517 (160-21079-7),

GW-BR04RB-021517 (160-21079-7[MS]), GW-BR04RB-021517 (160-21079-7[MSD]), GW-BR04RB-021517-FD (160-21079-8) and GW-NB80-021517 (160-21079-9)

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

TECHNETIUM-99 (LSC)

Samples GW-NB71-021517 (160-21079-6), GW-BR04RB-021517 (160-21079-7), GW-BR04RB-021517-FD (160-21079-8) and GW-NB80-021517 (160-21079-9) were analyzed for Technetium-99 (LSC) in accordance with TC_02_RC. The samples were prepared on 03/01/2017 and analyzed on 03/07/2017.

Preparation Batch 160-295318:
The following samples have a negative result greater than the three sigma uncertainty. The samples were recounted with a similar result. The data have been qualified and reported. (MB 160-295318/1-A)

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

Client Sample ID: TB-021517

Date Collected: 02/15/17 07:00
Date Received: 02/16/17 12:00

Lab Sample ID: 160-21079-1

Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.17	ug/L			02/20/17 15:10	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.10	ug/L			02/20/17 15:10	1
1,1,2-Trichloroethane	ND		1.0	0.13	ug/L			02/20/17 15:10	1
1,1-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 15:10	1
1,1-Dichloroethane	ND		1.0	0.070	ug/L			02/20/17 15:10	1
1,2,4-Trichlorobenzene	ND		1.0	0.10	ug/L			02/20/17 15:10	1
1,2-Dibromo-3-Chloropropane	ND		1.0	0.41	ug/L			02/20/17 15:10	1
1,2-Dichloroethane	ND		1.0	0.22	ug/L			02/20/17 15:10	1
1,2-Dichloroethene, Total	ND		2.0	0.14	ug/L			02/20/17 15:10	1
1,2-Dichloropropane	ND		1.0	0.10	ug/L			02/20/17 15:10	1
2-Butanone	ND		5.0	0.47	ug/L			02/20/17 15:10	1
2-Hexanone	ND		5.0	0.25	ug/L			02/20/17 15:10	1
4-Methyl-2-pentanone	ND		5.0	0.22	ug/L			02/20/17 15:10	1
Acetone	ND		2.0	0.55	ug/L			02/20/17 15:10	1
Benzene	ND		1.0	0.10	ug/L			02/20/17 15:10	1
Bromoform	ND		1.0	0.17	ug/L			02/20/17 15:10	1
Methyl bromide	ND		2.0	0.25	ug/L			02/20/17 15:10	1
Carbon disulfide	ND		1.0	0.10	ug/L			02/20/17 15:10	1
Carbon tetrachloride	ND		1.0	0.18	ug/L			02/20/17 15:10	1
Chlorobenzene	ND		1.0	0.11	ug/L			02/20/17 15:10	1
Chlorodibromomethane	ND		1.0	0.14	ug/L			02/20/17 15:10	1
Chloroethane	ND		2.0	0.16	ug/L			02/20/17 15:10	1
Chloroform	ND		1.0	0.10	ug/L			02/20/17 15:10	1
Chloromethane	ND		2.0	0.10	ug/L			02/20/17 15:10	1
cis-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 15:10	1
cis-1,3-Dichloropropene	ND		1.0	0.16	ug/L			02/20/17 15:10	1
Bromodichloromethane	ND		1.0	0.14	ug/L			02/20/17 15:10	1
Ethylbenzene	ND		1.0	0.12	ug/L			02/20/17 15:10	1
1,2-Dibromoethane	ND		1.0	0.13	ug/L			02/20/17 15:10	1
Methylene Chloride	ND		1.0	0.27	ug/L			02/20/17 15:10	1
n-Butanol	ND		50	12	ug/L			02/20/17 15:10	1
Styrene	ND		1.0	0.13	ug/L			02/20/17 15:10	1
Tetrachloroethene	ND		1.0	0.18	ug/L			02/20/17 15:10	1
Toluene	ND		1.0	0.14	ug/L			02/20/17 15:10	1
trans-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 15:10	1
trans-1,3-Dichloropropene	ND		1.0	0.10	ug/L			02/20/17 15:10	1
Trichloroethene	ND		1.0	0.25	ug/L			02/20/17 15:10	1
Vinyl acetate	ND		2.0	0.18	ug/L			02/20/17 15:10	1
Vinyl chloride	ND		2.0	0.19	ug/L			02/20/17 15:10	1
Xylenes, Total	ND		3.0	0.27	ug/L			02/20/17 15:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*75 - 129*		*02/20/17 15:10*	*1*
4-Bromofluorobenzene (Surr)	*106*		*81 - 130*		*02/20/17 15:10*	*1*
Dibromofluoromethane (Surr)	*99*		*81 - 124*		*02/20/17 15:10*	*1*
Toluene-d8 (Surr)	*105*		*87 - 128*		*02/20/17 15:10*	*1*

Client Sample ID: GW-BR05RB-021517

Date Collected: 02/15/17 08:15
Date Received: 02/16/17 12:00

Lab Sample ID: 160-21079-2

Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.17	ug/L			02/20/17 15:35	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.10	ug/L			02/20/17 15:35	1
1,1,2-Trichloroethane	ND		1.0	0.13	ug/L			02/20/17 15:35	1
1,1-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 15:35	1
1,1-Dichloroethane	ND		1.0	0.070	ug/L			02/20/17 15:35	1
1,2,4-Trichlorobenzene	ND		1.0	0.10	ug/L			02/20/17 15:35	1
1,2-Dibromo-3-Chloropropane	ND		1.0	0.41	ug/L			02/20/17 15:35	1
1,2-Dichloroethane	ND		1.0	0.22	ug/L			02/20/17 15:35	1
1,2-Dichloroethene, Total	ND		2.0	0.14	ug/L			02/20/17 15:35	1
1,2-Dichloropropane	ND		1.0	0.10	ug/L			02/20/17 15:35	1
2-Butanone	ND		5.0	0.47	ug/L			02/20/17 15:35	1
2-Hexanone	ND		5.0	0.25	ug/L			02/20/17 15:35	1
4-Methyl-2-pentanone	ND		5.0	0.22	ug/L			02/20/17 15:35	1
Acetone	ND		2.0	0.55	ug/L			02/20/17 15:35	1
Benzene	ND		1.0	0.10	ug/L			02/20/17 15:35	1
Bromoform	ND		1.0	0.17	ug/L			02/20/17 15:35	1
Methyl bromide	ND		2.0	0.25	ug/L			02/20/17 15:35	1
Carbon disulfide	ND		1.0	0.10	ug/L			02/20/17 15:35	1
Carbon tetrachloride	ND		1.0	0.18	ug/L			02/20/17 15:35	1
Chlorobenzene	ND		1.0	0.11	ug/L			02/20/17 15:35	1
Chlorodibromomethane	ND		1.0	0.14	ug/L			02/20/17 15:35	1
Chloroethane	ND		2.0	0.16	ug/L			02/20/17 15:35	1
Chloroform	ND		1.0	0.10	ug/L			02/20/17 15:35	1
Chloromethane	ND		2.0	0.10	ug/L			02/20/17 15:35	1
cis-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 15:35	1
cis-1,3-Dichloropropene	ND		1.0	0.16	ug/L			02/20/17 15:35	1
Bromodichloromethane	ND		1.0	0.14	ug/L			02/20/17 15:35	1
Ethylbenzene	ND		1.0	0.12	ug/L			02/20/17 15:35	1
1,2-Dibromoethane	ND		1.0	0.13	ug/L			02/20/17 15:35	1
Methylene Chloride	ND		1.0	0.27	ug/L			02/20/17 15:35	1
n-Butanol	ND		50	12	ug/L			02/20/17 15:35	1
Styrene	ND		1.0	0.13	ug/L			02/20/17 15:35	1
Tetrachloroethene	ND		1.0	0.18	ug/L			02/20/17 15:35	1
Toluene	ND		1.0	0.14	ug/L			02/20/17 15:35	1
trans-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 15:35	1
trans-1,3-Dichloropropene	ND		1.0	0.10	ug/L			02/20/17 15:35	1
Trichloroethene	ND		1.0	0.25	ug/L			02/20/17 15:35	1
Vinyl acetate	ND		2.0	0.18	ug/L			02/20/17 15:35	1
Vinyl chloride	ND		2.0	0.19	ug/L			02/20/17 15:35	1
Xylenes, Total	ND		3.0	0.27	ug/L			02/20/17 15:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*75 - 129*		*02/20/17 15:35*	*1*
4-Bromofluorobenzene (Surr)	*102*		*81 - 130*		*02/20/17 15:35*	*1*
Dibromofluoromethane (Surr)	*97*		*81 - 124*		*02/20/17 15:35*	*1*
Toluene-d8 (Surr)	*106*		*87 - 128*		*02/20/17 15:35*	*1*

Client Sample ID: GW-BR11JC-021517

Date Collected: 02/15/17 09:05
Date Received: 02/16/17 12:00

Lab Sample ID: 160-21079-3

Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.17	ug/L			02/20/17 16:01	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.10	ug/L			02/20/17 16:01	1
1,1,2-Trichloroethane	ND		1.0	0.13	ug/L			02/20/17 16:01	1
1,1-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 16:01	1
1,1-Dichloroethane	ND		1.0	0.070	ug/L			02/20/17 16:01	1
1,2,4-Trichlorobenzene	ND		1.0	0.10	ug/L			02/20/17 16:01	1
1,2-Dibromo-3-Chloropropane	ND		1.0	0.41	ug/L			02/20/17 16:01	1
1,2-Dichloroethane	ND		1.0	0.22	ug/L			02/20/17 16:01	1
1,2-Dichloroethene, Total	ND		2.0	0.14	ug/L			02/20/17 16:01	1
1,2-Dichloropropane	ND		1.0	0.10	ug/L			02/20/17 16:01	1
2-Butanone	ND		5.0	0.47	ug/L			02/20/17 16:01	1
2-Hexanone	ND		5.0	0.25	ug/L			02/20/17 16:01	1
4-Methyl-2-pentanone	ND		5.0	0.22	ug/L			02/20/17 16:01	1
Acetone	ND		2.0	0.55	ug/L			02/20/17 16:01	1
Benzene	ND		1.0	0.10	ug/L			02/20/17 16:01	1
Bromoform	ND		1.0	0.17	ug/L			02/20/17 16:01	1
Methyl bromide	ND		2.0	0.25	ug/L			02/20/17 16:01	1
Carbon disulfide	ND		1.0	0.10	ug/L			02/20/17 16:01	1
Carbon tetrachloride	ND		1.0	0.18	ug/L			02/20/17 16:01	1
Chlorobenzene	ND		1.0	0.11	ug/L			02/20/17 16:01	1
Chlorodibromomethane	ND		1.0	0.14	ug/L			02/20/17 16:01	1
Chloroethane	ND		2.0	0.16	ug/L			02/20/17 16:01	1
Chloroform	ND		1.0	0.10	ug/L			02/20/17 16:01	1
Chloromethane	ND		2.0	0.10	ug/L			02/20/17 16:01	1
cis-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 16:01	1
cis-1,3-Dichloropropene	ND		1.0	0.16	ug/L			02/20/17 16:01	1
Bromodichloromethane	ND		1.0	0.14	ug/L			02/20/17 16:01	1
Ethylbenzene	ND		1.0	0.12	ug/L			02/20/17 16:01	1
1,2-Dibromoethane	ND		1.0	0.13	ug/L			02/20/17 16:01	1
Methylene Chloride	ND		1.0	0.27	ug/L			02/20/17 16:01	1
n-Butanol	ND		50	12	ug/L			02/20/17 16:01	1
Styrene	ND		1.0	0.13	ug/L			02/20/17 16:01	1
Tetrachloroethene	ND		1.0	0.18	ug/L			02/20/17 16:01	1
Toluene	ND		1.0	0.14	ug/L			02/20/17 16:01	1
trans-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 16:01	1
trans-1,3-Dichloropropene	ND		1.0	0.10	ug/L			02/20/17 16:01	1
Trichloroethene	ND		1.0	0.25	ug/L			02/20/17 16:01	1
Vinyl acetate	ND		2.0	0.18	ug/L			02/20/17 16:01	1
Vinyl chloride	ND		2.0	0.19	ug/L			02/20/17 16:01	1
Xylenes, Total	ND		3.0	0.27	ug/L			02/20/17 16:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*75 - 129*		*02/20/17 16:01*	*1*
4-Bromofluorobenzene (Surr)	*106*		*81 - 130*		*02/20/17 16:01*	*1*
Dibromofluoromethane (Surr)	*101*		*81 - 124*		*02/20/17 16:01*	*1*
Toluene-d8 (Surr)	*106*		*87 - 128*		*02/20/17 16:01*	*1*

Client Sample ID: GW-BR02JC-021517

Date Collected: 02/15/17 09:45
Date Received: 02/16/17 12:00

Lab Sample ID: 160-21079-4

Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.17	ug/L			02/20/17 16:26	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.10	ug/L			02/20/17 16:26	1
1,1,2-Trichloroethane	ND		1.0	0.13	ug/L			02/20/17 16:26	1
1,1-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 16:26	1
1,1-Dichloroethane	ND		1.0	0.070	ug/L			02/20/17 16:26	1
1,2,4-Trichlorobenzene	ND		1.0	0.10	ug/L			02/20/17 16:26	1
1,2-Dibromo-3-Chloropropane	ND		1.0	0.41	ug/L			02/20/17 16:26	1
1,2-Dichloroethane	ND		1.0	0.22	ug/L			02/20/17 16:26	1
1,2-Dichloroethene, Total	ND		2.0	0.14	ug/L			02/20/17 16:26	1
1,2-Dichloropropane	ND		1.0	0.10	ug/L			02/20/17 16:26	1
2-Butanone	ND		5.0	0.47	ug/L			02/20/17 16:26	1
2-Hexanone	ND		5.0	0.25	ug/L			02/20/17 16:26	1
4-Methyl-2-pentanone	ND		5.0	0.22	ug/L			02/20/17 16:26	1
Acetone	ND		2.0	0.55	ug/L			02/20/17 16:26	1
Benzene	ND		1.0	0.10	ug/L			02/20/17 16:26	1
Bromoform	ND		1.0	0.17	ug/L			02/20/17 16:26	1
Methyl bromide	ND		2.0	0.25	ug/L			02/20/17 16:26	1
Carbon disulfide	ND		1.0	0.10	ug/L			02/20/17 16:26	1
Carbon tetrachloride	ND		1.0	0.18	ug/L			02/20/17 16:26	1
Chlorobenzene	ND		1.0	0.11	ug/L			02/20/17 16:26	1
Chlorodibromomethane	ND		1.0	0.14	ug/L			02/20/17 16:26	1
Chloroethane	ND		2.0	0.16	ug/L			02/20/17 16:26	1
Chloroform	ND		1.0	0.10	ug/L			02/20/17 16:26	1
Chloromethane	ND		2.0	0.10	ug/L			02/20/17 16:26	1
cis-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 16:26	1
cis-1,3-Dichloropropene	ND		1.0	0.16	ug/L			02/20/17 16:26	1
Bromodichloromethane	ND		1.0	0.14	ug/L			02/20/17 16:26	1
Ethylbenzene	ND		1.0	0.12	ug/L			02/20/17 16:26	1
1,2-Dibromoethane	ND		1.0	0.13	ug/L			02/20/17 16:26	1
Methylene Chloride	ND		1.0	0.27	ug/L			02/20/17 16:26	1
n-Butanol	ND		50	12	ug/L			02/20/17 16:26	1
Styrene	ND		1.0	0.13	ug/L			02/20/17 16:26	1
Tetrachloroethene	ND		1.0	0.18	ug/L			02/20/17 16:26	1
Toluene	ND		1.0	0.14	ug/L			02/20/17 16:26	1
trans-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 16:26	1
trans-1,3-Dichloropropene	ND		1.0	0.10	ug/L			02/20/17 16:26	1
Trichloroethene	ND		1.0	0.25	ug/L			02/20/17 16:26	1
Vinyl acetate	ND		2.0	0.18	ug/L			02/20/17 16:26	1
Vinyl chloride	ND		2.0	0.19	ug/L			02/20/17 16:26	1
Xylenes, Total	ND		3.0	0.27	ug/L			02/20/17 16:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*75 - 129*		*02/20/17 16:26*	*1*
4-Bromofluorobenzene (Surr)	*107*		*81 - 130*		*02/20/17 16:26*	*1*
Dibromofluoromethane (Surr)	*103*		*81 - 124*		*02/20/17 16:26*	*1*
Toluene-d8 (Surr)	*106*		*87 - 128*		*02/20/17 16:26*	*1*

Client Sample ID: GW-BR02RB-021517

Date Collected: 02/15/17 10:30
Date Received: 02/16/17 12:00

Lab Sample ID: 160-21079-5

Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.17	ug/L			02/20/17 16:51	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.10	ug/L			02/20/17 16:51	1
1,1,2-Trichloroethane	ND		1.0	0.13	ug/L			02/20/17 16:51	1
1,1-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 16:51	1
1,1-Dichloroethane	ND		1.0	0.070	ug/L			02/20/17 16:51	1
1,2,4-Trichlorobenzene	ND		1.0	0.10	ug/L			02/20/17 16:51	1
1,2-Dibromo-3-Chloropropane	ND		1.0	0.41	ug/L			02/20/17 16:51	1
1,2-Dichloroethane	ND		1.0	0.22	ug/L			02/20/17 16:51	1
1,2-Dichloroethene, Total	ND		2.0	0.14	ug/L			02/20/17 16:51	1
1,2-Dichloropropane	ND		1.0	0.10	ug/L			02/20/17 16:51	1
2-Butanone	ND		5.0	0.47	ug/L			02/20/17 16:51	1
2-Hexanone	ND		5.0	0.25	ug/L			02/20/17 16:51	1
4-Methyl-2-pentanone	ND		5.0	0.22	ug/L			02/20/17 16:51	1
Acetone	ND		2.0	0.55	ug/L			02/20/17 16:51	1
Benzene	ND		1.0	0.10	ug/L			02/20/17 16:51	1
Bromoform	ND		1.0	0.17	ug/L			02/20/17 16:51	1
Methyl bromide	ND		2.0	0.25	ug/L			02/20/17 16:51	1
Carbon disulfide	ND		1.0	0.10	ug/L			02/20/17 16:51	1
Carbon tetrachloride	ND		1.0	0.18	ug/L			02/20/17 16:51	1
Chlorobenzene	ND		1.0	0.11	ug/L			02/20/17 16:51	1
Chlorodibromomethane	ND		1.0	0.14	ug/L			02/20/17 16:51	1
Chloroethane	ND		2.0	0.16	ug/L			02/20/17 16:51	1
Chloroform	ND		1.0	0.10	ug/L			02/20/17 16:51	1
Chloromethane	ND		2.0	0.10	ug/L			02/20/17 16:51	1
cis-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 16:51	1
cis-1,3-Dichloropropene	ND		1.0	0.16	ug/L			02/20/17 16:51	1
Bromodichloromethane	ND		1.0	0.14	ug/L			02/20/17 16:51	1
Ethylbenzene	ND		1.0	0.12	ug/L			02/20/17 16:51	1
1,2-Dibromoethane	ND		1.0	0.13	ug/L			02/20/17 16:51	1
Methylene Chloride	ND		1.0	0.27	ug/L			02/20/17 16:51	1
n-Butanol	ND		50	12	ug/L			02/20/17 16:51	1
Styrene	ND		1.0	0.13	ug/L			02/20/17 16:51	1
Tetrachloroethene	ND		1.0	0.18	ug/L			02/20/17 16:51	1
Toluene	ND		1.0	0.14	ug/L			02/20/17 16:51	1
trans-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 16:51	1
trans-1,3-Dichloropropene	ND		1.0	0.10	ug/L			02/20/17 16:51	1
Trichloroethene	ND		1.0	0.25	ug/L			02/20/17 16:51	1
Vinyl acetate	ND		2.0	0.18	ug/L			02/20/17 16:51	1
Vinyl chloride	ND		2.0	0.19	ug/L			02/20/17 16:51	1
Xylenes, Total	ND		3.0	0.27	ug/L			02/20/17 16:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*75 - 129*		*02/20/17 16:51*	*1*
4-Bromofluorobenzene (Surr)	*102*		*81 - 130*		*02/20/17 16:51*	*1*
Dibromofluoromethane (Surr)	*97*		*81 - 124*		*02/20/17 16:51*	*1*
Toluene-d8 (Surr)	*104*		*87 - 128*		*02/20/17 16:51*	*1*

Client Sample ID: GW-NB71-021517

Date Collected: 02/15/17 12:40
Date Received: 02/16/17 12:00

Lab Sample ID: 160-21079-6

Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.17	ug/L			02/20/17 17:17	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.10	ug/L			02/20/17 17:17	1
1,1,2-Trichloroethane	ND		1.0	0.13	ug/L			02/20/17 17:17	1
1,1-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 17:17	1
1,1-Dichloroethane	ND		1.0	0.070	ug/L			02/20/17 17:17	1
1,2,4-Trichlorobenzene	ND		1.0	0.10	ug/L			02/20/17 17:17	1
1,2-Dibromo-3-Chloropropane	ND		1.0	0.41	ug/L			02/20/17 17:17	1
1,2-Dichloroethane	ND		1.0	0.22	ug/L			02/20/17 17:17	1
1,2-Dichloroethene, Total	ND		2.0	0.14	ug/L			02/20/17 17:17	1
1,2-Dichloropropane	ND		1.0	0.10	ug/L			02/20/17 17:17	1
2-Butanone	ND		5.0	0.47	ug/L			02/20/17 17:17	1
2-Hexanone	ND		5.0	0.25	ug/L			02/20/17 17:17	1
4-Methyl-2-pentanone	ND		5.0	0.22	ug/L			02/20/17 17:17	1
Acetone	ND		2.0	0.55	ug/L			02/20/17 17:17	1
Benzene	ND		1.0	0.10	ug/L			02/20/17 17:17	1
Bromoform	ND		1.0	0.17	ug/L			02/20/17 17:17	1
Methyl bromide	ND		2.0	0.25	ug/L			02/20/17 17:17	1
Carbon disulfide	ND		1.0	0.10	ug/L			02/20/17 17:17	1
Carbon tetrachloride	ND		1.0	0.18	ug/L			02/20/17 17:17	1
Chlorobenzene	ND		1.0	0.11	ug/L			02/20/17 17:17	1
Chlorodibromomethane	ND		1.0	0.14	ug/L			02/20/17 17:17	1
Chloroethane	ND		2.0	0.16	ug/L			02/20/17 17:17	1
Chloroform	ND		1.0	0.10	ug/L			02/20/17 17:17	1
Chloromethane	ND		2.0	0.10	ug/L			02/20/17 17:17	1
cis-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 17:17	1
cis-1,3-Dichloropropene	ND		1.0	0.16	ug/L			02/20/17 17:17	1
Bromodichloromethane	ND		1.0	0.14	ug/L			02/20/17 17:17	1
Ethylbenzene	ND		1.0	0.12	ug/L			02/20/17 17:17	1
1,2-Dibromoethane	ND		1.0	0.13	ug/L			02/20/17 17:17	1
Methylene Chloride	ND		1.0	0.27	ug/L			02/20/17 17:17	1
n-Butanol	ND		50	12	ug/L			02/20/17 17:17	1
Styrene	ND		1.0	0.13	ug/L			02/20/17 17:17	1
Tetrachloroethene	ND		1.0	0.18	ug/L			02/20/17 17:17	1
Toluene	ND		1.0	0.14	ug/L			02/20/17 17:17	1
trans-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 17:17	1
trans-1,3-Dichloropropene	ND		1.0	0.10	ug/L			02/20/17 17:17	1
Trichloroethene	ND		1.0	0.25	ug/L			02/20/17 17:17	1
Vinyl acetate	ND		2.0	0.18	ug/L			02/20/17 17:17	1
Vinyl chloride	ND		2.0	0.19	ug/L			02/20/17 17:17	1
Xylenes, Total	ND		3.0	0.27	ug/L			02/20/17 17:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*75 - 129*		*02/20/17 17:17*	*1*
4-Bromofluorobenzene (Surr)	*105*		*81 - 130*		*02/20/17 17:17*	*1*
Dibromofluoromethane (Surr)	*101*		*81 - 124*		*02/20/17 17:17*	*1*
Toluene-d8 (Surr)	*107*		*87 - 128*		*02/20/17 17:17*	*1*

Client Sample ID: GW-NB71-021517

Lab Sample ID: 160-21079-6

Date Collected: 02/15/17 12:40

Matrix: Water

Date Received: 02/16/17 12:00

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 238	0.00644	U	0.0129	0.0129	0.100	0.0193	pCi/L	02/21/17 16:28	02/27/17 15:42	1
Uranium 234	**0.0581**		0.0387	0.0390	0.100	0.0194	pCi/L	02/21/17 16:28	02/27/17 15:42	1
Uranium-235/236	0.00301	U	0.0189	0.0189	0.100	0.0507	pCi/L	02/21/17 16:28	02/27/17 15:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium 232	*105*		*30 - 110*	*02/21/17 16:28*	*02/27/17 15:42*	*1*

Method: TC-02-RC - Technetium-99 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	-0.989	U	1.12	1.13	3.00	1.97	pCi/L	03/01/17 12:55	03/07/17 15:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tc-99m	*101*		*30 - 110*	*03/01/17 12:55*	*03/07/17 15:41*	*1*

Client Sample ID: GW-BR04RB-021517

Lab Sample ID: 160-21079-7

Date Collected: 02/15/17 13:45

Matrix: Water

Date Received: 02/16/17 12:00

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.17	ug/L			02/20/17 12:13	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.10	ug/L			02/20/17 12:13	1
1,1,2-Trichloroethane	ND		1.0	0.13	ug/L			02/20/17 12:13	1
1,1-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 12:13	1
1,1-Dichloroethane	ND		1.0	0.070	ug/L			02/20/17 12:13	1
1,2,4-Trichlorobenzene	ND		1.0	0.10	ug/L			02/20/17 12:13	1
1,2-Dibromo-3-Chloropropane	ND		1.0	0.41	ug/L			02/20/17 12:13	1
1,2-Dichloroethane	ND		1.0	0.22	ug/L			02/20/17 12:13	1
1,2-Dichloroethene, Total	ND		2.0	0.14	ug/L			02/20/17 12:13	1
1,2-Dichloropropane	ND		1.0	0.10	ug/L			02/20/17 12:13	1
2-Butanone	ND		5.0	0.47	ug/L			02/20/17 12:13	1
2-Hexanone	ND		5.0	0.25	ug/L			02/20/17 12:13	1
4-Methyl-2-pentanone	ND		5.0	0.22	ug/L			02/20/17 12:13	1
Acetone	ND		2.0	0.55	ug/L			02/20/17 12:13	1
Benzene	ND		1.0	0.10	ug/L			02/20/17 12:13	1
Bromoform	ND		1.0	0.17	ug/L			02/20/17 12:13	1
Methyl bromide	ND		2.0	0.25	ug/L			02/20/17 12:13	1
Carbon disulfide	ND		1.0	0.10	ug/L			02/20/17 12:13	1
Carbon tetrachloride	ND		1.0	0.18	ug/L			02/20/17 12:13	1
Chlorobenzene	ND		1.0	0.11	ug/L			02/20/17 12:13	1
Chlorodibromomethane	ND		1.0	0.14	ug/L			02/20/17 12:13	1
Chloroethane	ND		2.0	0.16	ug/L			02/20/17 12:13	1
Chloroform	ND		1.0	0.10	ug/L			02/20/17 12:13	1
Chloromethane	ND		2.0	0.10	ug/L			02/20/17 12:13	1
cis-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 12:13	1
cis-1,3-Dichloropropene	ND		1.0	0.16	ug/L			02/20/17 12:13	1

Client Sample ID: GW-BR04RB-021517

Date Collected: 02/15/17 13:45
Date Received: 02/16/17 12:00

Lab Sample ID: 160-21079-7

Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	ND		1.0	0.14	ug/L			02/20/17 12:13	1
Ethylbenzene	ND		1.0	0.12	ug/L			02/20/17 12:13	1
1,2-Dibromoethane	ND		1.0	0.13	ug/L			02/20/17 12:13	1
Methylene Chloride	ND		1.0	0.27	ug/L			02/20/17 12:13	1
n-Butanol	ND		50	12	ug/L			02/20/17 12:13	1
Styrene	ND		1.0	0.13	ug/L			02/20/17 12:13	1
Tetrachloroethene	ND		1.0	0.18	ug/L			02/20/17 12:13	1
Toluene	ND		1.0	0.14	ug/L			02/20/17 12:13	1
trans-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 12:13	1
trans-1,3-Dichloropropene	ND		1.0	0.10	ug/L			02/20/17 12:13	1
Trichloroethene	ND		1.0	0.25	ug/L			02/20/17 12:13	1
Vinyl acetate	ND		2.0	0.18	ug/L			02/20/17 12:13	1
Vinyl chloride	ND		2.0	0.19	ug/L			02/20/17 12:13	1
Xylenes, Total	ND		3.0	0.27	ug/L			02/20/17 12:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*75 - 129*		*02/20/17 12:13*	*1*
4-Bromofluorobenzene (Surr)	*105*		*81 - 130*		*02/20/17 12:13*	*1*
Dibromofluoromethane (Surr)	*95*		*81 - 124*		*02/20/17 12:13*	*1*
Toluene-d8 (Surr)	*105*		*87 - 128*		*02/20/17 12:13*	*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 238	**0.241**		0.0830	0.0854	0.100	0.0519	pCi/L	02/21/17 16:28	02/28/17 18:28	1
Uranium 234	**2.43**		0.258	0.329	0.100	0.0652	pCi/L	02/21/17 16:28	02/28/17 18:28	1
Uranium-235/236	0.0168	U	0.0238	0.0239	0.100	0.0253	pCi/L	02/21/17 16:28	02/28/17 18:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium 232	*89.1*		*30 - 110*	*02/21/17 16:28*	*02/28/17 18:28*	*1*

Method: TC-02-RC - Technetium-99 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	-0.962	U	1.20	1.20	3.00	2.10	pCi/L	03/01/17 12:55	03/07/17 16:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tc-99m	*93.6*		*30 - 110*	*03/01/17 12:55*	*03/07/17 16:28*	*1*

Client Sample ID: GW-BR04RB-021517-FD

Date Collected: 02/15/17 13:45
Date Received: 02/16/17 12:00

Lab Sample ID: 160-21079-8

Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.17	ug/L			02/20/17 17:42	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.10	ug/L			02/20/17 17:42	1
1,1,2-Trichloroethane	ND		1.0	0.13	ug/L			02/20/17 17:42	1
1,1-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 17:42	1

Client Sample ID: GW-BR04RB-021517-FD

Date Collected: 02/15/17 13:45
Date Received: 02/16/17 12:00

Lab Sample ID: 160-21079-8

Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	ND		1.0	0.070	ug/L			02/20/17 17:42	1
1,2,4-Trichlorobenzene	ND		1.0	0.10	ug/L			02/20/17 17:42	1
1,2-Dibromo-3-Chloropropane	ND		1.0	0.41	ug/L			02/20/17 17:42	1
1,2-Dichloroethane	ND		1.0	0.22	ug/L			02/20/17 17:42	1
1,2-Dichloroethene, Total	ND		2.0	0.14	ug/L			02/20/17 17:42	1
1,2-Dichloropropane	ND		1.0	0.10	ug/L			02/20/17 17:42	1
2-Butanone	ND		5.0	0.47	ug/L			02/20/17 17:42	1
2-Hexanone	ND		5.0	0.25	ug/L			02/20/17 17:42	1
4-Methyl-2-pentanone	ND		5.0	0.22	ug/L			02/20/17 17:42	1
Acetone	ND		2.0	0.55	ug/L			02/20/17 17:42	1
Benzene	ND		1.0	0.10	ug/L			02/20/17 17:42	1
Bromoform	ND		1.0	0.17	ug/L			02/20/17 17:42	1
Methyl bromide	ND		2.0	0.25	ug/L			02/20/17 17:42	1
Carbon disulfide	ND		1.0	0.10	ug/L			02/20/17 17:42	1
Carbon tetrachloride	ND		1.0	0.18	ug/L			02/20/17 17:42	1
Chlorobenzene	ND		1.0	0.11	ug/L			02/20/17 17:42	1
Chlorodibromomethane	ND		1.0	0.14	ug/L			02/20/17 17:42	1
Chloroethane	ND		2.0	0.16	ug/L			02/20/17 17:42	1
Chloroform	ND		1.0	0.10	ug/L			02/20/17 17:42	1
Chloromethane	ND		2.0	0.10	ug/L			02/20/17 17:42	1
cis-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 17:42	1
cis-1,3-Dichloropropene	ND		1.0	0.16	ug/L			02/20/17 17:42	1
Bromodichloromethane	ND		1.0	0.14	ug/L			02/20/17 17:42	1
Ethylbenzene	ND		1.0	0.12	ug/L			02/20/17 17:42	1
1,2-Dibromoethane	ND		1.0	0.13	ug/L			02/20/17 17:42	1
Methylene Chloride	ND		1.0	0.27	ug/L			02/20/17 17:42	1
n-Butanol	ND		50	12	ug/L			02/20/17 17:42	1
Styrene	ND		1.0	0.13	ug/L			02/20/17 17:42	1
Tetrachloroethene	ND		1.0	0.18	ug/L			02/20/17 17:42	1
Toluene	ND		1.0	0.14	ug/L			02/20/17 17:42	1
trans-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 17:42	1
trans-1,3-Dichloropropene	ND		1.0	0.10	ug/L			02/20/17 17:42	1
Trichloroethene	ND		1.0	0.25	ug/L			02/20/17 17:42	1
Vinyl acetate	ND		2.0	0.18	ug/L			02/20/17 17:42	1
Vinyl chloride	ND		2.0	0.19	ug/L			02/20/17 17:42	1
Xylenes, Total	ND		3.0	0.27	ug/L			02/20/17 17:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*75 - 129*		*02/20/17 17:42*	*1*
4-Bromofluorobenzene (Surr)	*105*		*81 - 130*		*02/20/17 17:42*	*1*
Dibromofluoromethane (Surr)	*94*		*81 - 124*		*02/20/17 17:42*	*1*
Toluene-d8 (Surr)	*106*		*87 - 128*		*02/20/17 17:42*	*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 238	**0.195**		0.0696	0.0715	0.100	0.0380	pCi/L	02/21/17 16:28	02/27/17 15:42	1
Uranium 234	**2.40**		0.241	0.314	0.100	0.0464	pCi/L	02/21/17 16:28	02/27/17 15:42	1
Uranium-235/236	0.000	U	0.00938	0.00938	0.100	0.0225	pCi/L	02/21/17 16:28	02/27/17 15:42	1

Client Sample ID: GW-BR04RB-021517-FD

Lab Sample ID: 160-21079-8

Date Collected: 02/15/17 13:45

Matrix: Water

Date Received: 02/16/17 12:00

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium 232	91.9		30 - 110	02/21/17 16:28	02/27/17 15:42	1

Method: TC-02-RC - Technetium-99 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	-0.963	U	1.12	1.13	3.00	1.96	pCi/L	03/01/17 12:55	03/07/17 18:47	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tc-99m	102		30 - 110	03/01/17 12:55	03/07/17 18:47	1

Client Sample ID: GW-NB80-021517

Lab Sample ID: 160-21079-9

Date Collected: 02/15/17 14:30

Matrix: Water

Date Received: 02/16/17 12:00

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.17	ug/L			02/20/17 18:07	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.10	ug/L			02/20/17 18:07	1
1,1,2-Trichloroethane	ND		1.0	0.13	ug/L			02/20/17 18:07	1
1,1-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 18:07	1
1,1-Dichloroethane	ND		1.0	0.070	ug/L			02/20/17 18:07	1
1,2,4-Trichlorobenzene	ND		1.0	0.10	ug/L			02/20/17 18:07	1
1,2-Dibromo-3-Chloropropane	ND		1.0	0.41	ug/L			02/20/17 18:07	1
1,2-Dichloroethane	ND		1.0	0.22	ug/L			02/20/17 18:07	1
1,2-Dichloroethene, Total	**30**		2.0	0.14	ug/L			02/20/17 18:07	1
1,2-Dichloropropane	ND		1.0	0.10	ug/L			02/20/17 18:07	1
2-Butanone	ND		5.0	0.47	ug/L			02/20/17 18:07	1
2-Hexanone	ND		5.0	0.25	ug/L			02/20/17 18:07	1
4-Methyl-2-pentanone	ND		5.0	0.22	ug/L			02/20/17 18:07	1
Acetone	ND		2.0	0.55	ug/L			02/20/17 18:07	1
Benzene	ND		1.0	0.10	ug/L			02/20/17 18:07	1
Bromoform	ND		1.0	0.17	ug/L			02/20/17 18:07	1
Methyl bromide	ND		2.0	0.25	ug/L			02/20/17 18:07	1
Carbon disulfide	ND		1.0	0.10	ug/L			02/20/17 18:07	1
Carbon tetrachloride	ND		1.0	0.18	ug/L			02/20/17 18:07	1
Chlorobenzene	ND		1.0	0.11	ug/L			02/20/17 18:07	1
Chlorodibromomethane	ND		1.0	0.14	ug/L			02/20/17 18:07	1
Chloroethane	ND		2.0	0.16	ug/L			02/20/17 18:07	1
Chloroform	ND		1.0	0.10	ug/L			02/20/17 18:07	1
Chloromethane	ND		2.0	0.10	ug/L			02/20/17 18:07	1
cis-1,2-Dichloroethene	**29**		1.0	0.10	ug/L			02/20/17 18:07	1
cis-1,3-Dichloropropene	ND		1.0	0.16	ug/L			02/20/17 18:07	1
Bromodichloromethane	ND		1.0	0.14	ug/L			02/20/17 18:07	1
Ethylbenzene	ND		1.0	0.12	ug/L			02/20/17 18:07	1
1,2-Dibromoethane	ND		1.0	0.13	ug/L			02/20/17 18:07	1
Methylene Chloride	ND		1.0	0.27	ug/L			02/20/17 18:07	1
n-Butanol	ND		50	12	ug/L			02/20/17 18:07	1
Styrene	ND		1.0	0.13	ug/L			02/20/17 18:07	1
Tetrachloroethene	ND		1.0	0.18	ug/L			02/20/17 18:07	1
Toluene	ND		1.0	0.14	ug/L			02/20/17 18:07	1

Client Sample ID: GW-NB80-021517

Date Collected: 02/15/17 14:30
Date Received: 02/16/17 12:00

Lab Sample ID: 160-21079-9
Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,2-Dichloroethene	**0.60**	**J**	1.0	0.10	ug/L			02/20/17 18:07	1
trans-1,3-Dichloropropene	ND		1.0	0.10	ug/L			02/20/17 18:07	1
Trichloroethene	**0.42**	**J**	1.0	0.25	ug/L			02/20/17 18:07	1
Vinyl acetate	ND		2.0	0.18	ug/L			02/20/17 18:07	1
Vinyl chloride	**3.5**		2.0	0.19	ug/L			02/20/17 18:07	1
Xylenes, Total	ND		3.0	0.27	ug/L			02/20/17 18:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*75 - 129*		*02/20/17 18:07*	*1*
4-Bromofluorobenzene (Surr)	*105*		*81 - 130*		*02/20/17 18:07*	*1*
Dibromofluoromethane (Surr)	*102*		*81 - 124*		*02/20/17 18:07*	*1*
Toluene-d8 (Surr)	*107*		*87 - 128*		*02/20/17 18:07*	*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 238	**0.0269**		0.0269	0.0270	0.100	0.0201	pCi/L	02/21/17 16:28	02/27/17 15:42	1
Uranium 234	**0.0269**		0.0269	0.0270	0.100	0.0202	pCi/L	02/21/17 16:28	02/27/17 15:42	1
Uranium-235/236	0.00837	U	0.0167	0.0168	0.100	0.0251	pCi/L	02/21/17 16:28	02/27/17 15:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium 232	*97.9*		*30 - 110*	*02/21/17 16:28*	*02/27/17 15:42*	*1*

Method: TC-02-RC - Technetium-99 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	-1.30	U	1.11	1.12	3.00	1.97	pCi/L	03/01/17 12:55	03/07/17 19:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tc-99m	*102*		*30 - 110*	*03/01/17 12:55*	*03/07/17 19:34*	*1*

Client Sample ID: GW-NB50-021517

Date Collected: 02/15/17 15:10
Date Received: 02/16/17 12:00

Lab Sample ID: 160-21079-10
Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.17	ug/L			02/20/17 18:32	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.10	ug/L			02/20/17 18:32	1
1,1,2-Trichloroethane	ND		1.0	0.13	ug/L			02/20/17 18:32	1
1,1-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 18:32	1
1,1-Dichloroethane	ND		1.0	0.070	ug/L			02/20/17 18:32	1
1,2,4-Trichlorobenzene	ND		1.0	0.10	ug/L			02/20/17 18:32	1
1,2-Dibromo-3-Chloropropane	ND		1.0	0.41	ug/L			02/20/17 18:32	1
1,2-Dichloroethane	ND		1.0	0.22	ug/L			02/20/17 18:32	1
1,2-Dichloroethene, Total	ND		2.0	0.14	ug/L			02/20/17 18:32	1
1,2-Dichloropropane	ND		1.0	0.10	ug/L			02/20/17 18:32	1
2-Butanone	ND		5.0	0.47	ug/L			02/20/17 18:32	1
2-Hexanone	ND		5.0	0.25	ug/L			02/20/17 18:32	1

Client Sample ID: GW-NB50-021517

Lab Sample ID: 160-21079-10

Date Collected: 02/15/17 15:10

Matrix: Water

Date Received: 02/16/17 12:00

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Methyl-2-pentanone	ND		5.0	0.22	ug/L			02/20/17 18:32	1
Acetone	**1.7**	**J**	2.0	0.55	ug/L			02/20/17 18:32	1
Benzene	ND		1.0	0.10	ug/L			02/20/17 18:32	1
Bromoform	ND		1.0	0.17	ug/L			02/20/17 18:32	1
Methyl bromide	ND		2.0	0.25	ug/L			02/20/17 18:32	1
Carbon disulfide	ND		1.0	0.10	ug/L			02/20/17 18:32	1
Carbon tetrachloride	ND		1.0	0.18	ug/L			02/20/17 18:32	1
Chlorobenzene	ND		1.0	0.11	ug/L			02/20/17 18:32	1
Chlorodibromomethane	ND		1.0	0.14	ug/L			02/20/17 18:32	1
Chloroethane	ND		2.0	0.16	ug/L			02/20/17 18:32	1
Chloroform	ND		1.0	0.10	ug/L			02/20/17 18:32	1
Chloromethane	ND		2.0	0.10	ug/L			02/20/17 18:32	1
cis-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 18:32	1
cis-1,3-Dichloropropene	ND		1.0	0.16	ug/L			02/20/17 18:32	1
Bromodichloromethane	ND		1.0	0.14	ug/L			02/20/17 18:32	1
Ethylbenzene	ND		1.0	0.12	ug/L			02/20/17 18:32	1
1,2-Dibromoethane	ND		1.0	0.13	ug/L			02/20/17 18:32	1
Methylene Chloride	ND		1.0	0.27	ug/L			02/20/17 18:32	1
n-Butanol	ND		50	12	ug/L			02/20/17 18:32	1
Styrene	ND		1.0	0.13	ug/L			02/20/17 18:32	1
Tetrachloroethene	ND		1.0	0.18	ug/L			02/20/17 18:32	1
Toluene	ND		1.0	0.14	ug/L			02/20/17 18:32	1
trans-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 18:32	1
trans-1,3-Dichloropropene	ND		1.0	0.10	ug/L			02/20/17 18:32	1
Trichloroethene	ND		1.0	0.25	ug/L			02/20/17 18:32	1
Vinyl acetate	ND		2.0	0.18	ug/L			02/20/17 18:32	1
Vinyl chloride	ND		2.0	0.19	ug/L			02/20/17 18:32	1
Xylenes, Total	ND		3.0	0.27	ug/L			02/20/17 18:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*75 - 129*		*02/20/17 18:32*	*1*
4-Bromofluorobenzene (Surr)	*104*		*81 - 130*		*02/20/17 18:32*	*1*
Dibromofluoromethane (Surr)	*99*		*81 - 124*		*02/20/17 18:32*	*1*
Toluene-d8 (Surr)	*105*		*87 - 128*		*02/20/17 18:32*	*1*

Client Sample ID: GW-NB57A-021517

Lab Sample ID: 160-21079-11

Date Collected: 02/15/17 15:55

Matrix: Water

Date Received: 02/16/17 12:00

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.17	ug/L			02/20/17 18:57	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.10	ug/L			02/20/17 18:57	1
1,1,2-Trichloroethane	ND		1.0	0.13	ug/L			02/20/17 18:57	1
1,1-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 18:57	1
1,1-Dichloroethane	ND		1.0	0.070	ug/L			02/20/17 18:57	1
1,2,4-Trichlorobenzene	ND		1.0	0.10	ug/L			02/20/17 18:57	1
1,2-Dibromo-3-Chloropropane	ND		1.0	0.41	ug/L			02/20/17 18:57	1
1,2-Dichloroethane	ND		1.0	0.22	ug/L			02/20/17 18:57	1
1,2-Dichloroethene, Total	ND		2.0	0.14	ug/L			02/20/17 18:57	1

Client Sample ID: GW-NB57A-021517

Date Collected: 02/15/17 15:55
Date Received: 02/16/17 12:00

Lab Sample ID: 160-21079-11

Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		1.0	0.10	ug/L			02/20/17 18:57	1
2-Butanone	ND		5.0	0.47	ug/L			02/20/17 18:57	1
2-Hexanone	ND		5.0	0.25	ug/L			02/20/17 18:57	1
4-Methyl-2-pentanone	ND		5.0	0.22	ug/L			02/20/17 18:57	1
Acetone	**0.57**	**J**	2.0	0.55	ug/L			02/20/17 18:57	1
Benzene	ND		1.0	0.10	ug/L			02/20/17 18:57	1
Bromoform	ND		1.0	0.17	ug/L			02/20/17 18:57	1
Methyl bromide	ND		2.0	0.25	ug/L			02/20/17 18:57	1
Carbon disulfide	ND		1.0	0.10	ug/L			02/20/17 18:57	1
Carbon tetrachloride	ND		1.0	0.18	ug/L			02/20/17 18:57	1
Chlorobenzene	ND		1.0	0.11	ug/L			02/20/17 18:57	1
Chlorodibromomethane	ND		1.0	0.14	ug/L			02/20/17 18:57	1
Chloroethane	ND		2.0	0.16	ug/L			02/20/17 18:57	1
Chloroform	ND		1.0	0.10	ug/L			02/20/17 18:57	1
Chloromethane	ND		2.0	0.10	ug/L			02/20/17 18:57	1
cis-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 18:57	1
cis-1,3-Dichloropropene	ND		1.0	0.16	ug/L			02/20/17 18:57	1
Bromodichloromethane	ND		1.0	0.14	ug/L			02/20/17 18:57	1
Ethylbenzene	ND		1.0	0.12	ug/L			02/20/17 18:57	1
1,2-Dibromoethane	ND		1.0	0.13	ug/L			02/20/17 18:57	1
Methylene Chloride	ND		1.0	0.27	ug/L			02/20/17 18:57	1
n-Butanol	ND		50	12	ug/L			02/20/17 18:57	1
Styrene	ND		1.0	0.13	ug/L			02/20/17 18:57	1
Tetrachloroethene	ND		1.0	0.18	ug/L			02/20/17 18:57	1
Toluene	ND		1.0	0.14	ug/L			02/20/17 18:57	1
trans-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 18:57	1
trans-1,3-Dichloropropene	ND		1.0	0.10	ug/L			02/20/17 18:57	1
Trichloroethene	ND		1.0	0.25	ug/L			02/20/17 18:57	1
Vinyl acetate	ND		2.0	0.18	ug/L			02/20/17 18:57	1
Vinyl chloride	ND		2.0	0.19	ug/L			02/20/17 18:57	1
Xylenes, Total	ND		3.0	0.27	ug/L			02/20/17 18:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*75 - 129*		*02/20/17 18:57*	*1*
4-Bromofluorobenzene (Surr)	*105*		*81 - 130*		*02/20/17 18:57*	*1*
Dibromofluoromethane (Surr)	*105*		*81 - 124*		*02/20/17 18:57*	*1*
Toluene-d8 (Surr)	*108*		*87 - 128*		*02/20/17 18:57*	*1*

Surrogate Summary

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-21079-1

Method: 8260C - Volatile Organic Compounds (GC/MS)

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

		Percent Surrogate Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	12DCE (75-129)	BFB (81-130)	DBFM (81-124)	TOL (87-128)
160-21079-1	TB-021517	95	106	99	105
160-21079-2	GW-BR05RB-021517	96	102	97	106
160-21079-3	GW-BR11JC-021517	96	106	101	106
160-21079-4	GW-BR02JC-021517	100	107	103	106
160-21079-5	GW-BR02RB-021517	94	102	97	104
160-21079-6	GW-NB71-021517	98	105	101	107
160-21079-7	GW-BR04RB-021517	96	105	95	105
160-21079-7 MS	GW-BR04RB-021517	92	104	100	105
160-21079-7 MSD	GW-BR04RB-021517	92	105	98	106
160-21079-8	GW-BR04RB-021517-FD	96	105	94	106
160-21079-9	GW-NB80-021517	98	105	102	107
160-21079-10	GW-NB50-021517	102	104	99	105
160-21079-11	GW-NB57A-021517	102	105	105	108
LCS 160-293176/5	Lab Control Sample	97	106	101	105
LCSD 160-293176/6	Lab Control Sample Dup	96	106	101	104
MB 160-293176/8	Method Blank	95	106	95	106

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Tracer/Carrier Summary

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-21079-1

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

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

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	U-232 (30-110)
160-21079-6	GW-NB71-021517	105
160-21079-7	GW-BR04RB-021517	89.1
160-21079-7 MS	GW-BR04RB-021517	104
160-21079-7 MSD	GW-BR04RB-021517	93.7
160-21079-8	GW-BR04RB-021517-FD	91.9
160-21079-9	GW-NB80-021517	97.9
LCS 160-293762/2-A	Lab Control Sample	97.3
MB 160-293762/1-A	Method Blank	96.8

Tracer/Carrier Legend

U-232 = Uranium 232

Method: TC-02-RC - Technetium-99 (LSC)

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

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Tc-99m (30-110)
160-21079-6	GW-NB71-021517	101
160-21079-7	GW-BR04RB-021517	93.6
160-21079-7 MS	GW-BR04RB-021517	93.1
160-21079-7 MSD	GW-BR04RB-021517	96.1
160-21079-8	GW-BR04RB-021517-FD	102
160-21079-9	GW-NB80-021517	102
LCS 160-295318/2-A	Lab Control Sample	95.7
MB 160-295318/1-A	Method Blank	109

Tracer/Carrier Legend

Tc-99m = Tc-99m

Method: 8260C - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-293176/8
Matrix: Water
Analysis Batch: 293176

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.17	ug/L			02/20/17 11:47	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.10	ug/L			02/20/17 11:47	1
1,1,2-Trichloroethane	ND		1.0	0.13	ug/L			02/20/17 11:47	1
1,1-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 11:47	1
1,1-Dichloroethane	ND		1.0	0.070	ug/L			02/20/17 11:47	1
1,2,4-Trichlorobenzene	ND		1.0	0.10	ug/L			02/20/17 11:47	1
1,2-Dibromo-3-Chloropropane	ND		1.0	0.41	ug/L			02/20/17 11:47	1
1,2-Dichloroethane	ND		1.0	0.22	ug/L			02/20/17 11:47	1
1,2-Dichloroethene, Total	ND		2.0	0.14	ug/L			02/20/17 11:47	1
1,2-Dichloropropane	ND		1.0	0.10	ug/L			02/20/17 11:47	1
2-Butanone	ND		5.0	0.47	ug/L			02/20/17 11:47	1
2-Hexanone	ND		5.0	0.25	ug/L			02/20/17 11:47	1
4-Methyl-2-pentanone	ND		5.0	0.22	ug/L			02/20/17 11:47	1
Acetone	ND		2.0	0.55	ug/L			02/20/17 11:47	1
Benzene	ND		1.0	0.10	ug/L			02/20/17 11:47	1
Bromoform	ND		1.0	0.17	ug/L			02/20/17 11:47	1
Methyl bromide	ND		2.0	0.25	ug/L			02/20/17 11:47	1
Carbon disulfide	ND		1.0	0.10	ug/L			02/20/17 11:47	1
Carbon tetrachloride	ND		1.0	0.18	ug/L			02/20/17 11:47	1
Chlorobenzene	ND		1.0	0.11	ug/L			02/20/17 11:47	1
Chlorodibromomethane	ND		1.0	0.14	ug/L			02/20/17 11:47	1
Chloroethane	ND		2.0	0.16	ug/L			02/20/17 11:47	1
Chloroform	ND		1.0	0.10	ug/L			02/20/17 11:47	1
Chloromethane	ND		2.0	0.10	ug/L			02/20/17 11:47	1
cis-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 11:47	1
cis-1,3-Dichloropropene	ND		1.0	0.16	ug/L			02/20/17 11:47	1
Bromodichloromethane	ND		1.0	0.14	ug/L			02/20/17 11:47	1
Ethylbenzene	ND		1.0	0.12	ug/L			02/20/17 11:47	1
1,2-Dibromoethane	ND		1.0	0.13	ug/L			02/20/17 11:47	1
Methylene Chloride	ND		1.0	0.27	ug/L			02/20/17 11:47	1
n-Butanol	ND		50	12	ug/L			02/20/17 11:47	1
Styrene	ND		1.0	0.13	ug/L			02/20/17 11:47	1
Tetrachloroethene	ND		1.0	0.18	ug/L			02/20/17 11:47	1
Toluene	ND		1.0	0.14	ug/L			02/20/17 11:47	1
trans-1,2-Dichloroethene	ND		1.0	0.10	ug/L			02/20/17 11:47	1
trans-1,3-Dichloropropene	ND		1.0	0.10	ug/L			02/20/17 11:47	1
Trichloroethene	ND		1.0	0.25	ug/L			02/20/17 11:47	1
Vinyl acetate	ND		2.0	0.18	ug/L			02/20/17 11:47	1
Vinyl chloride	ND		2.0	0.19	ug/L			02/20/17 11:47	1
Xylenes, Total	ND		3.0	0.27	ug/L			02/20/17 11:47	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*75 - 129*		*02/20/17 11:47*	*1*
4-Bromofluorobenzene (Surr)	*106*		*81 - 130*		*02/20/17 11:47*	*1*
Dibromofluoromethane (Surr)	*95*		*81 - 124*		*02/20/17 11:47*	*1*
Toluene-d8 (Surr)	*106*		*87 - 128*		*02/20/17 11:47*	*1*

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-293176/5
Matrix: Water
Analysis Batch: 293176

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	10.0	10.1		ug/L		101	85 - 116
1,1,2,2-Tetrachloroethane	10.0	10.3		ug/L		103	80 - 120
1,1,2-Trichloroethane	10.0	10.0		ug/L		100	80 - 120
1,1-Dichloroethene	10.0	10.2		ug/L		102	80 - 120
1,1-Dichloroethane	10.0	9.80		ug/L		98	80 - 120
1,2,4-Trichlorobenzene	10.0	10.6		ug/L		106	75 - 121
1,2-Dibromo-3-Chloropropane	10.0	11.3		ug/L		113	73 - 123
1,2-Dichloroethane	10.0	9.78		ug/L		98	80 - 115
1,2-Dichloroethene, Total	20.0	20.4		ug/L		102	80 - 120
1,2-Dichloropropane	10.0	10.1		ug/L		101	80 - 120
2-Butanone	10.0	9.75		ug/L		97	67 - 127
2-Hexanone	10.0	10.9		ug/L		109	70 - 123
4-Methyl-2-pentanone	10.0	9.94		ug/L		99	75 - 126
Acetone	10.0	11.2		ug/L		112	69 - 129
Benzene	10.0	9.70		ug/L		97	80 - 120
Bromoform	10.0	10.6		ug/L		106	80 - 120
Methyl bromide	10.0	9.46		ug/L		95	70 - 124
Carbon disulfide	10.0	9.97		ug/L		100	80 - 121
Carbon tetrachloride	10.0	10.2		ug/L		102	83 - 125
Chlorobenzene	10.0	9.65		ug/L		96	80 - 120
Chlorodibromomethane	10.0	10.6		ug/L		106	80 - 120
Chloroethane	10.0	9.37		ug/L		94	73 - 119
Chloroform	10.0	9.80		ug/L		98	80 - 120
Chloromethane	10.0	9.55		ug/L		96	72 - 124
cis-1,2-Dichloroethene	10.0	10.2		ug/L		102	80 - 120
cis-1,3-Dichloropropene	10.0	11.5		ug/L		115	80 - 120
Bromodichloromethane	10.0	10.2		ug/L		102	80 - 120
Ethylbenzene	10.0	10.1		ug/L		101	80 - 120
1,2-Dibromoethane	10.0	10.6		ug/L		106	80 - 120
Methylene Chloride	10.0	9.62		ug/L		96	80 - 120
n-Butanol	250	258		ug/L		103	62 - 128
Styrene	10.0	11.3		ug/L		113	81 - 133
Tetrachloroethene	10.0	10.1		ug/L		101	83 - 123
Toluene	10.0	10.3		ug/L		103	80 - 120
trans-1,2-Dichloroethene	10.0	10.2		ug/L		102	80 - 120
trans-1,3-Dichloropropene	10.0	11.6		ug/L		116	82 - 124
Trichloroethene	10.0	9.66		ug/L		97	80 - 120
Vinyl acetate	10.0	13.4		ug/L		134	63 - 140
Vinyl chloride	10.0	9.81		ug/L		98	77 - 122

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*75 - 129*
4-Bromofluorobenzene (Surr)	*106*		*81 - 130*
Dibromofluoromethane (Surr)	*101*		*81 - 124*
Toluene-d8 (Surr)	*105*		*87 - 128*

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 160-293176/6
Matrix: Water
Analysis Batch: 293176

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

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane			10.0	10.1		ug/L		101	85 - 116	0	20
1,1,2,2-Tetrachloroethane			10.0	10.4		ug/L		104	80 - 120	2	20
1,1,2-Trichloroethane			10.0	9.94		ug/L		99	80 - 120	1	20
1,1-Dichloroethene			10.0	10.1		ug/L		101	80 - 120	1	20
1,1-Dichloroethane			10.0	9.75		ug/L		98	80 - 120	1	20
1,2,4-Trichlorobenzene			10.0	10.6		ug/L		106	75 - 121	0	20
1,2-Dibromo-3-Chloropropane			10.0	11.2		ug/L		112	73 - 123	1	20
1,2-Dichloroethane			10.0	9.82		ug/L		98	80 - 115	0	20
1,2-Dichloroethene, Total			20.0	20.3		ug/L		102	80 - 120	0	20
1,2-Dichloropropane			10.0	10.1		ug/L		101	80 - 120	0	20
2-Butanone			10.0	10.1		ug/L		101	67 - 127	4	20
2-Hexanone			10.0	11.0		ug/L		110	70 - 123	1	20
4-Methyl-2-pentanone			10.0	9.87		ug/L		99	75 - 126	1	20
Acetone			10.0	10.9		ug/L		109	69 - 129	2	20
Benzene			10.0	9.74		ug/L		97	80 - 120	0	20
Bromoform			10.0	10.7		ug/L		107	80 - 120	1	20
Methyl bromide			10.0	9.51		ug/L		95	70 - 124	1	20
Carbon disulfide			10.0	9.99		ug/L		100	80 - 121	0	20
Carbon tetrachloride			10.0	10.0		ug/L		100	83 - 125	2	20
Chlorobenzene			10.0	9.62		ug/L		96	80 - 120	0	20
Chlorodibromomethane			10.0	10.7		ug/L		107	80 - 120	1	20
Chloroethane			10.0	9.35		ug/L		93	73 - 119	0	20
Chloroform			10.0	9.80		ug/L		98	80 - 120	0	20
Chloromethane			10.0	9.24		ug/L		92	72 - 124	3	20
cis-1,2-Dichloroethene			10.0	10.2		ug/L		102	80 - 120	0	20
cis-1,3-Dichloropropene			10.0	11.4		ug/L		114	80 - 120	1	20
Bromodichloromethane			10.0	10.1		ug/L		101	80 - 120	1	20
Ethylbenzene			10.0	10.0		ug/L		100	80 - 120	1	20
1,2-Dibromoethane			10.0	10.6		ug/L		106	80 - 120	0	20
Methylene Chloride			10.0	9.61		ug/L		96	80 - 120	0	20
n-Butanol			250	253		ug/L		101	62 - 128	2	20
Styrene			10.0	11.2		ug/L		112	81 - 133	1	20
Tetrachloroethene			10.0	10.1		ug/L		101	83 - 123	0	20
Toluene			10.0	10.4		ug/L		104	80 - 120	1	20
trans-1,2-Dichloroethene			10.0	10.1		ug/L		101	80 - 120	0	20
trans-1,3-Dichloropropene			10.0	11.5		ug/L		115	82 - 124	0	20
Trichloroethene			10.0	9.58		ug/L		96	80 - 120	1	20
Vinyl acetate			10.0	13.3		ug/L		133	63 - 140	0	20
Vinyl chloride			10.0	9.78		ug/L		98	77 - 122	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*75 - 129*
4-Bromofluorobenzene (Surr)	*106*		*81 - 130*
Dibromofluoromethane (Surr)	*101*		*81 - 124*
Toluene-d8 (Surr)	*104*		*87 - 128*

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-21079-7 MS
Matrix: Water
Analysis Batch: 293176

Client Sample ID: GW-BR04RB-021517
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	ND		10.0	10.3		ug/L		103	82 - 124
1,1,2,2-Tetrachloroethane	ND		10.0	9.58		ug/L		96	75 - 121
1,1,2-Trichloroethane	ND		10.0	9.41		ug/L		94	80 - 120
1,1-Dichloroethene	ND		10.0	10.2		ug/L		102	80 - 120
1,1-Dichloroethane	ND		10.0	9.84		ug/L		98	80 - 122
1,2,4-Trichlorobenzene	ND		10.0	10.5		ug/L		105	74 - 120
1,2-Dibromo-3-Chloropropane	ND		10.0	9.68		ug/L		97	64 - 130
1,2-Dichloroethane	ND		10.0	9.49		ug/L		95	80 - 120
1,2-Dichloroethene, Total	ND		20.0	20.4		ug/L		102	80 - 120
1,2-Dichloropropane	ND		10.0	10.1		ug/L		101	80 - 120
2-Butanone	ND		10.0	8.42		ug/L		84	53 - 145
2-Hexanone	ND		10.0	8.79		ug/L		88	59 - 132
4-Methyl-2-pentanone	ND		10.0	8.35		ug/L		84	70 - 131
Acetone	ND		10.0	9.61		ug/L		96	50 - 137
Benzene	ND		10.0	9.98		ug/L		100	80 - 120
Bromoform	ND		10.0	9.68		ug/L		97	81 - 121
Methyl bromide	ND		10.0	7.32		ug/L		73	55 - 137
Carbon disulfide	ND		10.0	10.2		ug/L		102	80 - 121
Carbon tetrachloride	ND		10.0	10.3		ug/L		103	77 - 131
Chlorobenzene	ND		10.0	9.82		ug/L		98	80 - 120
Chlorodibromomethane	ND		10.0	10.1		ug/L		101	84 - 123
Chloroethane	ND		10.0	9.52		ug/L		95	71 - 126
Chloroform	ND		10.0	9.72		ug/L		97	80 - 120
Chloromethane	ND		10.0	10.1		ug/L		101	62 - 132
cis-1,2-Dichloroethene	ND		10.0	10.2		ug/L		102	80 - 120
cis-1,3-Dichloropropene	ND		10.0	10.7		ug/L		107	83 - 127
Bromodichloromethane	ND		10.0	9.97		ug/L		100	80 - 120
Ethylbenzene	ND		10.0	10.4		ug/L		104	84 - 125
1,2-Dibromoethane	ND		10.0	9.52		ug/L		95	82 - 122
Methylene Chloride	ND		10.0	9.54		ug/L		95	80 - 120
n-Butanol	ND		250	216		ug/L		86	58 - 144
Styrene	ND		10.0	11.3		ug/L		113	77 - 139
Tetrachloroethene	ND		10.0	10.4		ug/L		104	80 - 126
Toluene	ND		10.0	10.5		ug/L		105	85 - 123
trans-1,2-Dichloroethene	ND		10.0	10.2		ug/L		102	80 - 120
trans-1,3-Dichloropropene	ND		10.0	10.7		ug/L		107	83 - 125
Trichloroethene	ND		10.0	9.78		ug/L		98	81 - 125
Vinyl acetate	ND		10.0	13.2		ug/L		132	58 - 150
Vinyl chloride	ND		10.0	9.83		ug/L		98	70 - 129

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*92*		*75 - 129*
4-Bromofluorobenzene (Surr)	*104*		*81 - 130*
Dibromofluoromethane (Surr)	*100*		*81 - 124*
Toluene-d8 (Surr)	*105*		*87 - 128*

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-21079-7 MSD
Matrix: Water
Analysis Batch: 293176

Client Sample ID: GW-BR04RB-021517
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	ND		10.0	10.2		ug/L		102	82 - 124	1	20
1,1,2,2-Tetrachloroethane	ND		10.0	9.47		ug/L		95	75 - 121	1	20
1,1,2-Trichloroethane	ND		10.0	9.22		ug/L		92	80 - 120	2	20
1,1-Dichloroethene	ND		10.0	10.2		ug/L		102	80 - 120	1	20
1,1-Dichloroethane	ND		10.0	9.79		ug/L		98	80 - 122	1	20
1,2,4-Trichlorobenzene	ND		10.0	10.4		ug/L		104	74 - 120	1	20
1,2-Dibromo-3-Chloropropane	ND		10.0	9.89		ug/L		99	64 - 130	2	20
1,2-Dichloroethane	ND		10.0	9.27		ug/L		93	80 - 120	2	20
1,2-Dichloroethene, Total	ND		20.0	20.3		ug/L		102	80 - 120	0	20
1,2-Dichloropropane	ND		10.0	9.88		ug/L		99	80 - 120	2	20
2-Butanone	ND		10.0	7.95		ug/L		80	53 - 145	6	20
2-Hexanone	ND		10.0	9.06		ug/L		91	59 - 132	3	20
4-Methyl-2-pentanone	ND		10.0	8.40		ug/L		84	70 - 131	1	20
Acetone	ND		10.0	8.85		ug/L		88	50 - 137	8	20
Benzene	ND		10.0	9.77		ug/L		98	80 - 120	2	20
Bromoform	ND		10.0	9.57		ug/L		96	81 - 121	1	20
Methyl bromide	ND		10.0	8.17		ug/L		82	55 - 137	11	20
Carbon disulfide	ND		10.0	10.0		ug/L		100	80 - 121	1	20
Carbon tetrachloride	ND		10.0	10.2		ug/L		102	77 - 131	1	20
Chlorobenzene	ND		10.0	9.72		ug/L		97	80 - 120	1	20
Chlorodibromomethane	ND		10.0	9.86		ug/L		99	84 - 123	2	20
Chloroethane	ND		10.0	9.39		ug/L		94	71 - 126	1	20
Chloroform	ND		10.0	9.58		ug/L		96	80 - 120	1	20
Chloromethane	ND		10.0	9.64		ug/L		96	62 - 132	4	20
cis-1,2-Dichloroethene	ND		10.0	10.1		ug/L		101	80 - 120	1	20
cis-1,3-Dichloropropene	ND		10.0	10.7		ug/L		107	83 - 127	0	20
Bromodichloromethane	ND		10.0	9.89		ug/L		99	80 - 120	1	20
Ethylbenzene	ND		10.0	10.3		ug/L		103	84 - 125	1	20
1,2-Dibromoethane	ND		10.0	9.54		ug/L		95	82 - 122	0	20
Methylene Chloride	ND		10.0	9.47		ug/L		95	80 - 120	1	20
n-Butanol	ND		250	215		ug/L		86	58 - 144	0	20
Styrene	ND		10.0	11.3		ug/L		113	77 - 139	1	20
Tetrachloroethene	ND		10.0	10.3		ug/L		103	80 - 126	1	20
Toluene	ND		10.0	10.5		ug/L		105	85 - 123	0	20
trans-1,2-Dichloroethene	ND		10.0	10.2		ug/L		102	80 - 120	0	20
trans-1,3-Dichloropropene	ND		10.0	10.7		ug/L		107	83 - 125	0	20
Trichloroethene	ND		10.0	9.64		ug/L		96	81 - 125	1	20
Vinyl acetate	ND		10.0	13.1		ug/L		131	58 - 150	0	20
Vinyl chloride	ND		10.0	9.79		ug/L		98	70 - 129	0	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*92*		*75 - 129*
4-Bromofluorobenzene (Surr)	*105*		*81 - 130*
Dibromofluoromethane (Surr)	*98*		*81 - 124*
Toluene-d8 (Surr)	*106*		*87 - 128*

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

Lab Sample ID: MB 160-293762/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 294919 — **Prep Batch: 293762**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium 238	0.01239	U	0.0175	0.0176	0.100	0.0186	pCi/L	02/21/17 16:28	02/27/17 15:42	1
Uranium 234	-0.003879	U	0.00776	0.00777	0.100	0.0392	pCi/L	02/21/17 16:28	02/27/17 15:42	1
Uranium-235/236	0.002896	U	0.0182	0.0182	0.100	0.0488	pCi/L	02/21/17 16:28	02/27/17 15:42	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium 232	*96.8*		*30 - 110*	*02/21/17 16:28*	*02/27/17 15:42*	*1*

Lab Sample ID: LCS 160-293762/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 294920 — **Prep Batch: 293762**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium 238			6.51	6.666		0.688	0.100	0.0180	pCi/L	102	83 - 121		
Uranium 234			6.37	6.228		0.651	0.100	0.0527	pCi/L	98	84 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium 232	*97.3*		*30 - 110*

Lab Sample ID: 160-21079-7 MS — **Client Sample ID: GW-BR04RB-021517**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 294923 — **Prep Batch: 293762**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium 238	0.241		6.51	7.086		0.731	0.100	0.0191	pCi/L	105	68 - 143		
Uranium 234	2.43		6.36	9.028		0.898	0.100	0.0192	pCi/L	104	65 - 146		

Tracer	*MS %Yield*	*MS Qualifier*	*Limits*
Uranium 232	*104*		*30 - 110*

Lab Sample ID: 160-21079-7 MSD — **Client Sample ID: GW-BR04RB-021517**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 294924 — **Prep Batch: 293762**

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Uranium 238	0.241		6.51	6.641		0.687	0.100	0.0382	pCi/L	98	68 - 143	0.31	1
Uranium 234	2.43		6.37	8.404		0.838	0.100	0.0182	pCi/L	94	65 - 146	0.36	1

Tracer	*MSD %Yield*	*MSD Qualifier*	*Limits*
Uranium 232	*93.7*		*30 - 110*

Method: TC-02-RC - Technetium-99 (LSC)

Lab Sample ID: MB 160-295318/1-A
Matrix: Water
Analysis Batch: 296555

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 295318

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	-2.099	U	1.10	1.12	3.00	2.01	pCi/L	03/01/17 12:55	03/07/17 13:21	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tc-99m	*109*		*30 - 110*	*03/01/17 12:55*	*03/07/17 13:21*	*1*

Lab Sample ID: LCS 160-295318/2-A
Matrix: Water
Analysis Batch: 296555

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295318

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Technetium 99			206	207.2		20.4	3.00	2.06	pCi/L	101	75 - 125		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Tc-99m	*95.7*		*30 - 110*

Lab Sample ID: 160-21079-7 MS
Matrix: Water
Analysis Batch: 296555

Client Sample ID: GW-BR04RB-021517
Prep Type: Total/NA
Prep Batch: 295318

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Technetium 99	-0.962	U	206	212.7		20.9	3.00	2.13	pCi/L	103	68 - 121		

Tracer	*MS %Yield*	*MS Qualifier*	*Limits*
Tc-99m	*93.1*		*30 - 110*

Lab Sample ID: 160-21079-7 MSD
Matrix: Water
Analysis Batch: 296555

Client Sample ID: GW-BR04RB-021517
Prep Type: Total/NA
Prep Batch: 295318

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Technetium 99	-0.962	U	206	201.6		19.8	3.00	2.05	pCi/L	98	68 - 121	0.27	1

Tracer	*MSD %Yield*	*MSD Qualifier*	*Limits*
Tc-99m	*96.1*		*30 - 110*

QC Association Summary

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-21079-1

GC/MS VOA

Analysis Batch: 293176

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21079-1	TB-021517	Total/NA	Water	8260C	
160-21079-2	GW-BR05RB-021517	Total/NA	Water	8260C	
160-21079-3	GW-BR11JC-021517	Total/NA	Water	8260C	
160-21079-4	GW-BR02JC-021517	Total/NA	Water	8260C	
160-21079-5	GW-BR02RB-021517	Total/NA	Water	8260C	
160-21079-6	GW-NB71-021517	Total/NA	Water	8260C	
160-21079-7	GW-BR04RB-021517	Total/NA	Water	8260C	
160-21079-8	GW-BR04RB-021517-FD	Total/NA	Water	8260C	
160-21079-9	GW-NB80-021517	Total/NA	Water	8260C	
160-21079-10	GW-NB50-021517	Total/NA	Water	8260C	
160-21079-11	GW-NB57A-021517	Total/NA	Water	8260C	
MB 160-293176/8	Method Blank	Total/NA	Water	8260C	
LCS 160-293176/5	Lab Control Sample	Total/NA	Water	8260C	
LCSD 160-293176/6	Lab Control Sample Dup	Total/NA	Water	8260C	
160-21079-7 MS	GW-BR04RB-021517	Total/NA	Water	8260C	
160-21079-7 MSD	GW-BR04RB-021517	Total/NA	Water	8260C	

Rad

Prep Batch: 293762

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21079-6	GW-NB71-021517	Total/NA	Water	ExtChrom	
160-21079-7	GW-BR04RB-021517	Total/NA	Water	ExtChrom	
160-21079-8	GW-BR04RB-021517-FD	Total/NA	Water	ExtChrom	
160-21079-9	GW-NB80-021517	Total/NA	Water	ExtChrom	
MB 160-293762/1-A	Method Blank	Total/NA	Water	ExtChrom	
LCS 160-293762/2-A	Lab Control Sample	Total/NA	Water	ExtChrom	
160-21079-7 MS	GW-BR04RB-021517	Total/NA	Water	ExtChrom	
160-21079-7 MSD	GW-BR04RB-021517	Total/NA	Water	ExtChrom	

Prep Batch: 295318

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-21079-6	GW-NB71-021517	Total/NA	Water	Ext_Chrom_LSC	
160-21079-7	GW-BR04RB-021517	Total/NA	Water	Ext_Chrom_LSC	
160-21079-8	GW-BR04RB-021517-FD	Total/NA	Water	Ext_Chrom_LSC	
160-21079-9	GW-NB80-021517	Total/NA	Water	Ext_Chrom_LSC	
MB 160-295318/1-A	Method Blank	Total/NA	Water	Ext_Chrom_LSC	
LCS 160-295318/2-A	Lab Control Sample	Total/NA	Water	Ext_Chrom_LSC	
160-21079-7 MS	GW-BR04RB-021517	Total/NA	Water	Ext_Chrom_LSC	
160-21079-7 MSD	GW-BR04RB-021517	Total/NA	Water	Ext_Chrom_LSC	

Client Sample ID: TB-021517 — Lab Sample ID: 160-21079-1

Date Collected: 02/15/17 07:00 — **Matrix: Water**
Date Received: 02/16/17 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	293176	02/20/17 15:10	ADB	TAL SL

Client Sample ID: GW-BR05RB-021517 — Lab Sample ID: 160-21079-2

Date Collected: 02/15/17 08:15 — **Matrix: Water**
Date Received: 02/16/17 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	293176	02/20/17 15:35	ADB	TAL SL

Client Sample ID: GW-BR11JC-021517 — Lab Sample ID: 160-21079-3

Date Collected: 02/15/17 09:05 — **Matrix: Water**
Date Received: 02/16/17 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	293176	02/20/17 16:01	ADB	TAL SL

Client Sample ID: GW-BR02JC-021517 — Lab Sample ID: 160-21079-4

Date Collected: 02/15/17 09:45 — **Matrix: Water**
Date Received: 02/16/17 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	293176	02/20/17 16:26	ADB	TAL SL

Client Sample ID: GW-BR02RB-021517 — Lab Sample ID: 160-21079-5

Date Collected: 02/15/17 10:30 — **Matrix: Water**
Date Received: 02/16/17 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	293176	02/20/17 16:51	ADB	TAL SL

Client Sample ID: GW-NB71-021517 — Lab Sample ID: 160-21079-6

Date Collected: 02/15/17 12:40 — **Matrix: Water**
Date Received: 02/16/17 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	293176	02/20/17 17:17	ADB	TAL SL
Total/NA	Prep	ExtChrom			293762	02/21/17 16:28	PJM	TAL SL
Total/NA	Analysis	A-01-R		1	294921	02/27/17 15:42	ALD	TAL SL
Total/NA	Prep	Ext_Chrom_LSC			295318	03/01/17 12:55	MRB	TAL SL
Total/NA	Analysis	TC-02-RC		1	296555	03/07/17 15:41	ALD	TAL SL

Client Sample ID: GW-BR04RB-021517

Lab Sample ID: 160-21079-7

Date Collected: 02/15/17 13:45

Matrix: Water

Date Received: 02/16/17 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	293176	02/20/17 12:13	ADB	TAL SL
Total/NA	Prep	ExtChrom			293762	02/21/17 16:28	PJM	TAL SL
Total/NA	Analysis	A-01-R		1	295175	02/28/17 18:28	ALD	TAL SL
Total/NA	Prep	Ext_Chrom_LSC			295318	03/01/17 12:55	MRB	TAL SL
Total/NA	Analysis	TC-02-RC		1	296555	03/07/17 16:28	ALD	TAL SL

Client Sample ID: GW-BR04RB-021517-FD

Lab Sample ID: 160-21079-8

Date Collected: 02/15/17 13:45

Matrix: Water

Date Received: 02/16/17 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	293176	02/20/17 17:42	ADB	TAL SL
Total/NA	Prep	ExtChrom			293762	02/21/17 16:28	PJM	TAL SL
Total/NA	Analysis	A-01-R		1	294925	02/27/17 15:42	ALD	TAL SL
Total/NA	Prep	Ext_Chrom_LSC			295318	03/01/17 12:55	MRB	TAL SL
Total/NA	Analysis	TC-02-RC		1	296555	03/07/17 18:47	ALD	TAL SL

Client Sample ID: GW-NB80-021517

Lab Sample ID: 160-21079-9

Date Collected: 02/15/17 14:30

Matrix: Water

Date Received: 02/16/17 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	293176	02/20/17 18:07	ADB	TAL SL
Total/NA	Prep	ExtChrom			293762	02/21/17 16:28	PJM	TAL SL
Total/NA	Analysis	A-01-R		1	294926	02/27/17 15:42	ALD	TAL SL
Total/NA	Prep	Ext_Chrom_LSC			295318	03/01/17 12:55	MRB	TAL SL
Total/NA	Analysis	TC-02-RC		1	296555	03/07/17 19:34	ALD	TAL SL

Client Sample ID: GW-NB50-021517

Lab Sample ID: 160-21079-10

Date Collected: 02/15/17 15:10

Matrix: Water

Date Received: 02/16/17 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	293176	02/20/17 18:32	ADB	TAL SL

Client Sample ID: GW-NB57A-021517

Lab Sample ID: 160-21079-11

Date Collected: 02/15/17 15:55

Matrix: Water

Date Received: 02/16/17 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	293176	02/20/17 18:57	ADB	TAL SL

Laboratory References:

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

Certification Summary

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-21079-1

Laboratory: TestAmerica St. Louis

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Louisiana	NELAP	6	04080	06-30-17

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
8260C		Water	1,1,1-Trichloroethane
8260C		Water	1,1,2,2-Tetrachloroethane
8260C		Water	1,1,2-Trichloroethane
8260C		Water	1,1-Dichloroethane
8260C		Water	1,1-Dichloroethene
8260C		Water	1,2,4-Trichlorobenzene
8260C		Water	1,2-Dibromo-3-Chloropropane
8260C		Water	1,2-Dibromoethane
8260C		Water	1,2-Dichloroethane
8260C		Water	1,2-Dichloroethene, Total
8260C		Water	1,2-Dichloropropane
8260C		Water	2-Butanone
8260C		Water	2-Hexanone
8260C		Water	4-Methyl-2-pentanone
8260C		Water	Acetone
8260C		Water	Benzene
8260C		Water	Bromodichloromethane
8260C		Water	Bromoform
8260C		Water	Carbon disulfide
8260C		Water	Carbon tetrachloride
8260C		Water	Chlorobenzene
8260C		Water	Chlorodibromomethane
8260C		Water	Chloroethane
8260C		Water	Chloroform
8260C		Water	Chloromethane
8260C		Water	cis-1,2-Dichloroethene
8260C		Water	cis-1,3-Dichloropropene
8260C		Water	Ethylbenzene
8260C		Water	Methyl bromide
8260C		Water	Methylene Chloride
8260C		Water	n-Butanol
8260C		Water	Styrene
8260C		Water	Tetrachloroethene
8260C		Water	Toluene
8260C		Water	trans-1,2-Dichloroethene
8260C		Water	trans-1,3-Dichloropropene
8260C		Water	Trichloroethene
8260C		Water	Vinyl acetate
8260C		Water	Vinyl chloride
8260C		Water	Xylenes, Total
A-01-R	ExtChrom	Water	Uranium-235/236
TC-02-RC	Ext_Chrom_LSC	Water	Technetium 99

Missouri	State Program	7	780	06-30-17

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
8260C		Water	1,1,1-Trichloroethane

Laboratory: TestAmerica St. Louis (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Missouri	State Program	7	780	06-30-17

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
8260C		Water	1,1,2,2-Tetrachloroethane
8260C		Water	1,1,2-Trichloroethane
8260C		Water	1,1-Dichloroethane
8260C		Water	1,1-Dichloroethene
8260C		Water	1,2,4-Trichlorobenzene
8260C		Water	1,2-Dibromo-3-Chloropropane
8260C		Water	1,2-Dibromoethane
8260C		Water	1,2-Dichloroethane
8260C		Water	1,2-Dichloroethene, Total
8260C		Water	1,2-Dichloropropane
8260C		Water	2-Butanone
8260C		Water	2-Hexanone
8260C		Water	4-Methyl-2-pentanone
8260C		Water	Acetone
8260C		Water	Benzene
8260C		Water	Bromodichloromethane
8260C		Water	Bromoform
8260C		Water	Carbon disulfide
8260C		Water	Carbon tetrachloride
8260C		Water	Chlorobenzene
8260C		Water	Chlorodibromomethane
8260C		Water	Chloroethane
8260C		Water	Chloroform
8260C		Water	Chloromethane
8260C		Water	cis-1,2-Dichloroethene
8260C		Water	cis-1,3-Dichloropropene
8260C		Water	Ethylbenzene
8260C		Water	Methyl bromide
8260C		Water	Methylene Chloride
8260C		Water	n-Butanol
8260C		Water	Styrene
8260C		Water	Tetrachloroethene
8260C		Water	Toluene
8260C		Water	trans-1,2-Dichloroethene
8260C		Water	trans-1,3-Dichloropropene
8260C		Water	Trichloroethene
8260C		Water	Vinyl acetate
8260C		Water	Vinyl chloride
8260C		Water	Xylenes, Total
A-01-R	ExtChrom	Water	Uranium 234
A-01-R	ExtChrom	Water	Uranium 238
A-01-R	ExtChrom	Water	Uranium-235/236
TC-02-RC	Ext_Chrom_LSC	Water	Technetium 99

NRC	NRC		24-24817-01	12-31-22

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte

Laboratory: TestAmerica St. Louis (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
NRC	NRC		24-24817-01	12-31-22

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
8260C		Water	1,1,1-Trichloroethane
8260C		Water	1,1,2,2-Tetrachloroethane
8260C		Water	1,1,2-Trichloroethane
8260C		Water	1,1-Dichloroethane
8260C		Water	1,1-Dichloroethene
8260C		Water	1,2,4-Trichlorobenzene
8260C		Water	1,2-Dibromo-3-Chloropropane
8260C		Water	1,2-Dibromoethane
8260C		Water	1,2-Dichloroethane
8260C		Water	1,2-Dichloroethene, Total
8260C		Water	1,2-Dichloropropane
8260C		Water	2-Butanone
8260C		Water	2-Hexanone
8260C		Water	4-Methyl-2-pentanone
8260C		Water	Acetone
8260C		Water	Benzene
8260C		Water	Bromodichloromethane
8260C		Water	Bromoform
8260C		Water	Carbon disulfide
8260C		Water	Carbon tetrachloride
8260C		Water	Chlorobenzene
8260C		Water	Chlorodibromomethane
8260C		Water	Chloroethane
8260C		Water	Chloroform
8260C		Water	Chloromethane
8260C		Water	cis-1,2-Dichloroethene
8260C		Water	cis-1,3-Dichloropropene
8260C		Water	Ethylbenzene
8260C		Water	Methyl bromide
8260C		Water	Methylene Chloride
8260C		Water	n-Butanol
8260C		Water	Styrene
8260C		Water	Tetrachloroethene
8260C		Water	Toluene
8260C		Water	trans-1,2-Dichloroethene
8260C		Water	trans-1,3-Dichloropropene
8260C		Water	Trichloroethene
8260C		Water	Vinyl acetate
8260C		Water	Vinyl chloride
8260C		Water	Xylenes, Total
A-01-R	ExtChrom	Water	Uranium 234
A-01-R	ExtChrom	Water	Uranium 238
A-01-R	ExtChrom	Water	Uranium-235/236
TC-02-RC	Ext_Chrom_LSC	Water	Technetium 99

Method Summary

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-21079-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds (GC/MS)	SW846	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
TC-02-RC	Technetium-99 Tracers	DOE	TAL SL
TC-02-RC	Technetium-99 (LSC)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

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

Laboratory References:

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

Sample Summary

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-21079-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-21079-1	TB-021517	Water	02/15/17 07:00	02/16/17 12:00
160-21079-2	GW-BR05RB-021517	Water	02/15/17 08:15	02/16/17 12:00
160-21079-3	GW-BR11JC-021517	Water	02/15/17 09:05	02/16/17 12:00
160-21079-4	GW-BR02JC-021517	Water	02/15/17 09:45	02/16/17 12:00
160-21079-5	GW-BR02RB-021517	Water	02/15/17 10:30	02/16/17 12:00
160-21079-6	GW-NB71-021517	Water	02/15/17 12:40	02/16/17 12:00
160-21079-7	GW-BR04RB-021517	Water	02/15/17 13:45	02/16/17 12:00
160-21079-8	GW-BR04RB-021517-FD	Water	02/15/17 13:45	02/16/17 12:00
160-21079-9	GW-NB80-021517	Water	02/15/17 14:30	02/16/17 12:00
160-21079-10	GW-NB50-021517	Water	02/15/17 15:10	02/16/17 12:00
160-21079-11	GW-NB57A-021517	Water	02/15/17 15:55	02/16/17 12:00

GC/MS VOA MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Instrument ID: VMSL Analysis Batch Number: 292232

Lab Sample ID: IC 160-292232/6 Client Sample ID:

Date Analyzed: 02/14/17 12:23 Lab File ID: LICL7558.D GC Column: RTX-VMS40 ID: 0.18(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
1,2-Dichloro-1,1,2,2-tetrafluoroethane	3.25	Peak Tail	rhoadess	02/15/17 10:50
1,4-Dioxane	9.78	Peak Tail	rhoadess	02/15/17 10:50
2-Chloroethyl vinyl ether	10.06	Peak Tail	rhoadess	02/15/17 10:50
1,2-Dibromo-3-Chloropropane	15.15	Peak Tail	rhoadess	02/15/17 10:50

Lab Sample ID: IC 160-292232/7 Client Sample ID:

Date Analyzed: 02/14/17 12:49 Lab File ID: LICL7559.D GC Column: RTX-VMS40 ID: 0.18(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
1,2-Dichloro-1,1,2,2-tetrafluoroethane	3.25	Peak Tail	rhoadess	02/15/17 10:51
2-Chloroethyl vinyl ether	10.06	Peak Tail	rhoadess	02/15/17 10:51
1,2-Dibromo-3-Chloropropane	15.15	Peak Tail	rhoadess	02/15/17 10:51

Lab Sample ID: IC 160-292232/8 Client Sample ID:

Date Analyzed: 02/14/17 13:14 Lab File ID: LICL7560.D GC Column: RTX-VMS40 ID: 0.18(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
1,2-Dichloro-1,1,2,2-tetrafluoroethane	3.25	Peak Tail	rhoadess	02/15/17 10:54

Lab Sample ID: ICV 160-292232/14 Client Sample ID:

Date Analyzed: 02/14/17 15:47 Lab File ID: LICV7566.D GC Column: RTX-VMS40 ID: 0.18(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
1,2-Dichloro-1,1,2,2-tetrafluoroethane	3.25	Peak Tail	rhoadess	02/15/17 10:59

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
82232-334_00001	06/03/60		Eckert & Ziegler, Lot 82232-334		(Purchased Reagent)		Am-241	7.281 Bq
							Pu-239	7.137 Bq
							Th-230	7.63 Bq
82233-334_00001	06/03/60		Eckert & Zigler, Lot 82233-334		(Purchased Reagent)		Am-241	5.114 Bq
							Pu-239	6.064 Bq
							Th-230	4.95 Bq
82234-334_00001	06/02/60		Eckert & Zigler, Lot 82234-334		(Purchased Reagent)		Am-241	5.652 Bq
							Pu-239	5.936 Bq
							Th-230	5.685 Bq
82235-334_00001	06/04/60		Eckert & Ziegler, Lot 82235-334		(Purchased Reagent)		Am-241	7.466 Bq
							Pu-239	6.897 Bq
							Th-230	7.167 Bq
82237-334_00003	06/01/60		Eckert & Ziegler, Lot 82237-334		(Purchased Reagent)		Am-241	5.608 Bq
							Pu-239	6.424 Bq
							Th-230	5.856 Bq
82240-334_00001	06/08/60		Eckert & Ziegler, Lot 82240-334		(Purchased Reagent)		Am-241	8.298 Bq
							Pu-239	7.163 Bq
							Th-230	6.304 Bq
82241-334_00001	06/08/60		Eckert & Ziegler, Lot 82241-334		(Purchased Reagent)		Am-241	6.638 Bq
							Pu-239	6.797 Bq
							Th-230	6.629 Bq
82242-334_00001	06/08/60		Eckert & Ziegler, Lot 82242-334		(Purchased Reagent)		Am-241	7.145 Bq
							Pu-239	6.414 Bq
							Th-230	6.583 Bq
82243-334_00001	06/09/60		Eckert & Ziegler, Lot 82243-334		(Purchased Reagent)		Am-241	6.39 Bq
							Pu-239	5.979 Bq
							Th-230	5.856 Bq
82246-334_00001	06/09/60		Eckert & Ziegler, Lot 82246-334		(Purchased Reagent)		Am-241	6.002 Bq
							Pu-239	5.353 Bq
							Th-230	5.57 Bq
82247-334_00001	06/10/60		Eckert & Ziegler, Lot 82247-334		(Purchased Reagent)		Am-241	6.291 Bq
							Pu-239	5.746 Bq
							Th-230	6.251 Bq
8260 NewWkMix_00206	02/19/17	02/12/17	Methanol, Lot DQ538	10 mL	8260_2_CLEVE_00049	100 uL	2-Chloroethyl vinyl ether	25 ug/mL
					8260Custom1_00047	125 uL	1,2-Dichloro-1,1,2,2-tetrafluoroethane	25 ug/mL
							n-Nonyl Aldehyde	25 ug/mL
					8260Cyclohexa_00049	100 uL	Cyclohexanone	250 ug/mL
					8260Gases_00195	100 uL	Butadiene	25 ug/mL
							Chloroethane	25 ug/mL
							Chloromethane	25 ug/mL
							Dichlorodifluoromethane	25 ug/mL
							Dichlorofluoromethane	25 ug/mL
							Methyl bromide	25 ug/mL

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Trichlorofluoromethane	25 ug/mL
							Vinyl chloride	25 ug/mL
					8260Ketones_00049	20 uL	2-Butanone	25 ug/mL
							2-Hexanone	25 ug/mL
							4-Methyl-2-pentanone	25 ug/mL
							Acetone	25 ug/mL
					8260MegaMix_00049	100 uL	1,1,1,2-Tetrachloroethane	25 ug/mL
							1,1,1-Trichloroethane	25 ug/mL
							1,1,2,2-Tetrachloroethane	25 ug/mL
							1,1,2-Trichloro-1,2,2-trifluoroethane	25 ug/mL
							1,1,2-Trichloroethane	25 ug/mL
							1,1-Dichloroethane	25 ug/mL
							1,1-Dichloroethene	25 ug/mL
							1,1-Dichloropropene	25 ug/mL
							1,2,3-Trichlorobenzene	25 ug/mL
							1,2,3-Trichloropropane	25 ug/mL
							1,2,4-Trichlorobenzene	25 ug/mL
							1,2,4-Trimethylbenzene	25 ug/mL
							1,2-Dibromo-3-Chloropropane	25 ug/mL
							1,2-Dibromoethane	25 ug/mL
							1,2-Dichlorobenzene	25 ug/mL
							1,2-Dichloroethane	25 ug/mL
							1,2-Dichloropropane	25 ug/mL
							1,3,5-Trimethylbenzene	25 ug/mL
							1,3-Dichlorobenzene	25 ug/mL
							1,3-Dichloropropane	25 ug/mL
							1,4-Dichlorobenzene	25 ug/mL
							1,4-Dioxane	500 ug/mL
							2,2-Dichloropropane	25 ug/mL
							2-Chlorotoluene	25 ug/mL
							2-Methyl-2-propanol	250 ug/mL
							3-Chloro-1-propene	25 ug/mL
							4-Chlorotoluene	25 ug/mL
							4-Isopropyltoluene	25 ug/mL
							Acrylonitrile	250 ug/mL
							Benzene	25 ug/mL
							Bromobenzene	25 ug/mL
							Bromodichloromethane	25 ug/mL
							Bromoform	25 ug/mL
							Carbon disulfide	25 ug/mL
							Carbon tetrachloride	25 ug/mL
							Chlorobenzene	25 ug/mL
							Chlorobromomethane	25 ug/mL
							Chlorodibromomethane	25 ug/mL
							Chloroform	25 ug/mL
							cis-1,2-Dichloroethene	25 ug/mL
							cis-1,3-Dichloropropene	25 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Cyclohexane	25 ug/mL
							Dibromomethane	25 ug/mL
							Ethyl ether	25 ug/mL
							Ethyl methacrylate	25 ug/mL
							Ethylbenzene	25 ug/mL
							Hexachlorobutadiene	25 ug/mL
							Hexane	25 ug/mL
							Iodomethane	25 ug/mL
							Isobutyl alcohol	625 ug/mL
							Isopropylbenzene	25 ug/mL
							m-Xylene & p-Xylene	25 ug/mL
							Methyl acetate	125 ug/mL
							Methyl tert-butyl ether	25 ug/mL
							Methylcyclohexane	25 ug/mL
							Methylene Chloride	25 ug/mL
							n-Butylbenzene	25 ug/mL
							n-Heptane	25 ug/mL
							N-Propylbenzene	25 ug/mL
							Naphthalene	25 ug/mL
							o-Xylene	25 ug/mL
							sec-Butylbenzene	25 ug/mL
							Styrene	25 ug/mL
							tert-Butylbenzene	25 ug/mL
							Tetrachloroethene	25 ug/mL
							Tetrahydrofuran	50 ug/mL
							Toluene	25 ug/mL
							trans-1,2-Dichloroethene	25 ug/mL
							trans-1,3-Dichloropropene	25 ug/mL
							trans-1,4-Dichloro-2-butene	25 ug/mL
							Trichloroethene	25 ug/mL
					8260VinAcetat_00052	50 uL	Vinyl acetate	25 ug/mL
					Acrolein_00043	62.5 uL	Acrolein	125 ug/mL
					Adds(A) 2016_00011	100 uL	1,2,3-Trimethylbenzene	25 ug/mL
							1,3,5-Trichlorobenzene	25 ug/mL
							2-Chloro-1,3-butadiene	25 ug/mL
							2-Nitropropane	50 ug/mL
							Benzyl chloride	25 ug/mL
							Isooctane	25 ug/mL
							Isopropyl alcohol	250 ug/mL
							Methacrylonitrile	250 ug/mL
							n-Butanol	625 ug/mL
					Adds(B) 2016_00011	100 uL	Ethyl acetate	50 ug/mL
							Ethyl acrylate	25 ug/mL
							Methyl methacrylate	50 ug/mL
							n-Butyl acetate	25 ug/mL
					Polar Add._00040	100 uL	Acetonitrile	250 ug/mL
							Ethanol	1000 ug/mL
							Isopropyl ether	25 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Propionitrile	250 ug/mL
							Tert-amyl methyl ether	25 ug/mL
							Tert-butyl ethyl ether	25 ug/mL
.8260_2_CLEVE_00049	03/05/17		Restek, Lot A0115628		(Purchased Reagent)		2-Chloroethyl vinyl ether	2500 ug/mL
.8260Custom1_00047	02/28/17		Accustandard, Lot 215101095-01		(Purchased Reagent)		1,2-Dichloro-1,1,2,2-tetrafluoroethane	2000 ug/mL
							n-Nonyl Aldehyde	2000 ug/mL
.8260Cyclohexa_00049	03/05/17		Restek, Lot A0118487		(Purchased Reagent)		Cyclohexanone	25000 ug/mL
.8260Gases_00195	02/19/17		Restek, Lot A0122964		(Purchased Reagent)		Butadiene	2500 ug/mL
							Chloroethane	2500 ug/mL
							Chloromethane	2500 ug/mL
							Dichlorodifluoromethane	2500 ug/mL
							Dichlorofluoromethane	2500 ug/mL
							Methyl bromide	2500 ug/mL
							Trichlorofluoromethane	2500 ug/mL
							Vinyl chloride	2500 ug/mL
.8260Ketones_00049	03/05/17		Restek, Lot A0115554		(Purchased Reagent)		2-Butanone	12500 ug/mL
							2-Hexanone	12500 ug/mL
							4-Methyl-2-pentanone	12500 ug/mL
							Acetone	12500 ug/mL
.8260MegaMix_00049	03/05/17		Restek, Lot A0118177		(Purchased Reagent)		1,1,1,2-Tetrachloroethane	2500 ug/mL
							1,1,1-Trichloroethane	2500 ug/mL
							1,1,2,2-Tetrachloroethane	2500 ug/mL
							1,1,2-Trichloro-1,2,2-trifluoroethane	2500 ug/mL
							1,1,2-Trichloroethane	2500 ug/mL
							1,1-Dichloroethane	2500 ug/mL
							1,1-Dichloroethene	2500 ug/mL
							1,1-Dichloropropene	2500 ug/mL
							1,2,3-Trichlorobenzene	2500 ug/mL
							1,2,3-Trichloropropane	2500 ug/mL
							1,2,4-Trichlorobenzene	2500 ug/mL
							1,2,4-Trimethylbenzene	2500 ug/mL
							1,2-Dibromo-3-Chloropropane	2500 ug/mL
							1,2-Dibromoethane	2500 ug/mL
							1,2-Dichlorobenzene	2500 ug/mL
							1,2-Dichloroethane	2500 ug/mL
							1,2-Dichloropropane	2500 ug/mL
							1,3,5-Trimethylbenzene	2500 ug/mL
							1,3-Dichlorobenzene	2500 ug/mL
							1,3-Dichloropropane	2500 ug/mL
							1,4-Dichlorobenzene	2500 ug/mL
							1,4-Dioxane	50000 ug/mL
							2,2-Dichloropropane	2500 ug/mL
							2-Chlorotoluene	2500 ug/mL
							2-Methyl-2-propanol	25000 ug/mL
							3-Chloro-1-propene	2500 ug/mL
							4-Chlorotoluene	2500 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							4-Isopropyltoluene	2500 ug/mL
							Acrylonitrile	25000 ug/mL
							Benzene	2500 ug/mL
							Bromobenzene	2500 ug/mL
							Bromodichloromethane	2500 ug/mL
							Bromoform	2500 ug/mL
							Carbon disulfide	2500 ug/mL
							Carbon tetrachloride	2500 ug/mL
							Chlorobenzene	2500 ug/mL
							Chlorobromomethane	2500 ug/mL
							Chlorodibromomethane	2500 ug/mL
							Chloroform	2500 ug/mL
							cis-1,2-Dichloroethene	2500 ug/mL
							cis-1,3-Dichloropropene	2500 ug/mL
							Cyclohexane	2500 ug/mL
							Dibromomethane	2500 ug/mL
							Ethyl ether	2500 ug/mL
							Ethyl methacrylate	2500 ug/mL
							Ethylbenzene	2500 ug/mL
							Hexachlorobutadiene	2500 ug/mL
							Hexane	2500 ug/mL
							Iodomethane	2500 ug/mL
							Isobutyl alcohol	62500 ug/mL
							Isopropylbenzene	2500 ug/mL
							m-Xylene & p-Xylene	2500 ug/mL
							Methyl acetate	12500 ug/mL
							Methyl tert-butyl ether	2500 ug/mL
							Methylcyclohexane	2500 ug/mL
							Methylene Chloride	2500 ug/mL
							n-Butylbenzene	2500 ug/mL
							n-Heptane	2500 ug/mL
							N-Propylbenzene	2500 ug/mL
							Naphthalene	2500 ug/mL
							o-Xylene	2500 ug/mL
							sec-Butylbenzene	2500 ug/mL
							Styrene	2500 ug/mL
							tert-Butylbenzene	2500 ug/mL
							Tetrachloroethene	2500 ug/mL
							Tetrahydrofuran	5000 ug/mL
							Toluene	2500 ug/mL
							trans-1,2-Dichloroethene	2500 ug/mL
							trans-1,3-Dichloropropene	2500 ug/mL
							trans-1,4-Dichloro-2-butene	2500 ug/mL
							Trichloroethene	2500 ug/mL
.8260VinAcetat_00052	03/12/17		Restek, Lot A0123626		(Purchased Reagent)		Vinyl acetate	5000 ug/mL
.Acrolein_00043	02/28/17		Restek, Lot A0122668		(Purchased Reagent)		Acrolein	20000 ug/mL
.Adds(A) 2016_00011	02/22/17		Restek, Lot A0116133		(Purchased Reagent)		1,2,3-Trimethylbenzene	2500 ug/mL
							1,3,5-Trichlorobenzene	2500 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							2-Chloro-1,3-butadiene	2500 ug/mL
							2-Nitropropane	5000 ug/mL
							Benzyl chloride	2500 ug/mL
							Isooctane	2500 ug/mL
							Isopropyl alcohol	25000 ug/mL
							Methacrylonitrile	25000 ug/mL
							n-Butanol	62500 ug/mL
.Adds(B) 2016_00011	02/22/17		Restek, Lot A0116077		(Purchased Reagent)		Ethyl acetate	5000 ug/mL
							Ethyl acrylate	2500 ug/mL
							Methyl methacrylate	5000 ug/mL
							n-Butyl acetate	2500 ug/mL
.Polar Add._00040	03/05/17		Restek, Lot A0114666		(Purchased Reagent)		Acetonitrile	25000 ug/mL
							Ethanol	100000 ug/mL
							Isopropyl ether	2500 ug/mL
							Propionitrile	25000 ug/mL
							Tert-amyl methyl ether	2500 ug/mL
							Tert-butyl ethyl ether	2500 ug/mL
8260 NewWkMix_00207	02/26/17	02/19/17	Methanol, Lot DQ538	10 mL	8260Gases_00196	100 uL	Chloroethane	25 ug/mL
							Chloromethane	25 ug/mL
							Methyl bromide	25 ug/mL
							Vinyl chloride	25 ug/mL
					8260Ketones_00049	20 uL	2-Butanone	25 ug/mL
							2-Hexanone	25 ug/mL
							4-Methyl-2-pentanone	25 ug/mL
							Acetone	25 ug/mL
					8260MegaMix_00049	100 uL	1,1,1-Trichloroethane	25 ug/mL
							1,1,2,2-Tetrachloroethane	25 ug/mL
							1,1,2-Trichloroethane	25 ug/mL
							1,1-Dichloroethane	25 ug/mL
							1,1-Dichloroethene	25 ug/mL
							1,2,4-Trichlorobenzene	25 ug/mL
							1,2-Dibromo-3-Chloropropane	25 ug/mL
							1,2-Dibromoethane	25 ug/mL
							1,2-Dichloroethane	25 ug/mL
							1,2-Dichloropropane	25 ug/mL
							Benzene	25 ug/mL
							Bromodichloromethane	25 ug/mL
							Bromoform	25 ug/mL
							Carbon disulfide	25 ug/mL
							Carbon tetrachloride	25 ug/mL
							Chlorobenzene	25 ug/mL
							Chlorodibromomethane	25 ug/mL
							Chloroform	25 ug/mL
							cis-1,2-Dichloroethene	25 ug/mL
							cis-1,3-Dichloropropene	25 ug/mL
							Ethylbenzene	25 ug/mL
							Methylene Chloride	25 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Styrene	25 ug/mL
							Tetrachloroethene	25 ug/mL
							Toluene	25 ug/mL
							trans-1,2-Dichloroethene	25 ug/mL
							trans-1,3-Dichloropropene	25 ug/mL
							Trichloroethene	25 ug/mL
					8260VinAcetat_00052	50 uL	Vinyl acetate	25 ug/mL
					Adds(A) 2016_00012	100 uL	n-Butanol	625 ug/mL
.8260Gases_00196	02/26/17		Restek, Lot A0122964		(Purchased Reagent)		Chloroethane	2500 ug/mL
							Chloromethane	2500 ug/mL
							Methyl bromide	2500 ug/mL
							Vinyl chloride	2500 ug/mL
.8260Ketones_00049	03/05/17		Restek, Lot A0115554		(Purchased Reagent)		2-Butanone	12500 ug/mL
							2-Hexanone	12500 ug/mL
							4-Methyl-2-pentanone	12500 ug/mL
							Acetone	12500 ug/mL
.8260MegaMix_00049	03/05/17		Restek, Lot A0118177		(Purchased Reagent)		1,1,1-Trichloroethane	2500 ug/mL
							1,1,2,2-Tetrachloroethane	2500 ug/mL
							1,1,2-Trichloroethane	2500 ug/mL
							1,1-Dichloroethane	2500 ug/mL
							1,1-Dichloroethene	2500 ug/mL
							1,2,4-Trichlorobenzene	2500 ug/mL
							1,2-Dibromo-3-Chloropropane	2500 ug/mL
							1,2-Dibromoethane	2500 ug/mL
							1,2-Dichloroethane	2500 ug/mL
							1,2-Dichloropropane	2500 ug/mL
							Benzene	2500 ug/mL
							Bromodichloromethane	2500 ug/mL
							Bromoform	2500 ug/mL
							Carbon disulfide	2500 ug/mL
							Carbon tetrachloride	2500 ug/mL
							Chlorobenzene	2500 ug/mL
							Chlorodibromomethane	2500 ug/mL
							Chloroform	2500 ug/mL
							cis-1,2-Dichloroethene	2500 ug/mL
							cis-1,3-Dichloropropene	2500 ug/mL
							Ethylbenzene	2500 ug/mL
							Methylene Chloride	2500 ug/mL
							Styrene	2500 ug/mL
							Tetrachloroethene	2500 ug/mL
							Toluene	2500 ug/mL
							trans-1,2-Dichloroethene	2500 ug/mL
							trans-1,3-Dichloropropene	2500 ug/mL
							Trichloroethene	2500 ug/mL
.8260VinAcetat_00052	03/12/17		Restek, Lot A0123626		(Purchased Reagent)		Vinyl acetate	5000 ug/mL
.Adds(A) 2016_00012	03/19/17		Restek, Lot A0123685		(Purchased Reagent)		n-Butanol	62500 ug/mL
8260 Surr 25_00071	03/05/17	02/05/17	Methanol, Lot DQ538	25 mL	8260_Surr_00044	250 uL	1,2-Dichloroethane-d4 (Surr)	25 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							4-Bromofluorobenzene (Surr)	25 ug/mL
							Dibromofluoromethane (Surr)	25 ug/mL
							Toluene-d8 (Surr)	25 ug/mL
.8260_Surr_00044	03/05/17		Restek, Lot A0120212		(Purchased Reagent)		1,2-Dichloroethane-d4 (Surr)	2500 ug/mL
							4-Bromofluorobenzene (Surr)	2500 ug/mL
							Dibromofluoromethane (Surr)	2500 ug/mL
							Toluene-d8 (Surr)	2500 ug/mL
							1,2-Dichloroethane-d4 (Surr)	2500 ug/mL
							4-Bromofluorobenzene (Surr)	2500 ug/mL
							Dibromofluoromethane (Surr)	2500 ug/mL
							Toluene-d8 (Surr)	2500 ug/mL
8260NewHiWrk_00183	02/19/17	02/12/17	Methanol, Lot DQ538	1 mL	8260_2_CLEVE_00049	50 uL	2-Chloroethyl vinyl ether	125 ug/mL
					8260Custom1_00047	62.5 uL	1,2-Dichloro-1,1,2,2-tetrafluoroethane	125 ug/mL
							n-Nonyl Aldehyde	125 ug/mL
					8260Cyclohexa_00049	50 uL	Cyclohexanone	1250 ug/mL
					8260Gases_00195	50 uL	Butadiene	125 ug/mL
							Chloroethane	125 ug/mL
							Chloromethane	125 ug/mL
							Dichlorodifluoromethane	125 ug/mL
							Dichlorofluoromethane	125 ug/mL
							Methyl bromide	125 ug/mL
							Trichlorofluoromethane	125 ug/mL
							Vinyl chloride	125 ug/mL
					8260Ketones_00049	10 uL	2-Butanone	125 ug/mL
							2-Hexanone	125 ug/mL
							4-Methyl-2-pentanone	125 ug/mL
							Acetone	125 ug/mL
					8260MegaMix_00049	50 uL	1,1,1,2-Tetrachloroethane	125 ug/mL
							1,1,1-Trichloroethane	125 ug/mL
							1,1,2,2-Tetrachloroethane	125 ug/mL
							1,1,2-Trichloro-1,2,2-trifluoroethane	125 ug/mL
							1,1,2-Trichloroethane	125 ug/mL
							1,1-Dichloroethane	125 ug/mL
							1,1-Dichloroethene	125 ug/mL
							1,1-Dichloropropene	125 ug/mL
							1,2,3-Trichlorobenzene	125 ug/mL
							1,2,3-Trichloropropane	125 ug/mL
							1,2,4-Trichlorobenzene	125 ug/mL
							1,2,4-Trimethylbenzene	125 ug/mL
							1,2-Dibromo-3-Chloropropane	125 ug/mL
							1,2-Dibromoethane	125 ug/mL
							1,2-Dichlorobenzene	125 ug/mL
							1,2-Dichloroethane	125 ug/mL
							1,2-Dichloropropane	125 ug/mL
							1,3,5-Trimethylbenzene	125 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							1,3-Dichlorobenzene	125 ug/mL
							1,3-Dichloropropane	125 ug/mL
							1,4-Dichlorobenzene	125 ug/mL
							1,4-Dioxane	2500 ug/mL
							2,2-Dichloropropane	125 ug/mL
							2-Chlorotoluene	125 ug/mL
							2-Methyl-2-propanol	1250 ug/mL
							3-Chloro-1-propene	125 ug/mL
							4-Chlorotoluene	125 ug/mL
							4-Isopropyltoluene	125 ug/mL
							Acrylonitrile	1250 ug/mL
							Benzene	125 ug/mL
							Bromobenzene	125 ug/mL
							Bromodichloromethane	125 ug/mL
							Bromoform	125 ug/mL
							Carbon disulfide	125 ug/mL
							Carbon tetrachloride	125 ug/mL
							Chlorobenzene	125 ug/mL
							Chlorobromomethane	125 ug/mL
							Chlorodibromomethane	125 ug/mL
							Chloroform	125 ug/mL
							cis-1,2-Dichloroethene	125 ug/mL
							cis-1,3-Dichloropropene	125 ug/mL
							Cyclohexane	125 ug/mL
							Dibromomethane	125 ug/mL
							Ethyl ether	125 ug/mL
							Ethyl methacrylate	125 ug/mL
							Ethylbenzene	125 ug/mL
							Hexachlorobutadiene	125 ug/mL
							Hexane	125 ug/mL
							Iodomethane	125 ug/mL
							Isobutyl alcohol	3125 ug/mL
							Isopropylbenzene	125 ug/mL
							m-Xylene & p-Xylene	125 ug/mL
							Methyl acetate	625 ug/mL
							Methyl tert-butyl ether	125 ug/mL
							Methylcyclohexane	125 ug/mL
							Methylene Chloride	125 ug/mL
							n-Butylbenzene	125 ug/mL
							n-Heptane	125 ug/mL
							N-Propylbenzene	125 ug/mL
							Naphthalene	125 ug/mL
							o-Xylene	125 ug/mL
							sec-Butylbenzene	125 ug/mL
							Styrene	125 ug/mL
							tert-Butylbenzene	125 ug/mL
							Tetrachloroethene	125 ug/mL
							Tetrahydrofuran	250 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Toluene	125 ug/mL
							trans-1,2-Dichloroethene	125 ug/mL
							trans-1,3-Dichloropropene	125 ug/mL
							trans-1,4-Dichloro-2-butene	125 ug/mL
							Trichloroethene	125 ug/mL
					8260VinAcetat_00052	25 uL	Vinyl acetate	125 ug/mL
					Acrolein_00043	31.25 uL	Acrolein	625 ug/mL
					Adds(A) 2016_00011	50 uL	1,2,3-Trimethylbenzene	125 ug/mL
							1,3,5-Trichlorobenzene	125 ug/mL
							2-Chloro-1,3-butadiene	125 ug/mL
							2-Nitropropane	250 ug/mL
							Benzyl chloride	125 ug/mL
							Isooctane	125 ug/mL
							Isopropyl alcohol	1250 ug/mL
							Methacrylonitrile	1250 ug/mL
							n-Butanol	3125 ug/mL
					Adds(B) 2016_00011	50 uL	Ethyl acetate	250 ug/mL
							Ethyl acrylate	125 ug/mL
							Methyl methacrylate	250 ug/mL
							n-Butyl acetate	125 ug/mL
					Polar Add._00040	50 uL	Acetonitrile	1250 ug/mL
							Ethanol	5000 ug/mL
							Isopropyl ether	125 ug/mL
							Propionitrile	1250 ug/mL
							Tert-amyl methyl ether	125 ug/mL
							Tert-butyl ethyl ether	125 ug/mL
.8260_2_CLEVE_00049	03/05/17		Restek, Lot A0115628		(Purchased Reagent)		2-Chloroethyl vinyl ether	2500 ug/mL
.8260Custom1_00047	02/28/17		Accustandard, Lot 215101095-01		(Purchased Reagent)		1,2-Dichloro-1,1,2,2-tetrafluoroethane	2000 ug/mL
							n-Nonyl Aldehyde	2000 ug/mL
.8260Cyclohexa_00049	03/05/17		Restek, Lot A0118487		(Purchased Reagent)		Cyclohexanone	25000 ug/mL
.8260Gases_00195	02/19/17		Restek, Lot A0122964		(Purchased Reagent)		Butadiene	2500 ug/mL
							Chloroethane	2500 ug/mL
							Chloromethane	2500 ug/mL
							Dichlorodifluoromethane	2500 ug/mL
							Dichlorofluoromethane	2500 ug/mL
							Methyl bromide	2500 ug/mL
							Trichlorofluoromethane	2500 ug/mL
							Vinyl chloride	2500 ug/mL
.8260Ketones_00049	03/05/17		Restek, Lot A0115554		(Purchased Reagent)		2-Butanone	12500 ug/mL
							2-Hexanone	12500 ug/mL
							4-Methyl-2-pentanone	12500 ug/mL
							Acetone	12500 ug/mL
.8260MegaMix_00049	03/05/17		Restek, Lot A0118177		(Purchased Reagent)		1,1,1,2-Tetrachloroethane	2500 ug/mL
							1,1,1-Trichloroethane	2500 ug/mL
							1,1,2,2-Tetrachloroethane	2500 ug/mL
							1,1,2-Trichloro-1,2,2-trifluoroethane	2500 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							1,1,2-Trichloroethane	2500 ug/mL
							1,1-Dichloroethane	2500 ug/mL
							1,1-Dichloroethene	2500 ug/mL
							1,1-Dichloropropene	2500 ug/mL
							1,2,3-Trichlorobenzene	2500 ug/mL
							1,2,3-Trichloropropane	2500 ug/mL
							1,2,4-Trichlorobenzene	2500 ug/mL
							1,2,4-Trimethylbenzene	2500 ug/mL
							1,2-Dibromo-3-Chloropropane	2500 ug/mL
							1,2-Dibromoethane	2500 ug/mL
							1,2-Dichlorobenzene	2500 ug/mL
							1,2-Dichloroethane	2500 ug/mL
							1,2-Dichloropropane	2500 ug/mL
							1,3,5-Trimethylbenzene	2500 ug/mL
							1,3-Dichlorobenzene	2500 ug/mL
							1,3-Dichloropropane	2500 ug/mL
							1,4-Dichlorobenzene	2500 ug/mL
							1,4-Dioxane	50000 ug/mL
							2,2-Dichloropropane	2500 ug/mL
							2-Chlorotoluene	2500 ug/mL
							2-Methyl-2-propanol	25000 ug/mL
							3-Chloro-1-propene	2500 ug/mL
							4-Chlorotoluene	2500 ug/mL
							4-Isopropyltoluene	2500 ug/mL
							Acrylonitrile	25000 ug/mL
							Benzene	2500 ug/mL
							Bromobenzene	2500 ug/mL
							Bromodichloromethane	2500 ug/mL
							Bromoform	2500 ug/mL
							Carbon disulfide	2500 ug/mL
							Carbon tetrachloride	2500 ug/mL
							Chlorobenzene	2500 ug/mL
							Chlorobromomethane	2500 ug/mL
							Chlorodibromomethane	2500 ug/mL
							Chloroform	2500 ug/mL
							cis-1,2-Dichloroethene	2500 ug/mL
							cis-1,3-Dichloropropene	2500 ug/mL
							Cyclohexane	2500 ug/mL
							Dibromomethane	2500 ug/mL
							Ethyl ether	2500 ug/mL
							Ethyl methacrylate	2500 ug/mL
							Ethylbenzene	2500 ug/mL
							Hexachlorobutadiene	2500 ug/mL
							Hexane	2500 ug/mL
							Iodomethane	2500 ug/mL
							Isobutyl alcohol	62500 ug/mL
							Isopropylbenzene	2500 ug/mL
							m-Xylene & p-Xylene	2500 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added	Methyl acetate	12500 ug/mL
							Methyl tert-butyl ether	2500 ug/mL
							Methylcyclohexane	2500 ug/mL
							Methylene Chloride	2500 ug/mL
							n-Butylbenzene	2500 ug/mL
							n-Heptane	2500 ug/mL
							N-Propylbenzene	2500 ug/mL
							Naphthalene	2500 ug/mL
							o-Xylene	2500 ug/mL
							sec-Butylbenzene	2500 ug/mL
							Styrene	2500 ug/mL
							tert-Butylbenzene	2500 ug/mL
							Tetrachloroethene	2500 ug/mL
							Tetrahydrofuran	5000 ug/mL
							Toluene	2500 ug/mL
							trans-1,2-Dichloroethene	2500 ug/mL
							trans-1,3-Dichloropropene	2500 ug/mL
							trans-1,4-Dichloro-2-butene	2500 ug/mL
							Trichloroethene	2500 ug/mL
.8260VinAcetat_00052	03/12/17		Restek, Lot A0123626		(Purchased Reagent)		Vinyl acetate	5000 ug/mL
.Acrolein_00043	02/28/17		Restek, Lot A0122668		(Purchased Reagent)		Acrolein	20000 ug/mL
.Adds(A) 2016_00011	02/22/17		Restek, Lot A0116133		(Purchased Reagent)		1,2,3-Trimethylbenzene	2500 ug/mL
							1,3,5-Trichlorobenzene	2500 ug/mL
							2-Chloro-1,3-butadiene	2500 ug/mL
							2-Nitropropane	5000 ug/mL
							Benzyl chloride	2500 ug/mL
							Isooctane	2500 ug/mL
							Isopropyl alcohol	25000 ug/mL
							Methacrylonitrile	25000 ug/mL
							n-Butanol	62500 ug/mL
.Adds(B) 2016_00011	02/22/17		Restek, Lot A0116077		(Purchased Reagent)		Ethyl acetate	5000 ug/mL
							Ethyl acrylate	2500 ug/mL
							Methyl methacrylate	5000 ug/mL
							n-Butyl acetate	2500 ug/mL
.Polar Add._00040	03/05/17		Restek, Lot A0114666		(Purchased Reagent)		Acetonitrile	25000 ug/mL
							Ethanol	100000 ug/mL
							Isopropyl ether	2500 ug/mL
							Propionitrile	25000 ug/mL
							Tert-amyl methyl ether	2500 ug/mL
							Tert-butyl ethyl ether	2500 ug/mL
8260NewICVMix_00196	02/19/17	02/12/17	Methanol, Lot DQ538	5 mL	8260GasesSS_00196	50 uL	Chloroethane	25 ug/mL
							Chloromethane	25 ug/mL
							Methyl bromide	25 ug/mL
							Vinyl chloride	25 ug/mL
					8260KetonesSS_00048	10 uL	2-Butanone	25 ug/mL
							2-Hexanone	25 ug/mL
							4-Methyl-2-pentanone	25 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Acetone	25 ug/mL
					8260MegaMixSS_00048	50 uL	1,1,1-Trichloroethane	25 ug/mL
							1,1,2,2-Tetrachloroethane	25 ug/mL
							1,1,2-Trichloroethane	25 ug/mL
							1,1-Dichloroethane	25 ug/mL
							1,1-Dichloroethene	25 ug/mL
							1,2,4-Trichlorobenzene	25 ug/mL
							1,2-Dibromo-3-Chloropropane	25 ug/mL
							1,2-Dibromoethane	25 ug/mL
							1,2-Dichloroethane	25 ug/mL
							1,2-Dichloropropane	25 ug/mL
							Benzene	25 ug/mL
							Bromodichloromethane	25 ug/mL
							Bromoform	25 ug/mL
							Carbon disulfide	25 ug/mL
							Carbon tetrachloride	25 ug/mL
							Chlorobenzene	25 ug/mL
							Chlorodibromomethane	25 ug/mL
							Chloroform	25 ug/mL
							cis-1,2-Dichloroethene	25 ug/mL
							cis-1,3-Dichloropropene	25 ug/mL
							Ethylbenzene	25 ug/mL
							Methylene Chloride	25 ug/mL
							Styrene	25 ug/mL
							Tetrachloroethene	25 ug/mL
							Toluene	25 ug/mL
							trans-1,2-Dichloroethene	25 ug/mL
							trans-1,3-Dichloropropene	25 ug/mL
							Trichloroethene	25 ug/mL
					8260VinAcetSS_00050	25 uL	Vinyl acetate	25 ug/mL
					Add(A)SS 2016_00013	50 uL	n-Butanol	625 ug/mL
.8260GasesSS_00196	02/19/17		Restek, Lot A0115484		(Purchased Reagent)		Chloroethane	2500 ug/mL
							Chloromethane	2500 ug/mL
							Methyl bromide	2500 ug/mL
							Vinyl chloride	2500 ug/mL
.8260KetonesSS_00048	03/05/17		Restek, Lot A0118013		(Purchased Reagent)		2-Butanone	12500 ug/mL
							2-Hexanone	12500 ug/mL
							4-Methyl-2-pentanone	12500 ug/mL
							Acetone	12500 ug/mL
.8260MegaMixSS_00048	03/05/17		Restek, Lot A0120604		(Purchased Reagent)		1,1,1-Trichloroethane	2500 ug/mL
							1,1,2,2-Tetrachloroethane	2500 ug/mL
							1,1,2-Trichloroethane	2500 ug/mL
							1,1-Dichloroethane	2500 ug/mL
							1,1-Dichloroethene	2500 ug/mL
							1,2,4-Trichlorobenzene	2500 ug/mL
							1,2-Dibromo-3-Chloropropane	2500 ug/mL
							1,2-Dibromoethane	2500 ug/mL
							1,2-Dichloroethane	2500 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							1,2-Dichloropropane	2500 ug/mL
							Benzene	2500 ug/mL
							Bromodichloromethane	2500 ug/mL
							Bromoform	2500 ug/mL
							Carbon disulfide	2500 ug/mL
							Carbon tetrachloride	2500 ug/mL
							Chlorobenzene	2500 ug/mL
							Chlorodibromomethane	2500 ug/mL
							Chloroform	2500 ug/mL
							cis-1,2-Dichloroethene	2500 ug/mL
							cis-1,3-Dichloropropene	2500 ug/mL
							Ethylbenzene	2500 ug/mL
							Methylene Chloride	2500 ug/mL
							Styrene	2500 ug/mL
							Tetrachloroethene	2500 ug/mL
							Toluene	2500 ug/mL
							trans-1,2-Dichloroethene	2500 ug/mL
							trans-1,3-Dichloropropene	2500 ug/mL
							Trichloroethene	2500 ug/mL
.8260VinAcetSS_00050	02/22/17		Restek, Lot A0122475		(Purchased Reagent)		Vinyl acetate	5000 ug/mL
.Add(A)SS 2016_00013	02/22/17		Restek, Lot A0116135		(Purchased Reagent)		n-Butanol	62500 ug/mL
I.S. Working_00143	02/20/17	01/20/17	Methanol, Lot DP461	25 mL	8260 IS(2014)_00036	250 uL	1,4-Dichlorobenzene-d4	25 ug/mL
							Chlorobenzene-d5	25 ug/mL
							Fluorobenzene	25 ug/mL
.8260 IS(2014)_00036	02/20/17		Restek, Lot A0118801		(Purchased Reagent)		1,4-Dichlorobenzene-d4	2500 ug/mL
							Chlorobenzene-d5	2500 ug/mL
							Fluorobenzene	2500 ug/mL
I.S. Working_00144	03/19/17	02/19/17	Methanol, Lot DQ538	25 mL	8260 IS(2014)_00037	250 uL	1,4-Dichlorobenzene-d4	25 ug/mL
							Chlorobenzene-d5	25 ug/mL
							Fluorobenzene	25 ug/mL
.8260 IS(2014)_00037	03/19/17		Restek, Lot A0118801		(Purchased Reagent)		1,4-Dichlorobenzene-d4	2500 ug/mL
							Chlorobenzene-d5	2500 ug/mL
							Fluorobenzene	2500 ug/mL
LSC Check_00001	02/23/21		Perkin Elmer, Lot 135		(Purchased Reagent)		Background	0 dpm
							C-14	112100 dpm
							Tritium	286200 dpm
Source A_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9986 Source	Gamma Ampuole_00001	0.9986 g	Am-241	9.4429 Bq
							Cd-109	132.909 Bq
							Ce-139	4.4538 Bq
							Co-57	2.9513 Bq
							Co-60	6.2002 Bq
							Cs-137	3.7296 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)		Am-241	9442.9 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Co-57	2951.3 Bq
							Co-60	6200.2 Bq
							Cs-137	3729.6 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	Am-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Co-57	2951.3 Bq
							Co-60	6200.2 Bq
							Cs-137	3729.6 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)		Am-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Co-57	2951.3 Bq
							Co-60	6200.2 Bq
							Cs-137	3729.6 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	Am-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Co-57	2951.3 Bq
							Co-60	6200.2 Bq
							Cs-137	3729.6 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)		Am-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Co-57	2951.3 Bq
							Co-60	6200.2 Bq
							Cs-137	3729.6 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Tc (T) Dil #1_00227	03/03/17	02/28/17	Blood Bank Saline, Lot 231454	100 mL	Tc (T) Source_00215	1 mL	Tc-99m	200000 pCi/ml
.Tc (T) Source_00215	03/03/17		Triad, Lot 20160928		(Purchased Reagent)		Tc-99m	20 uCi/ml

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
Tc-99_00007	01/01/50	07/19/06	DI Water, Lot 0	100 mL	Tc-99_00003	4.9519 g	Technetium 99	22185.5 dpm/mL
.Tc-99_00003	01/01/50	Isotope Products, Lot 681-78-1			(Purchased Reagent)		Technetium 99	7.467 kBq/g
Tc-99_00019	03/15/17	03/18/15	2M HNO3, Lot n/a	500 mL	Tc-99_00015	12 mL	Technetium 99	228.819 dpm/mL
							Total Activity	228.819 dpm/mL
.Tc-99_00015	03/16/17	06/28/05	2M HNO3, Lot 0	100 mL	Tc-99_00004	10 mL	Technetium 99	9534.11 dpm/mL
							Total Activity	9534.11 dpm/mL
..Tc-99_00004	03/16/17	02/28/02	2M HNO3, Lot 0	100 mL	Tc-99_00002	4.8728 g	Technetium 99	95341.1 dpm/mL
							Total Activity	95341.1 dpm/mL
...Tc-99_00002	03/16/17	NIST, Lot SRM 4288A			(Purchased Reagent)		Technetium 99	32.61 kBq/g
							Total Activity	32.61 kBq/g
Tuna Can LCS_00006	09/29/17	Analytics, Lot 74139-334			(Purchased Reagent)		Am-241	219 dpm/g
							Co-60	136 dpm/g
							Cs-137	82.3 dpm/g
Tuna Can_00002	02/03/15	Eckert & Ziegler, Lot 81427-334			(Purchased Reagent)		Am-241	1164 Bq
							Cd-109	16063 Bq
							Ce-139	546 Bq
							Co-57	357 Bq
							Co-60	742 Bq
							Cs-137	465 Bq
							Hg-203	1208 Bq
							Pb-210	15186 Bq
							Sn-113	943 Bq
							Y-88	1571 Bq
Tuna Can_00003	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Am-241	1164 Bq
							Cd-109	16373 Bq
							Ce-139	549 Bq
							Co-57	362 Bq
							Co-60	735 Bq
							Cs-137	467 Bq
							Hg-203	1171 Bq
							Pb-210	14936 Bq
							Sn-113	967 Bq
							Y-88	1590 Bq
Tuna Can_00006	03/01/16	Eckert & Ziegler, Lot 83814-334			(Purchased Reagent)		Am-241	1195 Bq
							Cd-109	16353 Bq
							Ce-139	543 Bq
							Co-57	354 Bq
							Co-60	745 Bq
							Cs-137	453 Bq
							Hg-203	1175 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Pb-210	14606 Bq
							Sn-113	961 Bq
							Y-88	1568 Bq
U-232_00035	07/13/17	07/16/15	2M HNO3, Lot n/a	500 mL	U-232_00009	4 mL	Uranium 232	82.2457 dpm/mL
.U-232_00009	07/13/17	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_00012	05/05/17	04/28/15	1M HNO3, Lot n/a	200 mL	UNAT Parent_00001	20 mL	Uranium 234	70.6912 dpm/mL
							Uranium 238	72.265 dpm/mL
							Uranium-235/236	3.37064 dpm/mL
.UNAT Parent_00001	12/22/17	05/03/13	1M HNO3, Lot n/a	200 mL	UNAT Ampoule_00001	19.2509 g	Uranium 234	706.912 dpm/mL
							Uranium 238	722.65 dpm/mL
							Uranium-235/236	33.7064 dpm/mL
..UNAT Ampoule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		Uranium 234	7344.2 dpm/g
							Uranium 238	7507.7 dpm/g
							Uranium-235/236	350.18 dpm/g

Reagent

82232-334_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

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

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

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

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
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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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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

82237-334_00003

Eckert & Ziegler
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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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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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

Eckert & Ziegler
Analytics

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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

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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

82246-334_00001

Eckert & Ziegler
Analytics

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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

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
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

8260 IS(2014)_00036

RESTEK
110 Benner Circle
Bellefonte, PA 16823-8812
Tel: (800)356-1688
Fax: (814)353-1309

www.restek.com

CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 30241 **Lot No.:** A0118801

Description : 8260A Internal Standard Mix

8260A Internal Standard Mix 2,500 µg/mL, P&T Methanol, 1mL/ampul

REC'D - 12-12-16 JDH 1074908 - 912

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : April 30, 2021 **Storage:** 0°C or colder

CERTIFIED VALUES

Elution Order	Compound		Grav. Conc. (weight/volume)	Expanded Uncertainty (95% C.L.; K=2)	
1	Fluorobenzene **CAS #** 462-06-6 **Purity** 99%	(Lot BCBK8171V)	2,507.2 µg/mL	+/- 14.5771 µg/mL +/- 140.5762 µg/mL +/- 143.8655 µg/mL	Gravimetric Unstressed Stressed
2	Chlorobenzene-d5 **CAS #** 3114-55-4 **Purity** 99%	(Lot PR-23926)	2,508.4 µg/mL	+/- 14.5841 µg/mL +/- 140.6435 µg/mL +/- 143.9344 µg/mL	Gravimetric Unstressed Stressed
3	1,4-Diehlorobenzene-d4 **CAS #** 3855-82-1 **Purity** 99%	(Lot PR-18488)	2,511.0 µg/mL	+/- 14.5992 µg/mL +/- 140.7893 µg/mL +/- 144.0836 µg/mL	Gravimetric Unstressed Stressed

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

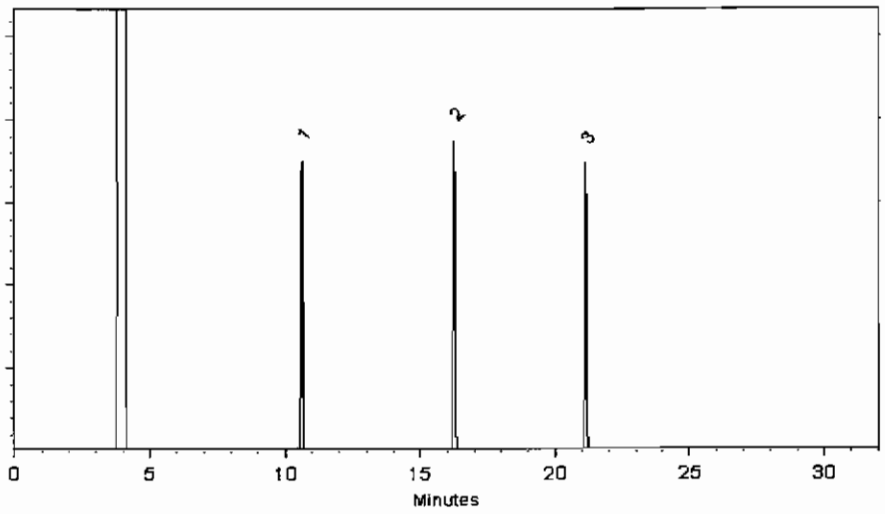
Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

Isaiah Harrison - Mix Technician

Date Mixed: 19-Apr-2016 **Balance:** 1125113331

Jodi E. Breon - QA Analyst

Date Passed: 21-Apr-2016

Manufactured under Restek's ISO 9001:2008 Registered Quality System Certificate #FM 80397

Reagent

8260 IS(2014)_00037

RESTEK
110 Benner Circle
Bellefonte, PA 16823-8812
Tel: (800)356-1688
Fax: (814)353-1309

www.restek.com

CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 30241 **Lot No.:** A0118801

Description : 8260A Internal Standard Mix

8260A Internal Standard Mix 2,500 µg/mL, P&T Methanol, 1mL/ampul

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : April 30, 2021 **Storage:** 0°C or colder

REC'D - 12-12-16
JDH
1074908 - 912

CERTIFIED VALUES

Elution Order	Compound	Grav. Conc. (weight/volume)	Expanded Uncertainty (95% C.L.; K=2)	
1	Fluorobenzene **CAS #** 462-06-6 (Lot BCBK8171V) **Purity** 99%	2,507.2 µg/mL	+/- 14.5771 µg/mL +/- 140.5762 µg/mL +/- 143.8655 µg/mL	Gravimetric Unstressed Stressed
2	Chlorobenzene-d5 **CAS #** 3114-55-4 (Lot PR-23926) **Purity** 99%	2,508.4 µg/mL	+/- 14.5841 µg/mL +/- 140.6435 µg/mL +/- 143.9344 µg/mL	Gravimetric Unstressed Stressed
3	1,4-Diehlorobenzene-d4 **CAS #** 3855-82-1 (Lot PR-18488) **Purity** 99%	2,511.0 µg/mL	+/- 14.5992 µg/mL +/- 140.7893 µg/mL +/- 144.0836 µg/mL	Gravimetric Unstressed Stressed

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

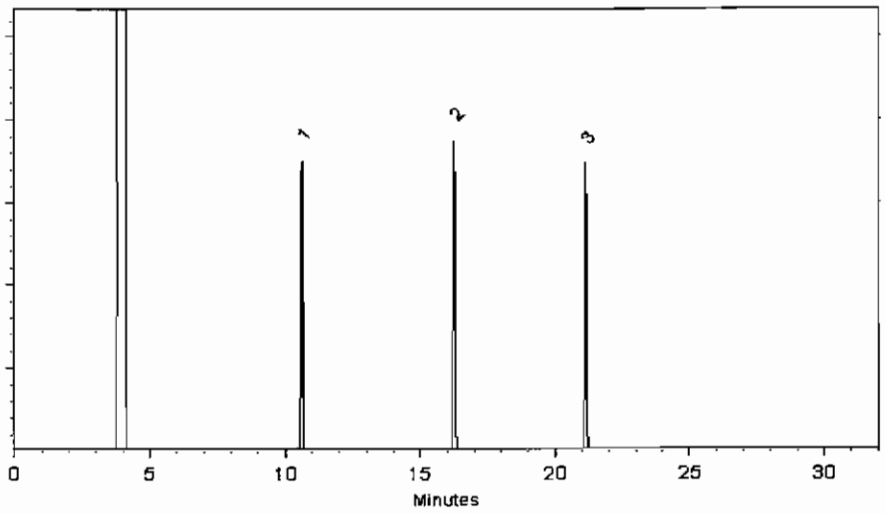
Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

Isaiah Harrison - Mix Technician

Date Mixed: 19-Apr-2016 **Balance:** 1125113331

Jodi E. Breon - QA Analyst

Date Passed: 21-Apr-2016

Manufactured under Restek's ISO 9001:2008 Registered Quality System Certificate #FM 80397

Reagent

8260_2_CLEVE_00049

RESTEK
110 Benner Circle
Bellefonte, PA 16823-8812
Tel: (800)356-1688
Fax: (814)353-1309

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CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

ACCREDITED
ISO Guide 34 Accredited
Reference Material Producer
Certificate #3122.01

ACCREDITED
ISO/IEC 17025 Accredited
Testing Laboratory
Certificate #3122.02

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 569723 **Lot No.:** A0115628

Description : 8260 List 1 / Std #4 2-CEVE (2015)

8260 List 1 / Std #4 2-CEVE (2015) 2,500 ug/ml, P&T Methanol, 1 ml/ampul

Rec'd 12-15-16 JDH

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : November 30, 2018 **Storage:** 0°C or colder

1074902-904

CERTIFIED VALUES

Elution Order	Compound	Grav. Conc. (weight/volume)	Expanded Uncertainty (95% C.L.; K=2)	
1	2-Chloroethyl vinyl ether	2,509.2 µg/mL	+/- 14.5887 µg/mL	Gravimetric
	CAS # 110-75-8 (Lot MKBK2735V)		+/- 53.7223 µg/mL	Unstressed
	Purity 99%		+/- 55.2841 µg/mL	Stressed

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

Tech Tips:
Degradation of tetrachloroethylene to pentachloroethane may occur if solutions containing 2-chloroethyl vinyl ether are combined with solutions that contain tetrachloroethylene.

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

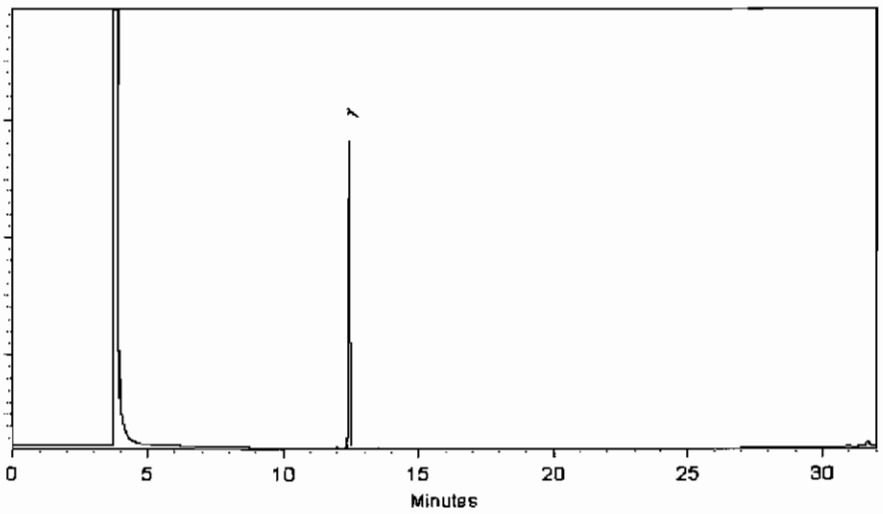
Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

Cheryl Graham - Mix Technician

Date Mixed: 24-Nov-2015 **Balance:** B251644995

Jennifer L. Pollino - QC Analyst

Date Passed: 30-Nov-2015

Manufactured under Restek's ISO 9001:2008 Registered Quality System Certificate #FM 80397

Reagent

8260_Surr_00044

RESTEK
110 Benner Circle
Bellefonte, PA 16823-8812
Tel: (800)356-1688
Fax: (814)353-1309

www.restek.com

CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

ACCREDITED ISO Guide 34 Accredited Reference Material Producer Certificate #3222.01

ACCREDITED ISO/IEC 17025 Accredited Testing Laboratory Certificate #3222.02

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 567650 **Lot No.:** A0120212

Description : 8260 Surrogate Standard

8260 Surrogate Standard 2,500 ug/ml, P&T Methanol, 5 ml/ampul

Container Size : 5 mL **Pkg Amt:** > 5 mL

Expiration Date : July 31, 2021 **Storage:** 0°C or colder

REC'D 12-12-16
JDH
1074913-917

CERTIFIED VALUES

Elution Order	Compound	Grav. Conc. (weight/volume)	Expanded Uncertainty (95% C.L.; K=2)	
1	Dibromofluoromethane	2,521.3 µg/mL	+/- 14.6591 µg/mL	Gravimetric
	CAS # 1868-53-7 (Lot 032015)		+/- 141.3668 µg/mL	Unstressed
	Purity 99%		+/- 144.6746 µg/mL	Stressed
2	1,2-Dichloroethane-d4	2,523.7 µg/mL	+/- 14.6730 µg/mL	Gravimetric
	CAS # 17060-07-0 (Lot 14C-191)		+/- 141.5014 µg/mL	Unstressed
	Purity 99%		+/- 144.8123 µg/mL	Stressed
3	Toluene-d8	2,523.6 µg/mL	+/- 14.6724 µg/mL	Gravimetric
	CAS # 2037-26-5 (Lot PR-26623)		+/- 141.4957 µg/mL	Unstressed
	Purity 99%		+/- 144.8066 µg/mL	Stressed
4	1-Bromo-4-fluorobenzene (BFB)	2,510.9 µg/mL	+/- 14.5986 µg/mL	Gravimetric
	CAS # 460-00-4 (Lot 20401KOV)		+/- 140.7837 µg/mL	Unstressed
	Purity 99%		+/- 144.0778 µg/mL	Stressed

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

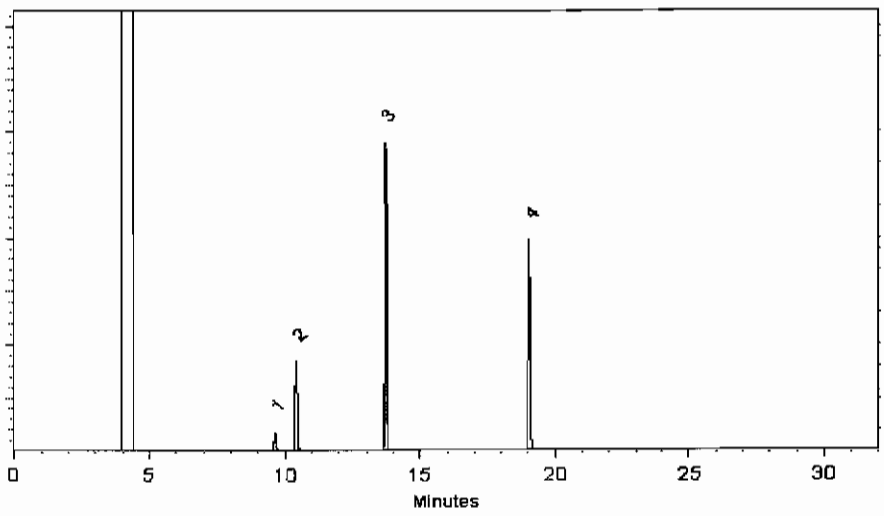
Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

Dawn Brownson - Mix Technician

Date Mixed: 06-Jul-2016 **Balance:** 1125113331

Jennifer L. Pollino - QC Analyst

Date Passed: 11-Jul-2016

Manufactured under Restek's ISO 9001:2008 Registered Quality System Certificate #FM 80397

Reagent

8260Custom1_00047

125 Market Street
New Haven, CT 06513
USA

AccuStandard® Inc.

Tel (203)786-5290
Fax (203)786-5287
www.AccuStandard.com

CERTIFICATE OF ANALYSIS

Catalog No: S-26138
Description: Custom VOC Standard
Lot: 215101095-01
Solvent: Methanol
Hazards: **HIGHLY FLAMMABLE** - *Refer to SDS for safety info*

Danger 2

Date Certified: Jul 25, 2016
Expiration: Jul 25, 2017
Sample Size: 1 mL
Components: 2
Storage Condition: Refrig (0-5 °C)

Included on ISO/IEC 17025 Scope of Accreditation: Yes

Included on ISO Guide 34 Scope of Accreditation: Yes

Component	CAS #	Purity % (GC/FID)	Prepared Concentration[1] (µg/mL)	Certified Analyte Concentration[2] (µg/mL)
Freon 114	76-14-2	99.0	2013	1993
Nonanal	124-19-6	100.0	2004	2004

REC'D 12-8-16
JDH

1063471-480

A product with a suffix (-1A, -2B, etc. or -01, -02, etc.) on its lot number has had its expiration date extended and is identical to the same lot number without the suffix.

[1] All weights are traceable through NIST, Test No. 822-275872-11

[2] Certified Analyte Concentration = Purity x Prepared Concentration. The Uncertainty associated with the gravimetric values reported on this certificate is ±0.24%. The CRM Uncertainty calculated for this product is ±5%. These values are the expanded uncertainty and represent an estimated standard deviation equal to the positive square root of the total variation of the uncertainty of components. A normal distribution is assumed and a coverage factor of K=2 is chosen using approximately a 95% confidence level.

Labels and certificates follow U.S. Conventions in raporting numerical values: A comma (,) is used to separate units of one-thousand or greater. A period (.) is used as a decimal place marker.

See reverse side for additional information

Certified By: Larry Decker, Organic QC Manager

For use in routine laboratory analysis.

AccuStandard is accredited to ISO Guide 34, ISO/IEC 17025 and certified to ISO 9001

CERTIFICATION REPORT

1. **Quality Documentation:** This certificate is designed in accordance with ISO Guide 31 (Reference Materials - Contents of Certificates and Labels) and ISO Guide 35 (Reference Materials – General and Statistical Principles for Certification).

2. **Quality Standards:**

   ISO Guide 34 - General Requirements for the Competence of Reference Material Producers ANAB Certificate Number AR-1463

   AR-1463

   ISO/IEC 17025 - General Requirements for the Competence of Testing and Calibration Laboratories ANAB Certificate Number AT-1339

   AT-1339

   ISO 9001 - Quality Management System - Requirements
   Eagle Registrations Certificate Number 3774

3. **Intended Use:** The product covered by this certificate is designed for calibration or for use in quality control procedures for the specified chemical compounds listed on the reverse side. This product can be used for quantification and/or identification. This product can also be used as a reference material to validate analytical procedures, subject to the conditions under Section 11. If dilution is required, use only Class A glassware and diluent compatible with all certified analytes in this preparation. All solutions should be thoroughly mixed prior to use.

4. **Raw Materials:** Reference standards are prepared from the highest quality starting materials with defined purities. All analytes and solvents are obtained from pre-qualified vendors and then analyzed or evaluated prior to use.

5. **Manufacturing:** All balances are calibrated daily using an in-house procedure with weights that are compared annually to master weights and traceable to NIST. The balances are also calibrated annually by an ISO/IEC 17025 accredited calibration laboratory. Please refer to the NIST test number listed on the front of this certificate. Class A glassware is used in the manufacture and quality control of all standards and calibrated using an in-house procedure. Good Laboratory Practices have been used throughout the preparation of this CRM.

6. **Homogeneity Assessment:** Homogeneity of the finished product is assessed by analyzing sample batches or by other methods consistent with the intended use of the product and by procedures that comply with the appropriate Quality System requirements, and ISO Guide 35.

7. **Stability Assessment:** The manufacturer guarantees the stability of this solution through the expiration date stated on the label, when handled and stored according to the conditions stated on the label. To ensure a uniform solution, mix the contents of the sealed container thoroughly prior to use. Care should be taken not to contaminate the contents of the original container.

8. **Analytical Quality Control:** Products are tested by validated analytical methods specified in the manufacturer's quality system.

9. **Uncertainty Statistics and Confidence Limits:** The uncertainty values as stated on the face of this certificate have been determined using the EURACHEM/CITAC Guide. We report a combined expanded uncertainty equal to the positive square root of the total variance of the uncertainty of the components using the following formula: $u_m = \sqrt{(u(P))^2 + (u(m))^2 + (u(V))^2}$. The expanded uncertainty, U_{CRM} assumes a normal distribution and a coverage factor of k=2 is chosen using approximately a 95% confidence level. The U_{CRM} for organic products is ±5%, the U_{CRM} for inorganic products is ±2%.

10. **Warranties:** The manufacturer warrants that its products shall conform to the description of such products as provided in its catalog or on the specific product label. This warranty is exclusive, and the manufacturer makes no other warranty, express or implied, including any implied warranty of merchantability or fitness for any particular purpose.

11. **Legal Notice and Limit of Liability:** This product is for routine laboratory analysis and research purposes only. Due to the hazardous nature, only trained personnel should handle this product. The company's liability will be limited to replacement of product or refund of purchase price. Notice of claims must be made within thirty (30) days from date of delivery.

Reagent

8260Cyclohexa_00049

RESTEK® CERTIFIED REFERENCE MATERIAL

110 Benner Circle
Bellefonte, PA 16823-8812
Tel: (800)356-1688
Fax: (814)353-1309

www.restek.com

Certificate of Analysis

ACCREDITED
ISO Guide 34 Accredited
Reference Material Producer
Certificate #3222.01

ACCREDITED
ISO/IEC 17025 Accredited
Testing Laboratory
Certificate #3222.02

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 569727 **Lot No.:** A0118487

Description : 8260 List 2/ Std #3 Cyclohexanone (2015)

8260 List 2/ Std #3 Cyclohexanone (2015) 25,000 µg/ml, Water, 1 ml/ampul

REC'D 12-12-16
JDH

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : March 31, 2019 **Storage:** 10°C or colder

1074885-887

CERTIFIED VALUES

Elution Order	Compound	Grav. Conc. (weight/volume)	Expanded Uncertainty (95% C.L.; K=2)	
1	Cyclohexanone	25,000.4 µg/mL	+/- 146.3826 µg/mL	Gravimetric
	CAS # 108-94-1 (Lot MKBN5282V)		+/- 1,508.4819 µg/mL	Unstressed
	Purity 99%		+/- 1,512.0629 µg/mL	Stressed

Solvent: Water
CAS # 7732-18-5
Purity 99%

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

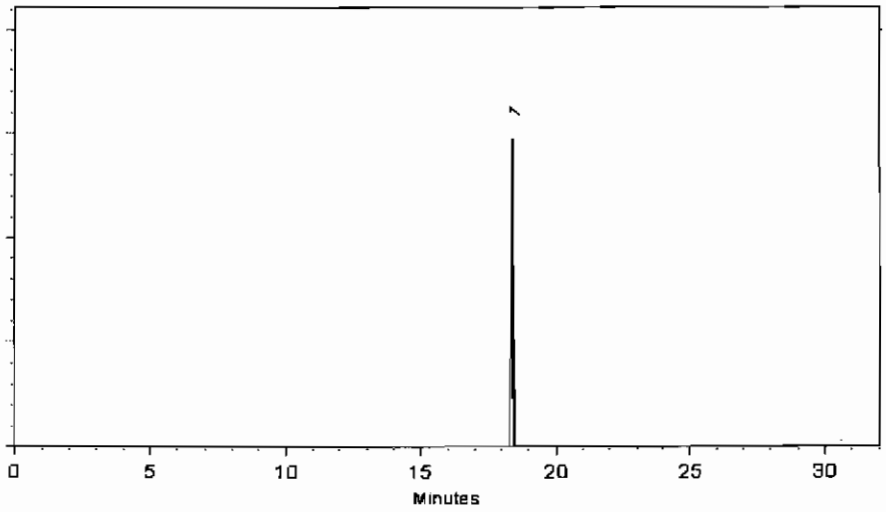
Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

Joseph Jaglowski - Mix Technician

Date Mixed: 31-Mar-2016 **Balance:** B442140311

Jodi E. Breon - QA Analyst

Date Passed: 04-Apr-2016

Manufactured under Restek's ISO 9001:2008 Registered Quality Syatem Certificate #FM 80397

Reagent

8260Ketones_00049

RESTEK®
110 Benner Circle
Bellefonte, PA 16823-8812
Tel: (800)356-1688
Fax: (814)353-1309

www.restek.com

CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 569721 **Lot No.:** A0115554

Description : 8260 List 1/ Std #2 Ketones (2015)

8260 List 1/ Std #2 Ketones (2015) 12,500 µg/ml, P&T Methanol/Water (90:10), 1 ml/ampul

REC'D 12-12-16 JAT

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : November 30, 2018 **Storage:** 0°C or colder

1074890-892

CERTIFIED VALUES

Elution Order	Compound		Grav. Conc. (weight/volume)	Expanded Uncertainty (95% C.L.; K=2)		
1	Acetone		12,501.8 µg/mL	+/- 72.6865	µg/mL	Gravimetrie
	CAS # 67-64-1	(Lot 07196AK)		+/- 754.2890	µg/mL	Unstressed
	Purity 99%			+/- 756.0798	µg/mL	Stressed
2	2-Butanone (MEK)		12,499.7 µg/mL	+/- 72.6744	µg/mL	Gravimetric
	CAS # 78-93-3	(Lot SHBG0444V)		+/- 754.1625	µg/mL	Unstressed
	Purity 98%			+/- 755.9530	µg/mL	Stressed
3	4-Methyl-2-pentanone (MIBK)		12,500.6 µg/mL	+/- 72.6796	µg/mL	Gravimetric
	CAS # 108-10-1	(Lot SHBF9556V)		+/- 754.2166	µg/mL	Unstressed
	Purity 99%			+/- 756.0072	µg/mL	Stressed
4	2-Hexanone		12,502.4 µg/mL	+/- 72.6900	µg/mL	Gravimetric
	CAS # 591-78-6	(Lot MKBT3158V)		+/- 754.3252	µg/mL	Unstressed
	Purity 99%			+/- 756.1161	µg/mL	Stressed

Solvent: P&T Methanol/Water (90:10)
CAS # 67-56-1/7732-18-5
Purity 99%

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

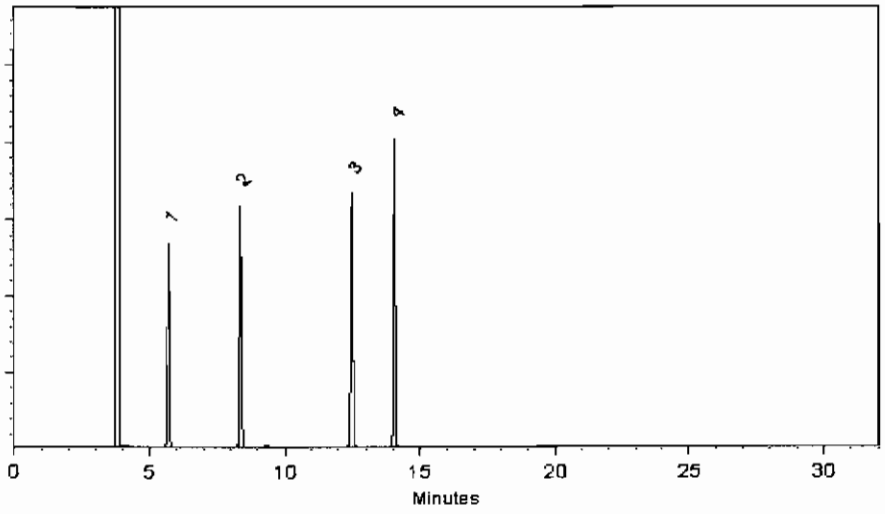
Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

F. Joseph Fallon - Mix Technician

Date Mixed: 20-Nov-2015 **Balance:** B251644995

Jennifer L. Pollino - QC Analyst

Date Passed: 24-Nov-2015

Manufactured under Restek's ISO 9001:2008 Registered Quality System Certificate #FM 80397

Reagent

8260KetonesSS_00048

RESTEK
110 Benner Circle
Bellefonte, PA 16823-8812
Tel: (800)356-1688
Fax: (814)353-1309

www.restek.com

CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 569721.sec **Lot No.:** A0118013

Description : 8260 List 1/ Std #2 Ketones (2015)

8260 List 1/ Std #2 Ketones (2015) 12,500 µg/ml, P&T Methanol/Water (90:10), 1 ml/ampul

REC'D 12-12-16 JDH

1074893-895

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : March 31, 2019 **Storage:** 0°C or colder

CERTIFIED VALUES

Elution Order	Compound	Grav. Conc. (weight/volume)	Expanded Uncertainty (95% C.L.; K=2)	
1	Acetone	12,550.0 µg/mL	+/- 73.4830 µg/mL	Gravimetric
	CAS # 67-64-1.SEC (Lot P14A572)		+/- 757.2470 µg/mL	Unstressed
	Purity 99%		+/- 759.0446 µg/mL	Stressed
2	2-Butanone (MEK)	12,603.0 µg/mL	+/- 73.7933 µg/mL	Gravimetric
	CAS # 78-93-3.SEC (Lot RA58J)		+/- 760.4450 µg/mL	Unstressed
	Purity 99%		+/- 762.2502 µg/mL	Stressed
3	4-Methyl-2-pentanone (MIBK)	12,591.5 µg/mL	+/- 73.7260 µg/mL	Gravimetric
	CAS # 108-10-1.SEC (Lot E29T040)		+/- 759.7511 µg/mL	Unstressed
	Purity 99%		+/- 761.5546 µg/mL	Stressed
4	2-Hexanone	12,588.0 µg/mL	+/- 73.7055 µg/mL	Gravimetric
	CAS # 591-78-6.SEC (Lot V3NRA)		+/- 759.5399 µg/mL	Unstressed
	Purity 99%		+/- 761.3429 µg/mL	Stressed

Solvent: P&T Methanol/Water (90:10)
CAS # 67-56-1/7732-18-5
Purity 99%

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

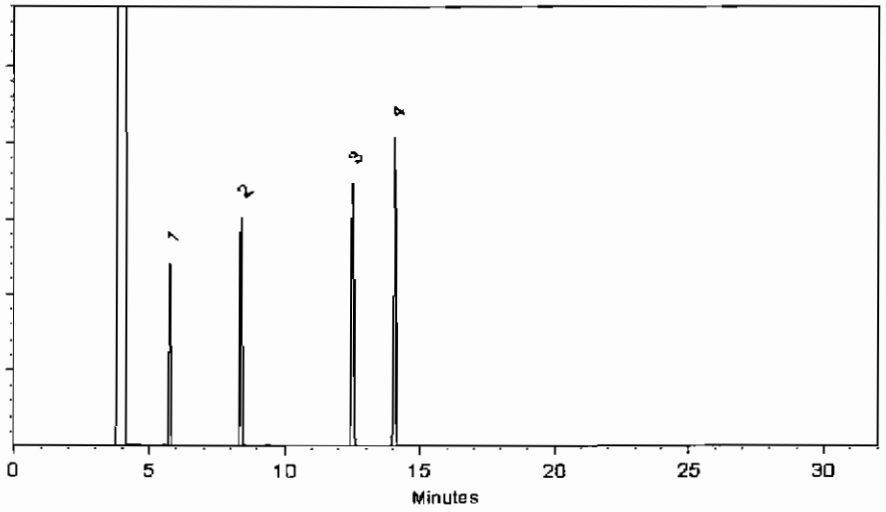
Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

Isaiah Harrison - Mix Technician

Date Mixed: 14-Mar-2016 **Balance:** 1127510105

Jennifer L. Pollino - QC Analyst

Date Passed: 16-Mar-2016

Manufactured under Restek's ISO 9001:2008 Registered Quality System Certificate #FM 80397

Reagent

8260MegaMix_00049

RESTEK
110 Benner Circle
Bellefonte, PA 16823-8812
Tel: (800)356-1688
Fax: (814)353-1309

www.restek.com

CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

ACCREDITED
ISO Guide 34 Accredited
Reference Material Producer
Certificate #3222.01

ACCREDITED
ISO/IEC 17025 Accredited
Testing Laboratory
Certificate #3222.02

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 569720 **Lot No.:** A0118177

Description : 8260 List 1 / Std #1 MegaMix (2015)

8260 List 1 / Std #1 MegaMix (2015) 1250-62500 µg/ml, P&T Methanol, 1 ml/ampul

REC'D 12-12-16
JDH
1074879-881

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : March 31, 2018 **Storage:** 0°C or colder

CERTIFIED VALUES

Elution Order	Compound		Grav. Conc. (weight/volume)		Expanded Uncertainty (95% C.L.; K=2)		
1	Diethyl ether (ethyl ether) **CAS #** 60-29-7 **Purity** 99%	(Lot SHBG1462V)	2,503.5	µg/mL	+/- 14.5556 +/- 151.0472 +/- 151.4059	µg/mL µg/mL µg/mL	Gravimetric Unstressed Stressed
2	1,1,2-Trichlorotrifluoroethane (CFC-113) **CAS #** 76-13-1 **Purity** 99%	(Lot 00004562)	2,500.0	µg/mL	+/- 14.5352 +/- 150.8361 +/- 151.1942	µg/mL µg/mL µg/mL	Gravimetric Unstressed Stressed
3	1,1-Dichloroethane **CAS #** 75-34-3 **Purity** 99%	(Lot 00008621)	2,500.1	µg/mL	+/- 14.5359 +/- 150.8436 +/- 151.2017	µg/mL µg/mL µg/mL	Gravimetric Unstressed Stressed
4	tert-Butanol (TBA) **CAS #** 75-65-0 **Purity** 99%	(Lot SHBD0362V)	25,033.4	µg/mL	+/- 145.5386 +/- 1,510.3737 +/- 1,513.9596	µg/mL µg/mL µg/mL	Gravimetric Unstressed Stressed
5	Iodomethane (methyl iodide) **CAS #** 74-88-4 **Purity** 98%	(Lot SHBF2149V)	2,502.9	µg/mL	+/- 14.5522 +/- 151.0123 +/- 151.3708	µg/mL µg/mL µg/mL	Gravimetric Unstressed Stressed
6	Methyl acetate **CAS #** 79-20-9 **Purity** 98%	(Lot SHBD7134V)	12,508.6	µg/mL	+/- 72.7223 +/- 754.6987 +/- 756.4905	µg/mL µg/mL µg/mL	Gravimetric Unstressed Stressed
7	Allyl chloride (3-chloropropene) **CAS #** 107-05-1 **Purity** 99%	(Lot SHBF8133V)	2,500.0	µg/mL	+/- 19.2743 +/- 151.3663 +/- 151.7231	µg/mL µg/mL µg/mL	Gravimetric Unstressed Stressed

8	Methylene chloride (dichloromethane)		2,521.4	µg/mL	+/-	14.6595	µg/mL	Gravimetric
	CAS # 75-09-2	(Lot SHBF9870V)			+/-	152.1257	µg/mL	Unstressed
	Purity 99%				+/-	152.4869	µg/mL	Stressed
9	Carbon disulfide		2,516.0	µg/mL	+/-	14.6282	µg/mL	Gravimetric
	CAS # 75-15-0	(Lot S20A856)			+/-	151.8014	µg/mL	Unstressed
	Purity 99%				+/-	152.1618	µg/mL	Stressed
10	Acrylonitrile		25,001.3	µg/mL	+/-	145.3518	µg/mL	Gravimetric
	CAS # 107-13-1	(Lot J08Z057)			+/-	1,508.4355	µg/mL	Unstressed
	Purity 99%				+/-	1,512.0167	µg/mL	Stressed
11	cis-1,2-Dichloroethene		2,507.8	µg/mL	+/-	14.5807	µg/mL	Gravimetric
	CAS # 156-59-2	(Lot MKBV2831V)			+/-	151.3079	µg/mL	Unstressed
	Purity 98%				+/-	151.6671	µg/mL	Stressed
12	n-Hexane (C6)		2,512.4	µg/mL	+/-	14.6072	µg/mL	Gravimetric
	CAS # 110-54-3	(Lot SHBF7674V)			+/-	151.5827	µg/mL	Unstressed
	Purity 99%				+/-	151.9426	µg/mL	Stressed
13	1,1-dichloroethene		2,508.1	µg/mL	+/-	14.5825	µg/mL	Gravimetric
	CAS # 75-35-4	(Lot 73896KMV)			+/-	151.3263	µg/mL	Unstressed
	Purity 99%				+/-	151.6856	µg/mL	Stressed
14	2,2-Dichloropropane		2,507.6	µg/mL	+/-	14.5795	µg/mL	Gravimetric
	CAS # 594-20-7	(Lot BCBL9720V)			+/-	151.2961	µg/mL	Unstressed
	Purity 99%				+/-	151.6553	µg/mL	Stressed
15	trans-1,2-Dichloroethene		2,509.8	µg/mL	+/-	14.5919	µg/mL	Gravimetric
	CAS # 156-60-5	(Lot MKBH9850V)			+/-	151.4243	µg/mL	Unstressed
	Purity 99%				+/-	151.7838	µg/mL	Stressed
16	Isobutanol (2-Methyl-1-propanol)		62,815.4	µg/mL	+/-	365.1949	µg/mL	Gravimetric
	CAS # 78-83-1	(Lot SHBD1647V)			+/-	3,789.9281	µg/mL	Unstressed
	Purity 99%				+/-	3,798.9260	µg/mL	Stressed
17	Methyl-tert-butyl ether (MTBE)		2,510.0	µg/mL	+/-	14.5934	µg/mL	Gravimetric
	CAS # 1634-04-4	(Lot MKBV2134V)			+/-	151.4394	µg/mL	Unstressed
	Purity 99%				+/-	151.7990	µg/mL	Stressed
18	Bromochloromethane		2,507.0	µg/mL	+/-	14.5759	µg/mL	Gravimetric
	CAS # 74-97-5	(Lot 00004559)			+/-	151.2584	µg/mL	Unstressed
	Purity 99%				+/-	151.6175	µg/mL	Stressed
19	Tetrahydrofuran		5,025.3	µg/mL	+/-	29.2172	µg/mL	Gravimetric
	CAS # 109-99-9	(Lot SHBG2910V)			+/-	303.1956	µg/mL	Unstressed
	Purity 99%				+/-	303.9154	µg/mL	Stressed
20	1,1,1-trichloroethane		2,508.9	µg/mL	+/-	14.5868	µg/mL	Gravimetric
	CAS # 71-55-6	(Lot B15MW0705)			+/-	151.3715	µg/mL	Unstressed
	Purity 99%				+/-	151.7309	µg/mL	Stressed
21	Cyclohexane		2,503.4	µg/mL	+/-	14.5548	µg/mL	Gravimetric
	CAS # 110-82-7	(Lot MKBV3194V)			+/-	151.0397	µg/mL	Unstressed
	Purity 99%				+/-	151.3983	µg/mL	Stressed
22	1,1-Dichloropropene		2,507.4	µg/mL	+/-	14.5781	µg/mL	Gravimetric
	CAS # 563-58-6	(Lot PR09161302)			+/-	151.2810	µg/mL	Unstressed
	Purity 99%				+/-	151.6402	µg/mL	Stressed
23	carbon tetrachloride		2,505.9	µg/mL	+/-	14.5694	µg/mL	Gravimetric
	CAS # 56-23-5	(Lot SHBG1763V)			+/-	151.1905	µg/mL	Unstressed
	Purity 99%				+/-	151.5495	µg/mL	Stressed

24	n-Heptane (C7)		2,510.8	µg/mL	+/-	14.5977	µg/mL	Gravimetric
	CAS # 142-82-5	(Lot MKBV6176V)			+/-	151.4847	µg/mL	Unstressed
	Purity 99%				+/-	151.8443	µg/mL	Stressed
25	1,2-Dichloroethane		2,511.1	µg/mL	+/-	14.5999	µg/mL	Gravimetric
	CAS # 107-06-2	(Lot MKBV4565V)			+/-	151.5073	µg/mL	Unstressed
	Purity 99%				+/-	151.8670	µg/mL	Stressed
26	Benzene		2,502.9	µg/mL	+/-	14.5519	µg/mL	Gravimetric
	CAS # 71-43-2	(Lot SHBG1169V)			+/-	151.0095	µg/mL	Unstressed
	Purity 99%				+/-	151.3681	µg/mL	Stressed
27	Trichloroethene		2,500.4	µg/mL	+/-	14.5374	µg/mL	Gravimetric
	CAS # 79-01-6	(Lot SHBF0943V)			+/-	150.8587	µg/mL	Unstressed
	Purity 99%				+/-	151.2169	µg/mL	Stressed
28	Methylcyclohexane		2,503.9	µg/mL	+/-	14.5577	µg/mL	Gravimetric
	CAS # 108-87-2	(Lot 50996APV)			+/-	151.0699	µg/mL	Unstressed
	Purity 99%				+/-	151.4285	µg/mL	Stressed
29	1,2-Dichloropropane		2,523.5	µg/mL	+/-	14.6718	µg/mL	Gravimetric
	CAS # 78-87-5	(Lot 01113D0V)			+/-	152.2539	µg/mL	Unstressed
	Purity 99%				+/-	152.6154	µg/mL	Stressed
30	bromodichloromethane		2,509.0	µg/mL	+/-	14.5878	µg/mL	Gravimetric
	CAS # 75-27-4	(Lot MKBL1617V)			+/-	151.3818	µg/mL	Unstressed
	Purity 98%				+/-	151.7412	µg/mL	Stressed
31	1,4-Dioxane		50,018.1	µg/mL	+/-	290.7945	µg/mL	Gravimetric
	CAS # 123-91-1	(Lot SHBG6312V)			+/-	3,017.8137	µg/mL	Unstressed
	Purity 99%				+/-	3,024.9785	µg/mL	Stressed
32	Dibromomethane		2,511.4	µg/mL	+/-	14.6013	µg/mL	Gravimetric
	CAS # 74-95-3	(Lot 10183283)			+/-	151.5222	µg/mL	Unstressed
	Purity 98%				+/-	151.8820	µg/mL	Stressed
33	cis-1,3-Dichloropropene		2,506.0	µg/mL	+/-	14.5701	µg/mL	Gravimetric
	CAS # 10061-01-5	(Lot 22622)			+/-	151.1981	µg/mL	Unstressed
	Purity 99%				+/-	151.5571	µg/mL	Stressed
34	Toluene		2,515.5	µg/mL	+/-	14.6253	µg/mL	Gravimetric
	CAS # 108-88-3	(Lot MKBV5601V)			+/-	151.7713	µg/mL	Unstressed
	Purity 99%				+/-	152.1316	µg/mL	Stressed
35	Ethyl methacrylate		2,503.1	µg/mL	+/-	14.5534	µg/mL	Gravimetric
	CAS # 97-63-2	(Lot SHBD9190V)			+/-	151.0246	µg/mL	Unstressed
	Purity 99%				+/-	151.3832	µg/mL	Stressed
36	trans-1,3-Dichloropropene		2,508.0	µg/mL	+/-	14.5817	µg/mL	Gravimetric
	CAS # 10061-02-6	(Lot C584177)			+/-	151.3188	µg/mL	Unstressed
	Purity 99%				+/-	151.6780	µg/mL	Stressed
37	1,1,2-Trichloroethane		2,508.4	µg/mL	+/-	14.5839	µg/mL	Gravimetric
	CAS # 79-00-5	(Lot FGB01)			+/-	151.3414	µg/mL	Unstressed
	Purity 99%				+/-	151.7007	µg/mL	Stressed
38	1,3-Dichloropropane		2,522.8	µg/mL	+/-	14.6675	µg/mL	Gravimetric
	CAS # 142-28-9	(Lot BCBG2162V)			+/-	152.2087	µg/mL	Unstressed
	Purity 99%				+/-	152.5701	µg/mL	Stressed
39	Tetrachloroethene		2,518.9	µg/mL	+/-	14.6450	µg/mL	Gravimetric
	CAS # 127-18-4	(Lot SHBD9374V)			+/-	151.9749	µg/mL	Unstressed
	Purity 99%				+/-	152.3357	µg/mL	Stressed

40	dibromochloromethane		2,505.4	µg/mL	+/-	14.5664	µg/mL	Gravimetric
	CAS # 124-48-1	(Lot MKBQ6577V)			+/-	151.1601	µg/mL	Unstressed
	Purity 98%				+/-	151.5190	µg/mL	Stressed
41	1,2-Dibromoethane (EDB)		2,505.1	µg/mL	+/-	14.5650	µg/mL	Gravimetric
	CAS # 106-93-4	(Lot BCBH3877V)			+/-	151.1453	µg/mL	Unstressed
	Purity 99%				+/-	151.5041	µg/mL	Stressed
42	Chlorobenzene		2,505.6	µg/mL	+/-	14.5679	µg/mL	Gravimetric
	CAS # 108-90-7	(Lot SHBF0505V)			+/-	151.1755	µg/mL	Unstressed
	Purity 99%				+/-	151.5344	µg/mL	Stressed
43	1,1,2,2-Tetrachloroethane		2,505.1	µg/mL	+/-	14.5650	µg/mL	Gravimetric
	CAS # 79-34-5	(Lot CFA4D)			+/-	151.1453	µg/mL	Unstressed
	Purity 99%				+/-	151.5041	µg/mL	Stressed
44	Ethylbenzene		2,506.1	µg/mL	+/-	14.5708	µg/mL	Gravimetric
	CAS # 100-41-4	(Lot SHBG5920V)			+/-	151.2056	µg/mL	Unstressed
	Purity 99%				+/-	151.5646	µg/mL	Stressed
45	m-Xylene		1,254.4	µg/mL	+/-	7.2930	µg/mL	Gravimetric
	CAS # 108-38-3	(Lot SHBF8095V)			+/-	75.6820	µg/mL	Unstressed
	Purity 99%				+/-	75.8617	µg/mL	Stressed
46	p-Xylene		1,250.0	µg/mL	+/-	7.2676	µg/mL	Gravimetric
	CAS # 106-42-3	(Lot SHBF3427V)			+/-	75.4180	µg/mL	Unstressed
	Purity 99%				+/-	75.5971	µg/mL	Stressed
47	o-Xylene		2,506.3	µg/mL	+/-	14.5716	µg/mL	Gravimetric
	CAS # 95-47-6	(Lot SHBF7003V)			+/-	151.2132	µg/mL	Unstressed
	Purity 99%				+/-	151.5722	µg/mL	Stressed
48	Styrene		2,503.9	µg/mL	+/-	14.5577	µg/mL	Gravimetric
	CAS # 100-42-5	(Lot MKBS7097V)			+/-	151.0699	µg/mL	Unstressed
	Purity 99%				+/-	151.4285	µg/mL	Stressed
49	Isopropylbenzene (cumene)		2,509.4	µg/mL	+/-	14.5897	µg/mL	Gravimetric
	CAS # 98-82-8	(Lot 10185056)			+/-	151.4017	µg/mL	Unstressed
	Purity 99%				+/-	151.7612	µg/mL	Stressed
50	bromoform		2,503.3	µg/mL	+/-	14.5541	µg/mL	Gravimetric
	CAS # 75-25-2	(Lot SHBC3410V)			+/-	151.0322	µg/mL	Unstressed
	Purity 99%				+/-	151.3907	µg/mL	Stressed
51	1,1,1,2-Tetrachloroethane		2,505.0	µg/mL	+/-	14.5643	µg/mL	Gravimetric
	CAS # 630-20-6	(Lot MKBS3769V)			+/-	151.1378	µg/mL	Unstressed
	Purity 99%				+/-	151.4966	µg/mL	Stressed
52	chloroform		2,507.8	µg/mL	+/-	14.5803	µg/mL	Gravimetric
	CAS # 67-66-3	(Lot MKBV2089V)			+/-	151.3037	µg/mL	Unstressed
	Purity 99%				+/-	151.6629	µg/mL	Stressed
53	1,2,3-Trichloropropane		2,504.8	µg/mL	+/-	14.5628	µg/mL	Gravimetric
	CAS # 96-18-4	(Lot BCBH8722V)			+/-	151.1227	µg/mL	Unstressed
	Purity 99%				+/-	151.4815	µg/mL	Stressed
54	trans-1,4-dichloro-2-butene		2,499.7	µg/mL	+/-	14.5334	µg/mL	Gravimetric
	CAS # 110-57-6	(Lot MKBP6041V)			+/-	150.8172	µg/mL	Unstressed
	Purity 95%				+/-	151.1753	µg/mL	Stressed
55	n-Propylbenzene		2,507.5	µg/mL	+/-	14.5788	µg/mL	Gravimetric
	CAS # 103-65-1	(Lot MKBJ0332V)			+/-	151.2886	µg/mL	Unstressed
	Purity 99%				+/-	151.6478	µg/mL	Stressed

56	Bromobenzene		2,515.1	µg/mL	+/-	14.6232	µg/mL	Gravimetric
	CAS # 108-86-1	(Lot MKBD4032V)			+/-	151.7486	µg/mL	Unstressed
	Purity 99%				+/-	152.1089	µg/mL	Stressed
57	1,2,4-Trimethylbenzene		2,503.7	µg/mL	+/-	14.5565	µg/mL	Gravimetric
	CAS # 95-63-6	(Lot MKBJ6229V)			+/-	151.0566	µg/mL	Unstressed
	Purity 98%				+/-	151.4152	µg/mL	Stressed
58	2-Chlorotoluene		2,502.1	µg/mL	+/-	14.5476	µg/mL	Gravimetric
	CAS # 95-49-8	(Lot MKBH8892V)			+/-	150.9643	µg/mL	Unstressed
	Purity 99%				+/-	151.3227	µg/mL	Stressed
59	4-Chlorotoluene		2,512.6	µg/mL	+/-	14.6086	µg/mL	Gravimetric
	CAS # 106-43-4	(Lot MKBL7753V)			+/-	151.5978	µg/mL	Unstressed
	Purity 99%				+/-	151.9577	µg/mL	Stressed
60	tert-Butylbenzene		2,507.8	µg/mL	+/-	14.5803	µg/mL	Gravimetric
	CAS # 98-06-6	(Lot S52237V)			+/-	151.3037	µg/mL	Unstressed
	Purity 99%				+/-	151.6629	µg/mL	Stressed
61	1,3,5-Trimethylbenzene		2,502.5	µg/mL	+/-	14.5498	µg/mL	Gravimetric
	CAS # 108-67-8	(Lot BCBJ6245V)			+/-	150.9869	µg/mL	Unstressed
	Purity 99%				+/-	151.3454	µg/mL	Stressed
62	sec-Butylbenzene		2,521.8	µg/mL	+/-	14.6617	µg/mL	Gravimetric
	CAS # 135-98-8	(Lot MKBK3151V)			+/-	152.1484	µg/mL	Unstressed
	Purity 99%				+/-	152.5096	µg/mL	Stressed
63	p-Isopropyltoluene (p-Cymene)		2,502.6	µg/mL	+/-	14.5505	µg/mL	Gravimetric
	CAS # 99-87-6	(Lot MKBK4439V)			+/-	150.9945	µg/mL	Unstressed
	Purity 99%				+/-	151.3529	µg/mL	Stressed
64	1,3-Dichlorobenzene		2,505.8	µg/mL	+/-	14.5686	µg/mL	Gravimetric
	CAS # 541-73-1	(Lot BCBM5751V)			+/-	151.1830	µg/mL	Unstressed
	Purity 99%				+/-	151.5419	µg/mL	Stressed
65	1,4-Dichlorobenzene		2,504.1	µg/mL	+/-	14.5592	µg/mL	Gravimetric
	CAS # 106-46-7	(Lot MKBS1350V)			+/-	151.0850	µg/mL	Unstressed
	Purity 99%				+/-	151.4437	µg/mL	Stressed
66	n-Butylbenzene		2,503.3	µg/mL	+/-	14.5541	µg/mL	Gravimetric
	CAS # 104-51-8	(Lot 09418JJV)			+/-	151.0322	µg/mL	Unstressed
	Purity 99%				+/-	151.3907	µg/mL	Stressed
67	1,2-Dichlorobenzene		2,505.5	µg/mL	+/-	14.5672	µg/mL	Gravimetric
	CAS # 95-50-1	(Lot SHBD7331V)			+/-	151.1679	µg/mL	Unstressed
	Purity 99%				+/-	151.5268	µg/mL	Stressed
68	1,2-Dibromo-3-chloropropane		2,508.6	µg/mL	+/-	14.5854	µg/mL	Gravimetric
	CAS # 96-12-8	(Lot FBL01-JM)			+/-	151.3565	µg/mL	Unstressed
	Purity 99%				+/-	151.7158	µg/mL	Stressed
69	1,2,4-Trichlorobenzene		2,518.6	µg/mL	+/-	14.6435	µg/mL	Gravimetric
	CAS # 120-82-1	(Lot 26896BM)			+/-	151.9598	µg/mL	Unstressed
	Purity 99%				+/-	152.3206	µg/mL	Stressed
70	Hexachlorobutadiene		2,499.9	µg/mL	+/-	14.5344	µg/mL	Gravimetric
	CAS # 87-68-3	(Lot J31X013)			+/-	150.8275	µg/mL	Unstressed
	Purity 98%				+/-	151.1856	µg/mL	Stressed
71	Naphthalene		2,514.9	µg/mL	+/-	14.6217	µg/mL	Gravimetric
	CAS # 91-20-3	(Lot MKBH4351V)			+/-	151.7336	µg/mL	Unstressed
	Purity 99%				+/-	152.0938	µg/mL	Stressed

72	1,2,3-Trichlorobenzene		2,502.0 µg/mL	+/-	14.5468	µg/mL	Gravimetric
	CAS # 87-61-6	(Lot MKBS4859V)		+/-	150.9567	µg/mL	Unstressed
	Purity 99%			+/-	151.3151	µg/mL	Stressed

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

Column:
60m x 0.25mm x 1.4µm
Rtx-502.2 (cat.#10916)

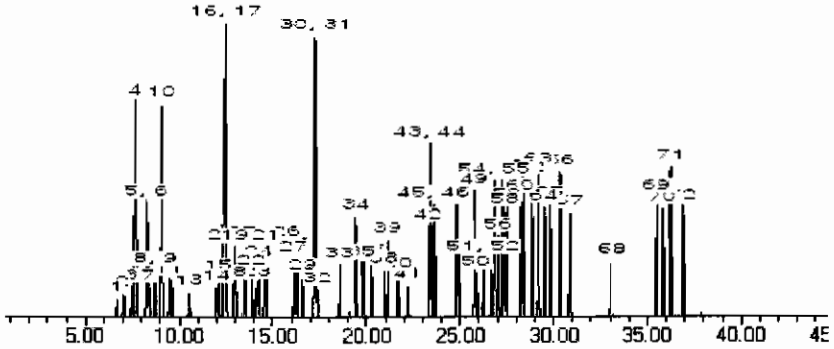
Carrier Gas:
helium-constant pressure 30 psi

Temp. Program:
40°C (hold 6 min.) to 240°C
@ 6°C/min. (hold 10 min.)

Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
MSD



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

Rebecca Sawyer

Date Mixed: 21-Mar-2016 **Balance:** 1125113331

Jodi E. Breon

Jodi E. Breon - QA Analyst

Date Passed: 28-Mar-2016

Manufactured under Restek's ISO 9001:2008 Registered Quality System Certificate #FM 80397

Reagent

8260MegaMixSS_00048

RESTEK
110 Benner Circle
Bellefonte, PA 16823-8812
Tel: (800)356-1688
Fax: (814)353-1309

www.restek.com

CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 569720.sec **Lot No.:** A0120604

Description : 8260 List 1 / Std #1 MegaMix (2015)

8260 List 1 / Std #1 MegaMix (2015) 1250-62500 µg/ml, P&T Methanol, 1 ml/ampul

REC'D 12-12-16 JDH

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : July 31, 2018 **Storage:** 0°C or colder

1074882-884

CERTIFIED VALUES

Elution Order	Compound	Grav. Conc. (weight/volume)	Expanded Uncertainty (95% C.L.; K=2)	
1	Diethyl ether (ethyl ether) **CAS #** 60-29-7.SEC (Lot F23X068) **Purity** 98%	2,501.1 µg/mL	+/- 14.5415 µg/mL +/- 150.9014 µg/mL +/- 151.2597 µg/mL	Gravimetric Unstressed Stressed
2	1,1,2-Trichlorotrifluoroethane (CFC-113) **CAS #** 76-13-1.SEC (Lot 18342) **Purity** 99%	2,501.1 µg/mL	+/- 14.5418 µg/mL +/- 150.9040 µg/mL +/- 151.2622 µg/mL	Gravimetric Unstressed Stressed
3	1,1-Dichloroethene **CAS #** 75-35-4.SEC (Lot 2767000) **Purity** 99%	2,500.8 µg/mL	+/- 14.5396 µg/mL +/- 150.8813 µg/mL +/- 151.2395 µg/mL	Gravimetric Unstressed Stressed
4	tert-Butanol (TBA) **CAS #** 75-65-0.SEC (Lot XYXDO) **Purity** 98%	25,004.1 µg/mL	+/- 145.3683 µg/mL +/- 1,508.6067 µg/mL +/- 1,512.1884 µg/mL	Gravimetric Unstressed Stressed
5	Iodomethane (methyl iodide) **CAS #** 74-88-4.SEC (Lot Y25A027) **Purity** 99%	2,501.0 µg/mL	+/- 14.5410 µg/mL +/- 150.8964 µg/mL +/- 151.2547 µg/mL	Gravimetric Unstressed Stressed
6	Methyl acetate **CAS #** 79-20-9.SEC (Lot 6WOXM) **Purity** 99%	12,501.6 µg/mL	+/- 72.6817 µg/mL +/- 754.2781 µg/mL +/- 756.0689 µg/mL	Gravimetric Unstressed Stressed
7	Allyl chloride (3-chloropropene) **CAS #** 107-05-1.SEC (Lot VEBOC) **Purity** 98%	2,501.0 µg/mL	+/- 14.5408 µg/mL +/- 150.8940 µg/mL +/- 151.2522 µg/mL	Gravimetric Unstressed Stressed

8	Methylene chloride (dichloromethane)		2,501.1	µg/mL	+/-	14.5418	µg/mL	Gravimetrie
	CAS # 75-09-2.SEC	(Lot FGM02)			+/-	150.9040	µg/mL	Unstressed
	Purity 99%				+/-	151.2622	µg/mL	Stressed
9	Carbon disulfide		2,500.5	µg/mL	+/-	14.5381	µg/mL	Gravimetric
	CAS # 75-15-0.SEC	(Lot MKBL1376V)			+/-	150.8662	µg/mL	Unstressed
	Purity 99%				+/-	151.2244	µg/mL	Stressed
10	Acrylonitrile		25,020.0	µg/mL	+/-	145.4608	µg/mL	Gravimetric
	CAS # 107-13-1.SEC	(Lot UERIL-DA)			+/-	1,509.5667	µg/mL	Unstressed
	Purity 99%				+/-	1,513.1507	µg/mL	Stressed
11	eis-1,2-Dichloroethene		2,500.8	µg/mL	+/-	14.5401	µg/mL	Gravimetric
	CAS # 156-59-2.SEC	(Lot HGC01-BLKT)			+/-	150.8866	µg/mL	Unstressed
	Purity 98%				+/-	151.2448	µg/mL	Stressed
12	n-Hexane (C6)		2,501.1	µg/mL	+/-	14.5418	µg/mL	Gravimetric
	CAS # 110-54-3.SEC	(Lot 10188491)			+/-	150.9040	µg/mL	Unstressed
	Purity 99%				+/-	151.2622	µg/mL	Stressed
13	1,1-Dichloroethane		2,501.1	µg/mL	+/-	14.5418	µg/mL	Gravimetric
	CAS # 75-34-3.SEC	(Lot 5035700)			+/-	150.9040	µg/mL	Unstressed
	Purity 99%				+/-	151.2622	µg/mL	Stressed
14	2,2-Dichloropropane		2,500.6	µg/mL	+/-	14.5388	µg/mL	Gravimetric
	CAS # 594-20-7.SEC	(Lot GI01)			+/-	150.8738	µg/mL	Unstressed
	Purity 99%				+/-	151.2320	µg/mL	Stressed
15	trans-1,2-Dichloroethene		2,501.3	µg/mL	+/-	14.5426	µg/mL	Gravimetric
	CAS # 156-60-5.SEC	(Lot TS5UB)			+/-	150.9125	µg/mL	Unstressed
	Purity 97%				+/-	151.2708	µg/mL	Stressed
16	Isobutanol (2-Methyl-1-propanol)		62,503.0	µg/mL	+/-	363.3788	µg/mL	Gravimetric
	CAS # 78-83-1.SEC	(Lot 83NHH)			+/-	3,771.0811	µg/mL	Unstressed
	Purity 99%				+/-	3,780.0343	µg/mL	Stressed
17	Methyl-tert-butyl ether (MTBE)		2,501.0	µg/mL	+/-	14.5410	µg/mL	Gravimetric
	CAS # 1634-04-4.SEC	(Lot ZAQTA-MS)			+/-	150.8964	µg/mL	Unstressed
	Purity 99%				+/-	151.2547	µg/mL	Stressed
18	Bromochloromethane		2,500.4	µg/mL	+/-	14.5374	µg/mL	Gravimetric
	CAS # 74-97-5.SEC	(Lot 1775400)			+/-	150.8587	µg/mL	Unstressed
	Purity 99%				+/-	151.2169	µg/mL	Stressed
19	Tetrahydrofuran		5,000.3	µg/mL	+/-	29.0719	µg/mL	Gravimetric
	CAS # 109-99-9.SEC	(Lot K3V7J-SJ)			+/-	301.6872	µg/mL	Unstressed
	Purity 99%				+/-	302.4035	µg/mL	Stressed
20	I,1,I-Trichloroethane		2,501.3	µg/mL	+/-	14.5429	µg/mL	Gravimetric
	CAS # 71-55-6.SEC	(Lot CS160712)			+/-	150.9162	µg/mL	Unstressed
	Purity 98%				+/-	151.2745	µg/mL	Stressed
21	Cyclohexane		2,500.3	µg/mL	+/-	14.5367	µg/mL	Gravimetric
	CAS # 110-82-7.SEC	(Lot YADRA)			+/-	150.8512	µg/mL	Unstressed
	Purity 99%				+/-	151.2093	µg/mL	Stressed
22	1,1-Dichloropropene		2,500.4	µg/mL	+/-	14.5378	µg/mL	Gravimetric
	CAS # 563-58-6.SEC	(Lot 4672600)			+/-	150.8626	µg/mL	Unstressed
	Purity 96%				+/-	151.2208	µg/mL	Stressed
23	Carbon tetrachloride		2,500.5	µg/mL	+/-	14.5381	µg/mL	Gravimetric
	CAS # 56-23-5.SEC	(Lot 11466)			+/-	150.8662	µg/mL	Unstressed
	Purity 99%				+/-	151.2244	µg/mL	Stressed

24	n-Heptane (C7)		2,500.5	µg/mL	+/-	14.5381	µg/mL	Gravimetric
	CAS # 142-82-5.SEC	(Lot OGM01)			+/-	150.8662	µg/mL	Unstressed
	Purity 99%				+/-	151.2244	µg/mL	Stressed
25	1,2-Dichloroethane		2,501.3	µg/mL	+/-	14.5425	µg/mL	Gravimetric
	CAS # 107-06-2.SEC	(Lot FO6PK)			+/-	150.9115	µg/mL	Unstressed
	Purity 99%				+/-	151.2698	µg/mL	Stressed
26	Benzene		2,500.6	µg/mL	+/-	14.5388	µg/mL	Gravimetric
	CAS # 71-43-2.SEC	(Lot B28Y008)			+/-	150.8738	µg/mL	Unstressed
	Purity 99%				+/-	151.2320	µg/mL	Stressed
27	Trichloroethene		2,500.4	µg/mL	+/-	14.5374	µg/mL	Gravimetric
	CAS # 79-01-6.SEC	(Lot H04X050)			+/-	150.8587	µg/mL	Unstressed
	Purity 99%				+/-	151.2169	µg/mL	Stressed
28	Methylcyclohexane		2,501.9	µg/mL	+/-	14.5461	µg/mL	Gravimetric
	CAS # 108-87-2.SEC	(Lot 24MSD-CD)			+/-	150.9492	µg/mL	Unstressed
	Purity 99%				+/-	151.3076	µg/mL	Stressed
29	1,2-Dichloropropane		2,500.8	µg/mL	+/-	14.5396	µg/mL	Gravimetric
	CAS # 78-87-5.SEC	(Lot OGG01)			+/-	150.8813	µg/mL	Unstressed
	Purity 99%				+/-	151.2395	µg/mL	Stressed
30	Bromodichloromethane		2,500.4	µg/mL	+/-	14.5374	µg/mL	Gravimetric
	CAS # 75-27-4.SEC	(Lot 10171168)			+/-	150.8587	µg/mL	Unstressed
	Purity 99%				+/-	151.2169	µg/mL	Stressed
31	1,4-Dioxane		50,014.8	µg/mL	+/-	290.7749	µg/mL	Gravimetric
	CAS # 123-91-1.SEC	(Lot CHA4A)			+/-	3,017.6100	µg/mL	Unstressed
	Purity 99%				+/-	3,024.7743	µg/mL	Stressed
32	Dibromomethane		2,501.4	µg/mL	+/-	14.5432	µg/mL	Gravimetric
	CAS # 74-95-3.SEC	(Lot FGI01-OICH)			+/-	150.9190	µg/mL	Unstressed
	Purity 99%				+/-	151.2773	µg/mL	Stressed
33	cis-1,3-Dichloropropene		2,500.8	µg/mL	+/-	14.5396	µg/mL	Gravimetric
	CAS # 10061-01-5.SEC	(Lot 7ZLXJ-TJ)			+/-	150.8813	µg/mL	Unstressed
	Purity 99%				+/-	151.2395	µg/mL	Stressed
34	Toluene		2,501.3	µg/mL	+/-	14.5425	µg/mL	Gravimetric
	CAS # 108-88-3.SEC	(Lot YND2B-BD)			+/-	150.9115	µg/mL	Unstressed
	Purity 99%				+/-	151.2698	µg/mL	Stressed
35	Ethyl methacrylate		2,501.6	µg/mL	+/-	14.5447	µg/mL	Gravimetric
	CAS # 97-63-2.SEC	(Lot MLWYK-LS)			+/-	150.9341	µg/mL	Unstressed
	Purity 99%				+/-	151.2925	µg/mL	Stressed
36	trans-1,3-Dichloropropene		2,500.5	µg/mL	+/-	14.5381	µg/mL	Gravimetric
	CAS # 10061-02-6.SEC	(Lot 2ECIC)			+/-	150.8662	µg/mL	Unstressed
	Purity 99%				+/-	151.2244	µg/mL	Stressed
37	1,1,2-Trichloroethane		2,500.5	µg/mL	+/-	14.5379	µg/mL	Gravimetric
	CAS # 79-00-5.SEC	(Lot 3440900)			+/-	150.8644	µg/mL	Unstressed
	Purity 98%				+/-	151.2226	µg/mL	Stressed
38	1,3-Diehloropropane		2,501.0	µg/mL	+/-	14.5410	µg/mL	Gravimetric
	CAS # 142-28-9.SEC	(Lot AGN01-EFPC)			+/-	150.8964	µg/mL	Unstressed
	Purity 99%				+/-	151.2547	µg/mL	Stressed
39	Tetrachloroethene		2,501.5	µg/mL	+/-	14.5439	µg/mL	Gravimetric
	CAS # 127-18-4.SEC	(Lot F09W014)			+/-	150.9266	µg/mL	Unstressed
	Purity 99%				+/-	151.2849	µg/mL	Stressed

40	Dibromochloromethane		2,501.9	µg/mL	+/-	14.5461	µg/mL	Gravimetrie
	CAS # 124-48-1.SEC	(Lot 10181507)			+/-	150.9491	µg/mL	Unstressed
	Purity 97%				+/-	151.3074	µg/mL	Stressed
41	1,2-Dibromoethane (EDB)		2,500.1	µg/mL	+/-	14.5359	µg/mL	Gravimetric
	CAS # 106-93-4.SEC	(Lot 3505900)			+/-	150.8436	µg/mL	Unstressed
	Purity 99%				+/-	151.2017	µg/mL	Stressed
42	Chlorobenzene		2,501.5	µg/mL	+/-	14.5439	µg/mL	Gravimetric
	CAS # 108-90-7.SEC	(Lot 1161936)			+/-	150.9266	µg/mL	Unstressed
	Purity 99%				+/-	151.2849	µg/mL	Stressed
43	1,1,1,2-Tetrachlorocthane		2,501.0	µg/mL	+/-	14.5408	µg/mL	Gravimetric
	CAS # 630-20-6.SEC	(Lot GC01)			+/-	150.8940	µg/mL	Unstressed
	Purity 98%				+/-	151.2522	µg/mL	Stressed
44	Ethylbenzene		2,501.4	µg/mL	+/-	14.5432	µg/mL	Gravimetric
	CAS # 100-41-4.SEC	(Lot P14SE)			+/-	150.9190	µg/mL	Unstressed
	Purity 99%				+/-	151.2773	µg/mL	Stressed
45	m-Xylene		1,250.9	µg/mL	+/-	7.2727	µg/mL	Gravimetric
	CAS # 108-38-3.SEC	(Lot OUKMG-GB)			+/-	75.4708	µg/mL	Unstressed
	Purity 99%				+/-	75.6500	µg/mL	Stressed
46	p-Xylene		1,250.8	µg/mL	+/-	7.2720	µg/mL	Gravimetric
	CAS # 106-42-3.SEC	(Lot GM01)			+/-	75.4633	µg/mL	Unstressed
	Purity 99%				+/-	75.6425	µg/mL	Stressed
47	o-Xylene		2,501.0	µg/mL	+/-	14.5410	µg/mL	Gravimetric
	CAS # 95-47-6.SEC	(Lot FGL01-KTPK)			+/-	150.8964	µg/mL	Unstressed
	Purity 99%				+/-	151.2547	µg/mL	Stressed
48	Styrene		2,500.4	µg/mL	+/-	14.5374	µg/mL	Gravimetric
	CAS # 100-42-5.SEC	(Lot OF1OL-IA)			+/-	150.8587	µg/mL	Unstressed
	Purity 99%				+/-	151.2169	µg/mL	Stressed
49	Isopropylbenzene (cumene)		2,500.4	µg/mL	+/-	14.5374	µg/mL	Gravimetric
	CAS # 98-82-8.SEC	(Lot 2PHXG-IH)			+/-	150.8587	µg/mL	Unstressed
	Purity 99%				+/-	151.2169	µg/mL	Stressed
50	Bromoform		2,500.3	µg/mL	+/-	14.5367	µg/mL	Gravimetric
	CAS # 75-25-2.SEC	(Lot 5139000)			+/-	150.8512	µg/mL	Unstressed
	Purity 99%				+/-	151.2093	µg/mL	Stressed
51	1,1,2,2-Tetrachloroethane		2,500.5	µg/mL	+/-	14.5381	µg/mL	Gravimetric
	CAS # 79-34-5.SEC	(Lot CFA4D-AQ)			+/-	150.8662	µg/mL	Unstressed
	Purity 99%				+/-	151.2244	µg/mL	Stressed
52	Chloroform		2,500.6	µg/mL	+/-	14.5388	µg/mL	Gravimetric
	CAS # 67-66-3.SEC	(Lot 1297547)			+/-	150.8738	µg/mL	Unstressed
	Purity 99%				+/-	151.2320	µg/mL	Stressed
53	1,2,3-Trichloropropane		2,501.5	µg/mL	+/-	14.5436	µg/mL	Gravimetrie
	CAS # 96-18-4.SEC	(Lot OGI01)			+/-	150.9236	µg/mL	Unstressed
	Purity 98%				+/-	151.2819	µg/mL	Stressed
54	trans-1,4-Dichloro-2-butene		2,500.5	µg/mL	+/-	14.5379	µg/mL	Gravimetric
	CAS # 110-57-6.SEC	(Lot 100700-3)			+/-	150.8644	µg/mL	Unstressed
	Purity 98%				+/-	151.2226	µg/mL	Stressed
55	n-Propylbenzene		2,500.0	µg/mL	+/-	14.5352	µg/mL	Gravimetric
	CAS # 103-65-1.SEC	(Lot T2HFC-1T)			+/-	150.8361	µg/mL	Unstressed
	Purity 99%				+/-	151.1942	µg/mL	Stressed

56	Bromobenzene		2,501.0	µg/mL	+/-	14.5410	µg/mL	Gravimetric
	CAS # 108-86-1.SEC	(Lot 2FUHG-EM)			+/-	150.8964	µg/mL	Unstressed
	Purity 99%				+/-	151.2547	µg/mL	Stressed
57	1,2,4-Trimethylbenzene		2,500.6	µg/mL	+/-	14.5388	µg/mL	Gravimetric
	CAS # 95-63-6.SEC	(Lot SC7LO-QA)			+/-	150.8738	µg/mL	Unstressed
	Purity 99%				+/-	151.2320	µg/mL	Stressed
58	2-Chlorotoluene		2,500.6	µg/mL	+/-	14.5388	µg/mL	Gravimetric
	CAS # 95-49-8.SEC	(Lot SW8QG-AO)			+/-	150.8738	µg/mL	Unstressed
	Purity 99%				+/-	151.2320	µg/mL	Stressed
59	4-Chlorotoluene		2,500.9	µg/mL	+/-	14.5403	µg/mL	Gravimetric
	CAS # 106-43-4.SEC	(Lot P4XHJ-AO)			+/-	150.8889	µg/mL	Unstressed
	Purity 99%				+/-	151.2471	µg/mL	Stressed
60	tert-Butylbenzene		2,500.5	µg/mL	+/-	14.5381	µg/mL	Gravimetric
	CAS # 98-06-6.SEC	(Lot OGN01-CAI)			+/-	150.8662	µg/mL	Unstressed
	Purity 99%				+/-	151.2244	µg/mL	Stressed
61	1,3,5-Trimethylbenzene		2,500.8	µg/mL	+/-	14.5396	µg/mL	Gravimetric
	CAS # 108-67-8.SEC	(Lot FGH02-CMLN)			+/-	150.8813	µg/mL	Unstressed
	Purity 99%				+/-	151.2395	µg/mL	Stressed
62	sec-Butylbenzene		2,500.9	µg/mL	+/-	14.5403	µg/mL	Gravimetric
	CAS # 135-98-8.SEC	(Lot OGN01-IMA)			+/-	150.8889	µg/mL	Unstressed
	Purity 99%				+/-	151.2471	µg/mL	Stressed
63	4-Isopropyltoluene (p-cymene)		2,501.5	µg/mL	+/-	14.5441	µg/mL	Gravimetric
	CAS # 99-87-6.SEC	(Lot 1195000)			+/-	150.9278	µg/mL	Unstressed
	Purity 96%				+/-	151.2861	µg/mL	Stressed
64	1,3-Dichlorobenzene		2,501.6	µg/mL	+/-	14.5447	µg/mL	Gravimetric
	CAS # 541-73-1.SEC	(Lot FMDFD)			+/-	150.9341	µg/mL	Unstressed
	Purity 99%				+/-	151.2925	µg/mL	Stressed
65	1,4-Dichlorobenzene		2,501.1	µg/mL	+/-	14.5418	µg/mL	Gravimetric
	CAS # 106-46-7.SEC	(Lot 4Y5DC)			+/-	150.9040	µg/mL	Unstressed
	Purity 99%				+/-	151.2622	µg/mL	Stressed
66	n-Butylbenzene		2,501.4	µg/mL	+/-	14.5432	µg/mL	Gravimetric
	CAS # 104-51-8.SEC	(Lot OGN01-PNP)			+/-	150.9190	µg/mL	Unstressed
	Purity 99%				+/-	151.2773	µg/mL	Stressed
67	1,2-Dichlorobenzene		2,500.3	µg/mL	+/-	14.5367	µg/mL	Gravimetric
	CAS # 95-50-1.SEC	(Lot 4NRGF-OT)			+/-	150.8512	µg/mL	Unstressed
	Purity 99%				+/-	151.2093	µg/mL	Stressed
68	1,2-Dibromo-3-chloropropane		2,500.3	µg/mL	+/-	14.5369	µg/mL	Gravimetric
	CAS # 96-12-8.SEC	(Lot LC00408V)			+/-	150.8539	µg/mL	Unstressed
	Purity 97%				+/-	151.2121	µg/mL	Stressed
69	1,2,4-Trichlorobenzene		2,500.4	µg/mL	+/-	14.5374	µg/mL	Gravimetric
	CAS # 120-82-1.SEC	(Lot 3LYYC)			+/-	150.8587	µg/mL	Unstressed
	Purity 99%				+/-	151.2169	µg/mL	Stressed
70	Hexachlorobutadiene		2,500.7	µg/mL	+/-	14.5394	µg/mL	Gravimetric
	CAS # 87-68-3.SEC	(Lot 4974700)			+/-	150.8792	µg/mL	Unstressed
	Purity 98%				+/-	151.2374	µg/mL	Stressed
71	Naphthalene		2,500.0	µg/mL	+/-	14.5352	µg/mL	Gravimetric
	CAS # 91-20-3.SEC	(Lot SKZ5N)			+/-	150.8361	µg/mL	Unstressed
	Purity 99%				+/-	151.1942	µg/mL	Stressed

72	1,2,3-Trichlorobenzene		2,501.6 µg/mL	+/-	14.5444	µg/mL	Gravimetric
	CAS # 87-61-6.SEC	(Lot A0043055)		+/-	150.9310	µg/mL	Unstressed
	Purity 98%			+/-	151.2893	µg/mL	Stressed

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

Column:
60m x 0.25mm x 1.4µm
Rtx-502.2 (cat.#10916)

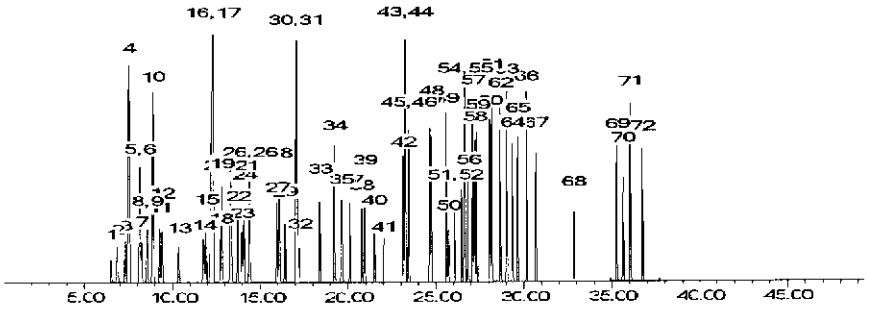
Carrier Gas:
helium-constant pressure 30 psi

Temp. Program:
40°C (hold 6 min.) to 240°C
@ 6°C/min. (hold 10 min.)

Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
MSD



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

Michael J Maye

Date Mixed: 25-Jul-2016 **Balance:** 1127510105

Jennifer L Pollino

Jennifer L. Pollino - QC Analyst

Date Passed: 28-Jul-2016

Manufactured under Restek's ISO 9001:2008 Registered Quality System Certificate #FM 80397

Reagent

Add(A)SS 2016_00013

RESTEK
110 Benner Circle
Bellefonte, PA 16823-8812
Tel: (800)356-1688
Fax: (814)353-1309

www.restek.com

CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

ACCREDITED
ISO Guide 34 Accredited Reference Material Producer
Certificate #3222.01

ACCREDITED
ISO/IEC 17025 Accredited Testing Laboratory
Certificate #3222.02

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 570808.sec **Lot No.:** A0116135

Description : 8260 List 2 / Std #6

8260 List 2 / Std #6 2500-62500 µg/ml, P&T Methanol, 1 ml/ampul

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : June 30, 2017 **Storage:** 0°C or colder

REC'D 11-9-16
JDH
1054704-706

CERTIFIED VALUES

Elution Order	Compound	Grav. Conc. (weight/volume)	Expanded Uncertainty (95% C.L.; K=2)	
1	2-Propanol (isopropanol) **CAS #** 67-63-0.SEC (Lot NWVYK) **Purity** 98%	25,004.1 µg/mL	+/- 146.4046 µg/mL +/- 1,237.0209 µg/mL +/- 1,267.7746 µg/mL	Gravimetric Unstressed Stressed
2	Chloroprene **CAS #** 126-99-8.A * (Lot 151210JLM) **Purity** 99%	2,502.4 µg/mL	+/- 14.6855 µg/mL +/- 123.8044 µg/mL +/- 126.8822 µg/mL	Gravimetric Unstressed Stressed
3	Methacrylonitrile **CAS #** 126-98-7 * (Lot 1012014) **Purity** 99%	25,001.6 µg/mL	+/- 146.3899 µg/mL +/- 1,236.8966 µg/mL +/- 1,267.6472 µg/mL	Gravimetric Unstressed Stressed
4	2,2,4-Trimethylpentane (Isooctane) **CAS #** 540-84-1.SEC (Lot 1894700) **Purity** 99%	2,500.8 µg/mL	+/- 14.6761 µg/mL +/- 123.7253 µg/mL +/- 126.8010 µg/mL	Gravimetric Unstressed Stressed
5	1-Butanol **CAS #** 71-36-3.SEC (Lot QBO2D) **Purity** 99%	62,500.0 µg/mL	+/- 365.9324 µg/mL +/- 3,092.0415 µg/mL +/- 3,168.9130 µg/mL	Gravimetric Unstressed Stressed
6	2-Nitropropane **CAS #** 79-46-9.SEC (Lot KW38H-RN) **Purity** 98%	5,000.4 µg/mL	+/- 29.2782 µg/mL +/- 247.3809 µg/mL +/- 253.5311 µg/mL	Gravimetric Unstressed Stressed
7	1-Chlorohexane **CAS #** 544-10-5.SEC (Lot 3890000) **Purity** 98%	2,500.2 µg/mL	+/- 14.6724 µg/mL +/- 123.6944 µg/mL +/- 126.7694 µg/mL	Gravimetric Unstressed Stressed

8	1,2,3-Trimethylbenzene		2,501.0	µg/mL	+/-	14.6776	µg/mL	Gravimetric
	CAS # 526-73-8.SEC	(Lot 4591200)			+/-	123.7375	µg/mL	Unstressed
	Purity 97%				+/-	126.8136	µg/mL	Stressed
9	Benzyl chloride		2,500.4	µg/mL	+/-	14.6737	µg/mL	Gravimetric
	CAS # 100-44-7.SEC	(Lot H29N03)			+/-	123.7055	µg/mL	Unstressed
	Purity 99%				+/-	126.7807	µg/mL	Stressed
10	1,3,5-Trichlorobenzene		2,500.4	µg/mL	+/-	14.6737	µg/mL	Gravimetric
	CAS # 108-70-3.SEC	(Lot I28U021)			+/-	123.7055	µg/mL	Unstressed
	Purity 99%				+/-	126.7807	µg/mL	Stressed

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

*** Restek is unable to identify a reliable and/or acceptable second source for this material - the same batch of neat material may have been used to produce both the primary and secondary standard. The primary and secondary standards were prepared using different equipment and personnel.**

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

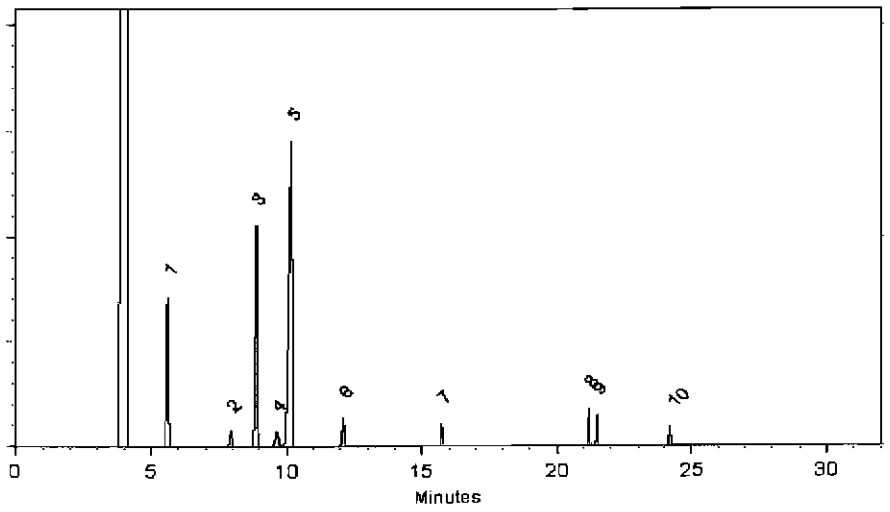
Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

Michael J Maye

Jennifer L. Pollino - QC Analyst

Date Mixed: 28-Dec-2015 **Balance:** 1127510105

Date Passed: 29-Dec-2015

Manufactured under Restek's ISO 9001:2008 Registered Quality System Certificate #FM 80397

Reagent

Adds(A) 2016_00011

RESTEK
110 Benner Circle
Bellefonte, PA 16823-8812
Tel: (800)356-1688
Fax: (814)353-1309

www.restek.com

CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 570808 **Lot No.:** A0116133

Description : 8260 List 2 / Std #6

8260 List 2 / Std #6 2500-62500 µg/ml, P&T Methanol, 1 ml/ampul

REC'D 11-9-16 JDH

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : June 30, 2017 **Storage:** 0°C or colder

1054701-703

CERTIFIED VALUES

Elution Order	Compound		Grav. Conc. (weight/volume)	Expanded Uncertainty (95% C.L.; K=2)	
1	2-Propanol (isopropanol) **CAS #** 67-63-0 **Purity** 99%	(Lot SHBF0274V)	25,021.0 µg/mL	+/- 145.4666 µg/mL +/- 1,237.7341 µg/mL +/- 1,268.5115 µg/mL	Gravimetric Unstressed Stressed
2	Chloroprene **CAS #** 126-99-8.A **Purity** 99%	(Lot 151210JLM)	2,515.8 µg/mL	+/- 14.6268 µg/mL +/- 124.4487 µg/mL +/- 127.5433 µg/mL	Gravimetric Unstressed Stressed
3	Methacrylonitrile **CAS #** 126-98-7 **Purity** 99%	(Lot 1012014)	25,005.8 µg/mL	+/- 145.3780 µg/mL +/- 1,236.9798 µg/mL +/- 1,267.7384 µg/mL	Gravimetric Unstressed Stressed
4	2,2,4-Trimethylpentane (isooctane) **CAS #** 540-84-1 **Purity** 99%	(Lot SHBD2922V)	2,501.3 µg/mL	+/- 14.5425 µg/mL +/- 123.7315 µg/mL +/- 126.8081 µg/mL	Gravimetric Unstressed Stressed
5	1-Butanol **CAS #** 71-36-3 **Purity** 99%	(Lot SHBF1679V)	62,520.3 µg/mL	+/- 363.4791 µg/mL +/- 3,092.7400 µg/mL +/- 3,169.6438 µg/mL	Gravimetric Unstressed Stressed
6	2-Nitropropane **CAS #** 79-46-9 **Purity** 97%	(Lot BCBB8938)	5,001.3 µg/mL	+/- 29.0781 µg/mL +/- 247.4045 µg/mL +/- 253.5565 µg/mL	Gravimetric Unstressed Stressed
7	1-Chlorohexane **CAS #** 544-10-5 **Purity** 98%	(Lot 05107LK)	2,503.2 µg/mL	+/- 14.5536 µg/mL +/- 123.8262 µg/mL +/- 126.9052 µg/mL	Gravimetric Unstressed Stressed

8	1,2,3-Trimethylbenzene		2,501.4	µg/mL	+/-	14.5433	µg/mL	Gravimetric
	CAS # 526-73-8	(Lot 877605-14)			+/-	123.7383	µg/mL	Unstressed
	Purity 97%				+/-	126.8151	µg/mL	Stressed
9	Benzyl chloride		2,502.0	µg/mL	+/-	14.5468	µg/mL	Gravimetric
	CAS # 100-44-7	(Lot SHBB7346V)			+/-	123.7686	µg/mL	Unstressed
	Purity 99%				+/-	126.8462	µg/mL	Stressed
10	1,3,5-Trichlorobenzene		2,500.8	µg/mL	+/-	14.5396	µg/mL	Gravimetric
	CAS # 108-70-3	(Lot 11319AS)			+/-	123.7067	µg/mL	Unstressed
	Purity 99%				+/-	126.7828	µg/mL	Stressed

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

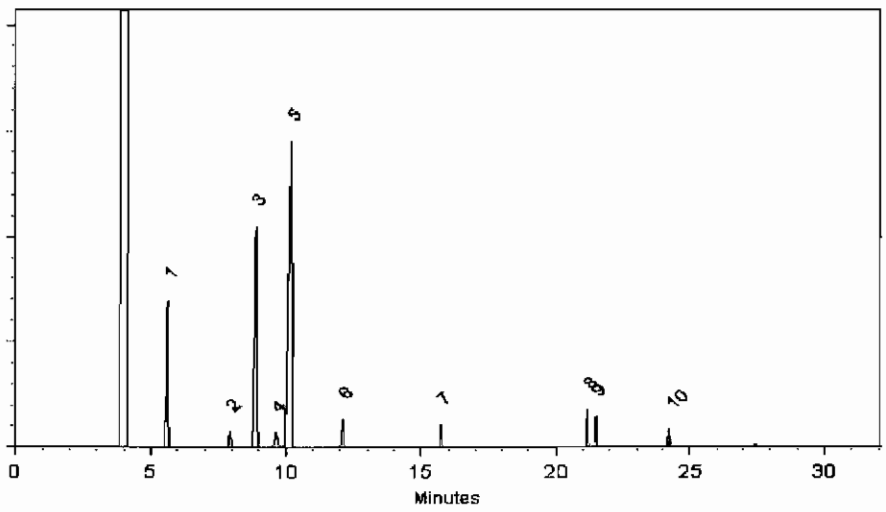
Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

F. Joseph Tallon - Mix Technician

Date Mixed: 28-Dec-2015 **Balance:** B251644995

Jennifer L. Pollino - QC Analyst

Date Passed: 29-Dec-2015

Manufactured under Restek's ISO 9001:2008 Registered Quality System Certificate #FM 80397

Reagent

Adds(B) 2016_00011

RESTEK
110 Benner Circle
Bellefonte, PA 16823-8812
Tel: (800)356-1688
Fax: (814)353-1309

www.restek.com

CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

ACCREDITED ISO Guide 34 Accredited Reference Material Producer Certificate #3222.01

ACCREDITED ISO/IEC 17025 Accredited Testing Laboratory Certificate #3222.02

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 570809 **Lot No.:** A0116077

Description : 8260 List 2 / Std #7

8260 List 2 / Std #7 2500-5000 µg/ml, P&T Methanol, 1 ml/ampul

REC'D 11-9-16 JDH

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : June 30, 2017 **Storage:** 0°C or colder

~~1054715-717~~ 1054713-715

JDH 11-27-16

CERTIFIED VALUES

Elution Order	Compound		Grav. Conc. (weight/volume)	Expanded Uncertainty (95% C.L.; K=2)		
1	Ethyl acetate **CAS #** 141-78-6 **Purity** 99%	(Lot SHBF6909V)	5,016.0 µg/mL	+/- 29.1635 µg/mL +/- 302.6375 µg/mL +/- 303.3560 µg/mL		Gravimetric Unstressed Stressed
2	Ethyl acrylate **CAS #** 140-88-5 **Purity** 99%	(Lot 10129902)	2,502.5 µg/mL	+/- 14.5498 µg/mL +/- 150.9869 µg/mL +/- 151.3454 µg/mL		Gravimetric Unstressed Stressed
3	Methyl methacrylate **CAS #** 80-62-6 **Purity** 99%	(Lot MKBN8882V)	5,007.8 µg/mL	+/- 29.1155 µg/mL +/- 302.1397 µg/mL +/- 302.8571 µg/mL		Gravimetric Unstressed Stressed
4	Butyl acetate **CAS #** 123-86-4 **Purity** 99%	(Lot SHBF4442V)	2,501.3 µg/mL	+/- 14.5425 µg/mL +/- 150.9115 µg/mL +/- 151.2698 µg/mL		Gravimetric Unstressed Stressed

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

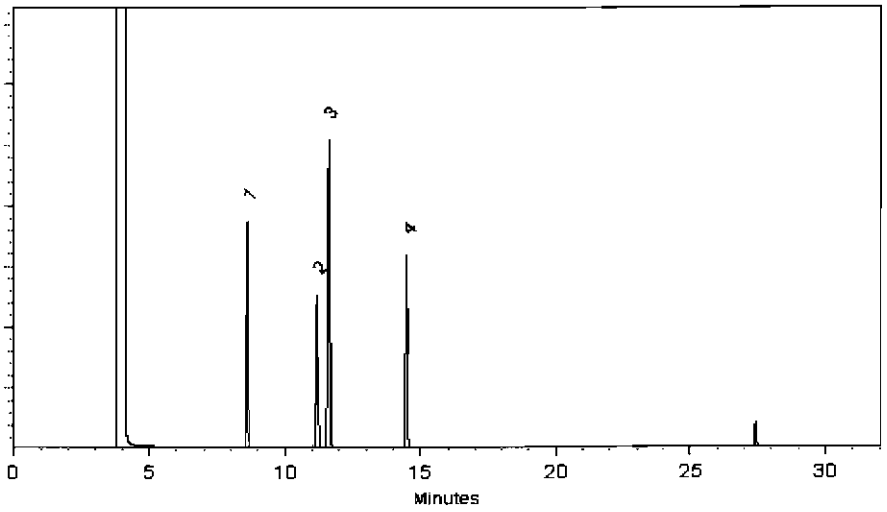
Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

Rebecca Lawver

Jennifer L Pollino

Jennifer L. Pollino - QC Analyst

Date Mixed: 21-Dec-2015 **Balance:** 1125113331

Date Passed: 22-Dec-2015

Manufactured under Restek's ISO 9001:2008 Registered Quality System Certificate #FM 80397

Reagent

Gamma Ampuole_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

Source Prepared by: _____ 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

LSC Check_00001

PerkinElmer Inc. 549 Albany Street, Boston, MA 02118 USA Tel. No. 800-762-4000

PerkinElmer®

Certificate of Radioactivity / Traceability

Product **Unquenched Toluene Standard for Liquid Scintillation Counting**

Part Number **6008500**

Radionuclide	Average Activity Assay		Lot No. = Assay Date	Serial No.
^{3}H (Tritium) - Toluene	**286,200** DPM/Std. ± 3 % 0.129 µCi		**February 23, 2016**	**135**
Carbon 14 - Toluene	**112,100** DPM/Std. ± 2 % 0.050 µCi		**February 23, 2016**	**135**

Expiration Date **February 23, 2021**

REFERENCE STANDARD: National Institute of Standards and Technology SRM 4947C (3H) and SRM 4222C (14C)

METHOD OF STANDARDIZATION:

The ^{3}H bulk solution is standardized by liquid scintillation counting using SRM 4947C as the reference material. The total uncertainty of the assay is ± 1.6 %

The ^{14}C bulk solution is standardized by liquid scintillation counting using SRM 4222C as the reference material. The total uncertainty of the assay is ± 1.3 %

The glass vial may have some imperfections due to the vendor's manufacturing process. These imperfections do not affect the performance of the product.

I hereby certify that the above information is accurate.

Approved by: *Donna Novi* **Date:** May 23, 2016

Chemist

CN 8845270

Reagent

Polar Add._00040

RESTEK
110 Benner Circle
Bellefonte, PA 16823-8812
Tel: (800)356-1688
Fax: (814)353-1309

www.restek.com

CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

ACCREDITED ISO Guide 34 Accredited Reference Material Producer Certificate #3222.01

ACCREDITED ISO/IEC 17025 Accredited Testing Laboratory Certificate #3222.02

FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 569728 **Lot No.:** A0114666

Description : 8260 List 3/ Std#1 Polar Additions (2015)

8260 List 3/ Std#1 Polar Additions (2015) 2500-100,000 µg/ml, 1 ml/ampul

REC'D 12-12-16 JDH

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : October 31, 2017 **Storage:** 0°C or colder

1074896-898

CERTIFIED VALUES

Elution Order	Compound		Grav. Conc. (weight/volume)	Expanded Uncertainty (95% C.L.; K=2)	
1	Ethanol **CAS #** 64-17-5 **Purity** 99%	(Lot PG0219)	100,005.8 µg/mL	+/- 581.4117 µg/mL +/- 4,947.0657 µg/mL +/- 5,070.0789 µg/mL	Gravimetric Unstressed Stressed
2	Acetonitrile **CAS #** 75-05-8 **Purity** 98%	(Lot SHBB3177V)	25,001.0 µg/mL	+/- 145.3505 µg/mL +/- 1,236.7460 µg/mL +/- 1,267.4988 µg/mL	Gravimetric Unstressed Stressed
3	Diisopropyl ether (DIPE) **CAS #** 108-20-3 **Purity** 99%	(Lot SHBB6268V)	2,500.8 µg/mL	+/- 14.5396 µg/mL +/- 123.7067 µg/mL +/- 126.7828 µg/mL	Gravimetric Unstressed Stressed
4	Ethyl-tert-butyl ether (ETBE) **CAS #** 637-92-3 **Purity** 99%	(Lot MKBR1623V)	2,505.0 µg/mL	+/- 14.5643 µg/mL +/- 123.9170 µg/mL +/- 126.9983 µg/mL	Gravimetric Unstressed Stressed
5	Propionitrile **CAS #** 107-12-0 **Purity** 99%	(Lot BCBM6569V)	25,001.5 µg/mL	+/- 145.3533 µg/mL +/- 1,236.7695 µg/mL +/- 1,267.5229 µg/mL	Gravimetric Unstressed Stressed
6	tert-Amyl alcohol **CAS #** 75-85-4 **Purity** 99%	(Lot STBB1898V)	25,012.3 µg/mL	+/- 145.4158 µg/mL +/- 1,237.3013 µg/mL +/- 1,268.0679 µg/mL	Gravimetric Unstressed Stressed
7	tert-Amyl methyl ether (TAME) **CAS #** 994-05-8 **Purity** 99%	(Lot HMBC8037V)	2,503.5 µg/mL	+/- 14.5556 µg/mL +/- 123.8428 µg/mL +/- 126.9222 µg/mL	Gravimetric Unstressed Stressed

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

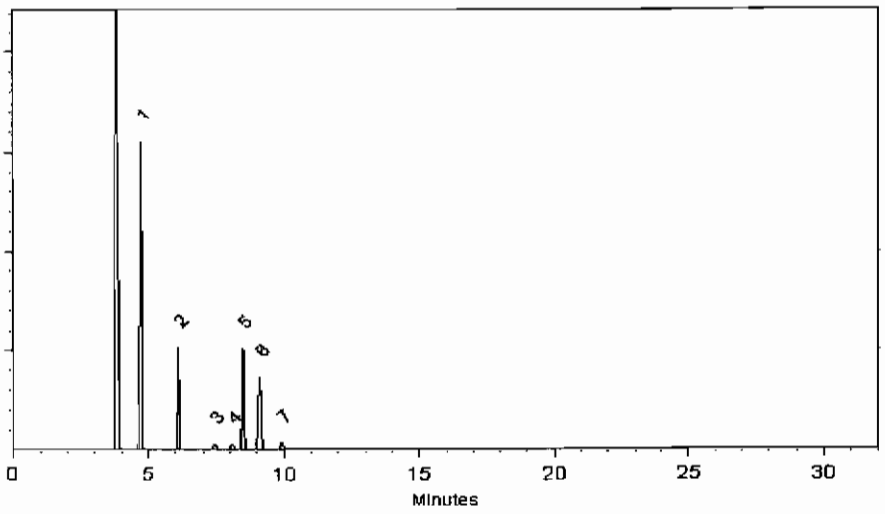
Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

F. Joseph Tallon - Mix Technician

Date Mixed: 12-Oct-2015 **Balance:** B251644995

Jennifer L. Pollino - QC Analyst

Date Passed: 14-Oct-2015

Manufactured under Restek's ISO 9001:2008 Registered Quality System Certificate #FM 80397

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
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 D_00001

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

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

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

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

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

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

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

This standard will expire one year after the calibration date.

Source Prepared by: _____ 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

Tc-99_00002

National Institute of Standards & Technology

Certificate

Standard Reference Material 4288A
Technetium-99 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive technetium-99, as potassium pertechnetate, and potassium hydroxide dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of beta-particle counting instruments and for the monitoring of radiochemical procedures.

Radiological Hazard

The SRM ampoule contains technetium-99 with a total activity of approximately 160 kBq. Technetium-99 decays by beta-particle emission. None of the beta particles escape from the SRM ampoule. During the decay process no photons are emitted. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. There is no detectable external radiation. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains potassium hydroxide (KOH) with a concentration of 0.001 moles per liter of water. The solution is mildly corrosive and could represent a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least September 2006.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) because of the radioactivity.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by M.M. Training.

Gaithersburg, Maryland 20899
October 1996

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

Recommended Procedure for Opening the SRM Ampoule

1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the SRM solution.

2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it.

3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.

4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process.

5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.

6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.

7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.

8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle. NEVER PIPETTE BY MOUTH.

9) Seal any unused SRM solution in a flame-sealed glass ampoule, if possible, to minimize the evaporation loss. See also reference [4]*.

*Notes and references are on pages 5 and 6.

PROPERTIES OF SRM 4288A
(Certified values are shown in bold type)

Source identification number	NIST SRM 4288A		
Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule		
Ampoule specifications	Body outside diameter Wall Thickness Barium content Lead-oxide content Other heavy elements	(16.5 ± 0.5) mm (0.60 ± 0.04) mm Less than 2.5% Less than 0.02% Trace quantities	
Solution density	(0.998 ± 0.002) $g \cdot mL^{-1}$ at 21 °C [b]*		
Solution mass	(4.998 ± 0.002) g [b]		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration ($mol \cdot L^{-1}$)	Mass Fraction ($g \cdot g^{-1}$)
	H_2O	55	1.00
	KOH	0.001	0.00006
	$K^{99}TcO_4$	0.0005	0.0001
Radiological Properties:			
Radionuclide	Technetium-99		
Reference time	1200 EST, 1 September 1996		
Massic activity of the solution [c]	32.61 $kBq \cdot g^{-1}$		
Relative expanded uncertainty (k=2)	1.14% [d] [e]		
Photon-emitting impurities	None detected [f]		
Half lives used in the decay corrections	Cobalt-60: (5.2714 ± 0.0005) a [g] Technetium-99: (2.111 ± 0.012) × 10^5 a [g]		
Measuring instrument	NIST 4πβ(LS)-γ-anticoincidence counting system using cobalt-60 as the efficiency-tracing radionuclide. The efficiency was varied electronically from 50 to 93 percent.		

*Notes and references are on pages 5 and 6.

EVALUATION OF THE UNCERTAINTY OF THE MASSIC ACTIVITY [d]*

Input Quantity x_i, the source of uncertainty (and individual uncertainty components where appropriate)	Method Used To Evaluate $u(x_i)$, the standard uncertainty of x_i (A) denotes evaluation by statistical methods (B) denotes evaluation by other methods	Relative Uncertainty Of Input Quantity, $u(x_i)/x_i$, (%) [h]	Relative Sensitivity Factor, $\lvert\partial y/\partial x_i\rvert \cdot (x_i/y)$ [i]	Relative Uncertainty Of Output Quantity, $u_i(y)/y$, (%) [j]
Extrapolated massic liquid-scintillation count rate of the Tc-99 solution, corrected for background, cobalt-60 tracer count rate, and decay.	Standard deviation of the mean for 4 sets of repeated measurements on each of 3 samples (A)	0.10	1.0	0.10
Decay corrections for cobalt-60 for technetium-99	[k] Standard uncertainty of the half life (A) Standard uncertainty of the half life (A)	[k] 0.01 0.6	[m] 0.01 0.000005	0.0001 0.000003
Decay scheme data	Standard uncertainty of the probability of decay by beta-particle emission (A)	0.01	1.0	0.01
Extrapolation of the beta-particle-count-rate versus anticoincidence-gamma-ray-count-rate to zero anticoincidence-gamma-ray-count-rate	Estimated (B)	0.40	1.0	0.40
Calibration of the cobalt-60 tracer solution using the 4πß(LS)-γ-anticoincidence counting system	Standard uncertainty of the extrapolated massic count rate (B)	0.25	1.0	0.25
Gravimetric measurements	Estimated (B)	0.20	1.0	0.20
Live-time measurements [n]	Estimated (B)	0.10	1.0	0.10
Variability between ampoules	Estimated (B)	0.20	1.0	0.20
Photon-emitting impurities	Limit of detection (B) [p]	100.	0.00004	0.004
Relative Combined Standard Uncertainty of the Output Quantity, $u_c(y)/y$, (%)				0.57
Coverage Factor, k				x 2
Relative Expanded Uncertainty of the Output Quantity, U/y, (%)				1.14

*Notes and references are on pages 5 and 6.

NOTES

[a] The Sievert is the SI unit for dose equivalent. See reference [1]. One μSv is equal to 0.1 mrem.

Distance from Ampoule (cm):	1	30	100
Approximate Dose Rate (μSv/h):	<0.1 (Not detectable)		

[b] The stated uncertainty is two times the standard uncertainty.

[c] Massic activity is the preferred name for the quantity activity divided by the total mass of the sample. See reference [1].

[d] The reported value, y, of massic activity (activity per unit mass) at the reference time was not measured directly but was derived from measurements and calculations of other quantities. This can be expressed as $y = f(x_1, x_2, x_3, \ldots x_n)$, where f is a mathematical function derived from the assumed model of the measurement process.

The value, x_i, used for each input quantity i has a standard uncertainty, $u(x_i)$, that generates a corresponding uncertainty in y, $u_i(y) = |\partial y/\partial x_i| \cdot u(x_i)$, called a component of combined standard uncertainty of y.

The combined standard uncertainty of y, $u_c(y)$, is the positive square root of the sum of the squares of the components of combined standard uncertainty.

The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ to obtain U, the expanded uncertainty of y.

Since it can be assumed that the possible estimated values of the massic activity are approximately normally distributed with approximate standard deviation $u_c(y)$, the unknown value of the massic activity is believed to lie in the interval $y \pm U$ with a level of confidence of approximately 95 percent.

For further information on the expression of uncertainties, see references [2] and [3].

[e] The value of each standard uncertainty component, and hence the value of the expanded uncertainty itself, is a best estimate based upon all available information, but is only approximately known. That is to say, the "uncertainty of the uncertainty" is large and not well known. This is true for uncertainties evaluated by statistical methods (e.g., the relative standard deviation of the standard deviation of the mean for the liquid-scintillation counting is approximately 50%) and for uncertainties evaluated by other methods (which could easily be over estimated or under estimated by substantial amounts). The unknown value of the expanded uncertainty is believed to lie in the interval $U/2$ to $2U$ (i.e., within a factor of 2 of the estimated value).

[f] Estimated limits of detection for photon-emitting impurities are:
2×10^{-4} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 20 and 85 keV,
2×10^{-5} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 93 and 503 keV,
1×10^{-5} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 519 and 1457 keV, and
5×10^{-6} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 1468 and 3250 keV.

[g] The stated uncertainty is the standard uncertainty. See reference [5].

[h] Relative standard uncertainty of the input quantity x_i.

[i] The relative change in the output quantity y divided by the relative change in the input quantity x_i. If $|\partial y/\partial x_i| \cdot (x_i/y) = 1.0$, then a 1% change in x_i results in a 1% change in y. If $|\partial y/\partial x_i| \cdot (x_i/y) = 0.05$, then a 1% change in x_i results in a 0.05% change in y.

[j] Relative component of combined standard uncertainty of output quantity y, rounded to two significant figures or less. The relative component of combined standard uncertainty of y is given by $u_i(y)/y = |\partial y/\partial x_i| \cdot u(x_i)/y = |\partial y/\partial x_i| \cdot (x_i/y) \cdot u(x_i)/x_i$. The numerical values of $u(x_i)/x_i$, $|\partial y/\partial x_i| \cdot (x_i/y)$, and $u_i(y)/y$, all dimensionless quantities, are listed in columns 3, 4, and 5, respectively. Thus, the value in column 5 is equal to the value in column 4 multiplied by the value in column 3. The input quantities are independent, or very nearly so. Hence the covariances are zero or negligible.

[k] The relative standard uncertainty of $\lambda \cdot t$ is determined by the relative standard uncertainty of λ (i.e., of the half life). The relative standard uncertainty of t is negligible.

[m] $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$, multiplied by other sensitivity factors where appropriate.

[n] The live time is determined by counting the pulses from a gated crystal-controlled oscillator.

[p] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e. $u(x_i)/x_i = 100\%$. $|\partial y/\partial x_i| \cdot (x_i/y) = \{$(response per Bq of impurity)/(response per Bq of Tc-99)$\} \cdot \{$(Bq of impurity)/(Bq of Tc-99)$\}$. Thus $u_i(y)/y$ is the relative change in y if the impurity were present with a massic activity equal to the estimated limit of detection.

REFERENCES

[1] International Organization for Standardization (ISO), *ISO Standards Handbook - Quantities and Units*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900.

[2] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900. (Listed under ISO miscellaneous publications as "ISO Guide to the Expression 1993".)

[3] B. N. Taylor and C. E. Kuyatt, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, U.S.A.

[4] National Council on Radiation Protection and Measurements Report No. 58, *A Handbook of Radioactivity Measurements Procedures*, Second Edition, 1985. Available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Bethesda, MD 20814 U.S.A.

[5] Evaluated Nuclear Structure Data File (ENSDF), September 1996.

Reagent

Tc-99_00003

NIST TRACEABLE CERTIFICATE
BETA STANDARD SOLUTION

Radionuclide:	Tc-99	**Customer:**	SEVERN TRENT LABORATORIES			
Half-life:	(2.13 ± 0.05)E+05 years	**P.O. No.:**	NJ14830			
Catalog No.:	7099	**Reference Date:**	1-Jan-00	12:00	PST	
Source No.:	681-78-1	**Contained Radioactivity:**	1.009	**µCi,**	37.33	**kBq**

Physical description:

A. Mass of solution:	5.00077 g in 5 mL flame-sealed ampoule
B. Chemical form:	NH_4TcO_4 in H_2O
C. Carrier content:	None
D. Density:	0.9982 g/mL @ 20°C

Radioimpurities: None detected

Radionuclide concentration: 0.2018 µCi/g, 7.467 kBq/g

Method of Calibration:
This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using a liquid scintillation counter.

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 1.3 %
B. Type B (systematic) uncertainty:	± 1.5 %
C. Uncertainty in aliquot weighing:	± 0.0 %
D. Total uncertainty at the 99% confidence level:	± 2.0 %

Notes:

- See reverse side for leak tests performed on this source.
- IPL participates in an 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 "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.

Daniel James Van Dalsem
Quality Control

10-Dec-99
Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 N. KEYSTONE STREET
BURBANK, CALIFORNIA 91504
818·843·7000 FAX 818·843·6168

IPL Reference Number: 681-78

Reagent

Tc-99_00004

National Institute of Standards & Technology

Certificate

Standard Reference Material 4288A
Technetium-99 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive technetium-99, as potassium pertechnetate, and potassium hydroxide dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of beta-particle counting instruments and for the monitoring of radiochemical procedures.

Radiological Hazard

The SRM ampoule contains technetium-99 with a total activity of approximately 160 kBq. Technetium-99 decays by beta-particle emission. None of the beta particles escape from the SRM ampoule. During the decay process no photons are emitted. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. There is no detectable external radiation. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains potassium hydroxide (KOH) with a concentration of 0.001 moles per liter of water. The solution is mildly corrosive and could represent a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least September 2006.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) because of the radioactivity.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
October 1996

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

Recommended Procedure for Opening the SRM Ampoule

1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the SRM solution.

2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it.

3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.

4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process.

5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.

6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.

7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.

8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle. NEVER PIPETTE BY MOUTH.

9) Seal any unused SRM solution in a flame-sealed glass ampoule, if possible, to minimize the evaporation loss. See also reference [4]*.

*Notes and references are on pages 5 and 6.

PROPERTIES OF SRM 4288A
(Certified values are shown in bold type)

Source identification number	NIST SRM 4288A		
Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule		
Ampoule specifications	Body outside diameter Wall Thickness Barium content Lead-oxide content Other heavy elements	(16.5 ± 0.5) mm (0.60 ± 0.04) mm Less than 2.5% Less than 0.02% Trace quantities	
Solution density	**(0.998 ± 0.002) g·mL^{-1} at 21 °C [b]***		
Solution mass	**(4.998 ± 0.002) g [b]**		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration (mol·L^{-1})	Mass Fraction (g·g^{-1})
	H_2O KOH $K^{99}TcO_4$	55 0.001 0.0005	1.00 0.00006 0.0001
Radiological Properties:			
Radionuclide	**Technetium-99**		
Reference time	**1200 EST, 1 September 1996**		
Massic activity of the solution [c]	**32.61 kBq·g^{-1}**		
Relative expanded uncertainty (k=2)	**1.14% [d] [e]**		
Photon-emitting impurities	None detected [f]		
Half lives used in the decay corrections	Cobalt-60: (5.2714 ± 0.0005) a [g] Technetium-99: (2.111 ± 0.012) × 10^5 a [g]		
Measuring instrument	NIST 4πß(LS)-γ-anticoincidence counting system using cobalt-60 as the efficiency-tracing radionuclide. The efficiency was varied electronically from 50 to 93 percent.		

*Notes and references are on pages 5 and 6.

EVALUATION OF THE UNCERTAINTY OF THE MASSIC ACTIVITY [d]*

Input Quantity x_i, the source of uncertainty (and individual uncertainty components where appropriate)	Method Used To Evaluate $u(x_i)$, the standard uncertainty of x_i (A) denotes evaluation by statistical methods (B) denotes evaluation by other methods	Relative Uncertainty Of Input Quantity, $u(x_i)/x_i$, (%) [h]	Relative Sensitivity Factor, $\lvert\partial y/\partial x_i\rvert * (x_i/y)$ [i]	Relative Uncertainty Of Output Quantity, $u_c(y)/y$, (%) [j]
Extrapolated massic liquid-scintillation count rate of the Tc-99 solution, corrected for background, cobalt-60 tracer count rate, and decay.	Standard deviation of the mean for 4 sets of repeated measurements on each of 3 samples (A)	0.10	1.0	0.10
Decay corrections for cobalt-60 for technetium-99	Standard uncertainty of the half life (A) Standard uncertainty of the half life (A)	[k] 0.01 0.6	[m] 0.01 0.0004005	0.0001 0.000003
Decay scheme data	Standard uncertainty of the probability of decay by beta-particle emission (A)	0.01	1.0	0.01
Extrapolation of the beta-particle-count-rate versus anticoincidence-gamma-ray-count-rate to zero anticoincidence-gamma-ray-count-rate	Estimated (B)	0.40	1.0	0.40
Calibration of the cobalt-60 tracer solution using the 4πβ(LS)-γ-anticoincidence counting system	Standard uncertainty of the extrapolated massic count rate (B)	0.25	1.0	0.25
Gravimetric measurements	Estimated (B)	0.20	1.0	0.20
Live-time measurements [n]	Estimated (B)	0.10	1.0	0.10
Variability between ampoules	Estimated (B)	0.20	1.0	0.20
Photon-emitting impurities	Limit of detection (B) [p]	109.	0.000004	0.004
Relative Combined Standard Uncertainty of the Output Quantity, $u_c(y)/y$, (%)				0.57
Coverage Factor, k				x 2
Relative Expanded Uncertainty of the Output Quantity, U/y, (%)				1.14

*Notes and references are on pages 5 and 6.

SRM 4288A, page 4 of 6

NOTES

[a] The Sievert is the SI unit for dose equivalent. See reference [1]. One μSv is equal to 0.1 mrem.

Distance from Ampoule (cm):	1	30	100
Approximate Dose Rate (μSv/h):	<0.1 (Not detectable)		

[b] The stated uncertainty is two times the standard uncertainty.

[c] Massic activity is the preferred name for the quantity activity divided by the total mass of the sample. See reference [1].

[d] The reported value, y, of massic activity (activity per unit mass) at the reference time was not measured directly but was derived from measurements and calculations of other quantities. This can be expressed as $y = f(x_1, x_2, x_3, \ldots x_n)$, where f is a mathematical function derived from the assumed model of the measurement process.

The value, x_i, used for each input quantity i has a standard uncertainty, $u(x_i)$, that generates a corresponding uncertainty in y, $u_i(y) = |\partial y/\partial x_i| * u(x_i)$, called a component of combined standard uncertainty of y.

The combined standard uncertainty of y, $u_c(y)$, is the positive square root of the sum of the squares of the components of combined standard uncertainty.

The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ to obtain U, the expanded uncertainty of y.

Since it can be assumed that the possible estimated values of the massic activity are approximately normally distributed with approximate standard deviation $u_c(y)$, the unknown value of the massic activity is believed to lie in the interval $y \pm U$ with a level of confidence of approximately 95 percent.

For further information on the expression of uncertainties, see references [2] and [3].

[e] The value of each standard uncertainty component, and hence the value of the expanded uncertainty itself, is a best estimate based upon all available information, but is only approximately known. That is to say, the "uncertainty of the uncertainty" is large and not well known. This is true for uncertainties evaluated by statistical methods (e.g., the relative standard deviation of the standard deviation of the mean for the liquid-scintillation counting is approximately 50%) and for uncertainties evaluated by other methods (which could easily be over estimated or under estimated by substantial amounts). The unknown value of the expanded uncertainty is believed to lie in the interval $U/2$ to $2U$ (i.e., within a factor of 2 of the estimated value).

[f] Estimated limits of detection for photon-emitting impurities are:
2×10^{-4} $\gamma * s^{-1} * g^{-1}$ for energies between 20 and 85 keV,
2×10^{-5} $\gamma * s^{-1} * g^{-1}$ for energies between 93 and 503 keV,
1×10^{-5} $\gamma * s^{-1} * g^{-1}$ for energies between 519 and 1457 keV, and
5×10^{-6} $\gamma * s^{-1} * g^{-1}$ for energies between 1465 and 3250 keV.

[g] The stated uncertainty is the standard uncertainty. See reference [5].

[h] Relative standard uncertainty of the input quantity x_i.

[i] The relative change in the output quantity y divided by the relative change in the input quantity x_i. If $|\partial y/\partial x_i| \cdot (x_i/y) = 1.0$, then a 1% change in x_i results in a 1% change in y. If $|\partial y/\partial x_i| \cdot (x_i/y) = 0.05$, then a 1% change in x_i results in a 0.05% change in y.

[j] Relative component of combined standard uncertainty of output quantity y, rounded to two significant figures or less. The relative component of combined standard uncertainty of y is given by $u_i(y)/y = |\partial y/\partial x_i| \cdot u(x_i)/y = |\partial y/\partial x_i| \cdot (x_i/y) * u(x_i)/x_i$. The numerical values of $u(x_i)/x_i$, $|\partial y/\partial x_i| \cdot (x_i/y)$, and $u_i(y)/y$, all dimensionless quantities, are listed in columns 3, 4, and 5, respectively. Thus, the value in column 5 is equal to the value in column 4 multiplied by the value in column 3. The input quantities are independent, or very nearly so. Hence the covariances are zero or negligible.

[k] The relative standard uncertainty of $\lambda \cdot t$ is determined by the relative standard uncertainty of λ (i.e., of the half life). The relative standard uncertainty of t is negligible.

[m] $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$, multiplied by other sensitivity factors where appropriate.

[n] The live time is determined by counting the pulses from a gated crystal-controlled oscillator.

[p] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e. $u(x_i)/x_i = 100\%$. $|\partial y/\partial x_i| \cdot (x_i/y) = \{$(response per Bq of impurity)/(response per Bq of Tc-99)$\} \cdot \{$(Bq of impurity)/(Bq of Tc-99)$\}$. Thus $u_i(y)/y$ is the relative change in y if the impurity were present with a massic activity equal to the estimated limit of detection.

REFERENCES

[1] International Organization for Standardization (ISO), *ISO Standards Handbook - Quantities and Units*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900.

[2] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900. (Listed under ISO miscellaneous publications as "ISO Guide to the Expression 1993".)

[3] B. N. Taylor and C. E. Kuyatt, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20407, U.S.A.

[4] National Council on Radiation Protection and Measurements Report No. 58, *A Handbook of Radioactivity Measurements Procedures*, Second Edition, 1985. Available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Bethesda, MD 20814 U.S.A.

[5] Evaluated Nuclear Structure Data File (ENSDF), September 1996.

Reagent

Tc-99_00019

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tc-99_00019
True Value = 228.82 DPM/L or g
Date Analyzed: 3/16/2016

Radionuclide: Tc-99

	Replicates	
#1	231.67	DPM/L or g
#2	231.67	DPM/L or g
#3	234.67	DPM/L or g

Mean = 232.67

1 sigma = 1.732051 1.96 sigma = 3.39482

True Value minus 5% = 217.379 (True Value - 5%)
True Value plus 5% = 240.261 (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: Amanda Leigh Dick 03/16/2016

SOP Reference: STL-QA-0002, Current Revision

Pink
Prot. 19
46 min

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Tc-99 Standard Verification:

Std #: 355913
Activity: 228.82dpm/mL
Reference Date: 9/1/1996

-00016

Vial #	InstaGel (mL)	Teva Column	Tc99_~~00012~~ (mL)	DI Water (mL)
1	10	2	1	4
2	10	2	1	4
3	10	2	1	4

0.25mL of 2M HNO_3 was added to vials to mimic the tracer amount added to counting standards (A, B, C).
BKG was made with 5 mL of DI water, 10 mL of InstaGel, 0.25 mL of 2M HNO3, and a conditioned teva column.
Teva column: conditioned with 5mL 0.01M HNO_3.

Prepared By: ~~Justin Price~~ MPM 3/15/16 Mark Minier 3/15/16
Date: ~~5/8/2014~~ MPM 3/15/16

~~PINK~~ MPM 3/15/16
~~Prot 17~~ MPM 3/15/16
30mins MPM 3/15/16

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Reagent ID: Tc-99_00016

Description:	Tc-99 Spike	Expiration Date:	05/12/2015
No. of Bottles:	1	Laboratory:	TestAmerica St. Louis
Storage Location:	RAD Actinide STDs	Prepared By:	Bernsen, Sarah C
Reagent Volume:	500.000 mL	Solvent:	2M HNO3
Creation Date:	04/30/2014	Solvent Lot:	n/a
Open Date:			
Container(s):	582609		
Comment:			

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
Tc-99	Tc-99_00015	09/01/2046	9534.11100	dpm/mL	228.81866	dpm/mL
Total Activity	Tc-99_00015	09/01/2046	9534.11100	dpm/mL	228.81866	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Tc-99_00015	Tc-99 Secondary Dilution		09/01/46				12.00000	mL

Assay Definition

Assay Description:

Assay Type: DPM (Single)
Report Name: Tc99_Protocol 19
Output Data Path: \Slsvr01\Rad\Upload\PACK_LSC_Pink
Raw Results Path: C:\Packard\Tricarb\Results\Default\Tc99_2015 Protocol 19\20160315_1535\20160315_1535.results
Assay File Name: C:\Packard\TriCarb\Assays\Tc99_2015 Protocol 19.1sa

Additional Data Files Generated with this Protocol:
19Tc99
[Auto] 19Tc99.001

Count Conditions

Nuclide: Tc99_2015
Quench Indicator: tSIE
External Std Terminator (sec): 15 sec
Pre-Count Delay (min): 0.00
Quench Set:
Low Energy: Tc99_2015
Count Time (min): 45.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract

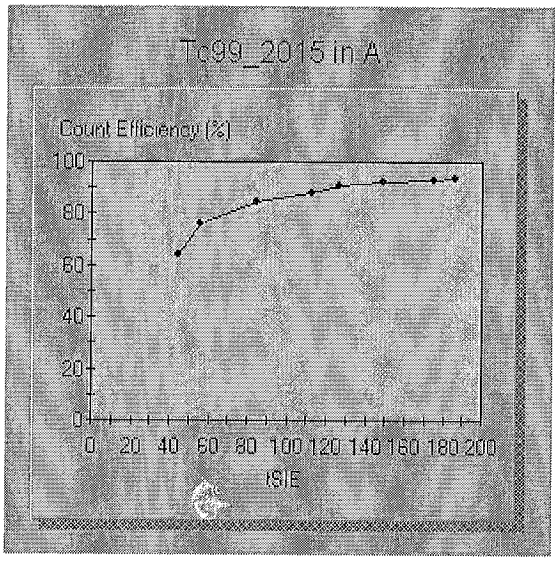
Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: On - Any Region

Regions	LL	UL	2Sigma % Terminator
A	0.0	292.0	1.50
B	2.0	292.0	0.00
C	292.1	450.0	0.00

Count Corrections

Static Controller: On Luminescence Correction: Off
Colored Samples: Off Heterogeneity Monitor: Off
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Cycle 1 Results
Quench Curve Block Data

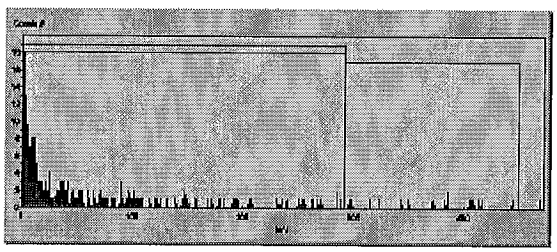


Date Acquired: 08/23/2015
Date Modified:
Tc99_2015 in A

tSIE	Count Efficiency (%)
185.95	93.82
175.23	93.08
148.66	92.15
126.06	91.00
112.84	88.16
84.69	84.43
55.45	76.30
44.33	63.88

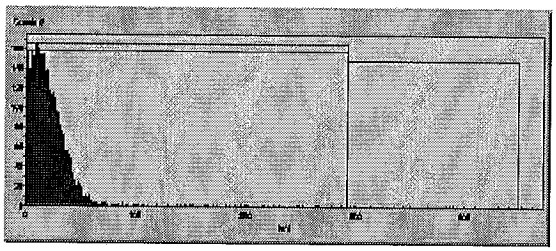
S#			SMPL ID	Count Time	CPMA	DPM1	TIME
DATE	EFF	tSIE	LUM	MESSAGES			
1			BKG	45.00	8.73e+000	9.33e+000	3:35:56 PM
3/15/2016	0.936	182.24	100				

SpectraView Block Data



2		Verification 1		45.00	2.10e+002	2.41e+002	4:26:13 PM
3/15/2016	0.872	105.43	100				

SpectraView Block Data



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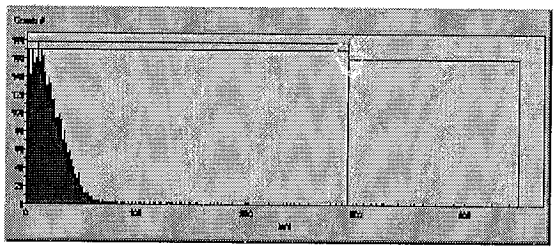
3 Verification 2 45.00 2.11e+002 2.41e+002 5:16:33 PM
3/15/2016 0.875 107.49 100

SpectraView Block Data



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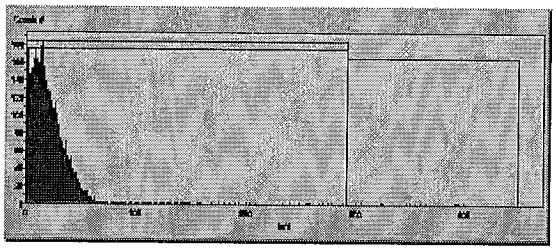
4 Verification 3 45.00 2.14e+002 2.44e+002 6:06:53 PM
3/15/2016 0.878 109.76 100

SpectraView Block Data



3/16/2016 12:01:50 AM: The network path was not found. : '\Slsvr01\Rad\Upload \PACK_LSC_Pink\19Tc99.001' redirected to 'C:\Packard\Tricarb\Results\Default\Tc99_2015 Protocol 19\20160315_1535\19Tc99.001'

Reagent

Tuna Can LCS_00006

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

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00006 (1012459)
True Value = 97.08 pCi/g
Date Analyzed: 9/29/2016

Radionuclide: Gamma LCS Am-241

	Replicates	
#1	96.82	pCi/g
#2	96.69	pCi/g
#3	97.75	pCi/g

Mean = 97.08667

1 sigma = 0.578129

1.96 sigma = 1.133133

True Value minus 5% = 92.226 (True Value - 5%)
True Value plus 5% = 101.934 (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 10/03/16

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00006 (112459)
True Value = 29.45 pCi/g
Date Analyzed: 9/29/2016

Radionuclide: Gamma LCS Cs-137

	Replicates	
#1	28.26	pCi/g
#2	28.64	pCi/g
#3	28.37	pCi/g

Mean = 28.42333

1 sigma = 0.195533

1.96 sigma = 0.383246

True Value minus 5% = 27.9775 (True Value - 5%)
True Value plus 5% = 30.9225 (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 10/03/16

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00006 (1012459)
True Value = 16.46 pCi/g
Date Analyzed: 9/29/116

Radionuclide: Gamma LCS Co-60

	Replicates	
#1	16.04	pCi/g
#2	15.77	pCi/g
#3	16.14	pCi/g

Mean = 15.98333

1 sigma = 0.191398

1.96 sigma = 0.375141

True Value minus 5% = 15.637 (True Value - 5%)
True Value plus 5% = 17.283 (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 10/3/16

SOP Reference: STL-QA-0002, Current Revision

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 272277 **Operator:**

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-272277~2-	LCS	341.90g	1.00	GammaVision	GV15	9 / 29 / 16 13:06	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	-2.044E-001pCi/g	5.500E-001	5.499E-001	1.436E+000	6.946E-001	-0.14	0.5500
AG-108M	10982	-1.018E-001pCi/g	9.743E-002	9.729E-002	3.075E-001	1.497E-001	-0.33	0.0974
AG-110M	10973	5.076E-002pCi/g	4.575E-002	4.567E-002	7.684E-001	3.751E-001	0.07	0.0457
AM-241	10818	9.682E+001pCi/g	5.100E+000	8.709E-001	1.290E+000	6.388E-001	75.07	5.0999
BA-133	10469	-1.624E-001pCi/g	1.661E-001	1.659E-001	5.506E-001	2.703E-001	-0.29	0.1661
BA-140	10463	-1.425E-001pCi/g	1.058E-001	1.055E-001	1.079E+000	5.219E-001	-0.13	0.1058
BE-7	10435	1.275E-001pCi/g	1.233E+000	1.233E+000	4.134E+000	2.030E+000	0.03	1.2334
BI-207	10195	1.058E-001pCi/g	7.194E-002	7.173E-002	2.372E-001	1.139E-001	0.45	0.0719
BI-210M	10173	8.477E-002pCi/g	9.587E-002	9.574E-002	4.994E-001	2.447E-001	0.17	0.0959
BI-212	10160	1.553E+000pCi/g	1.216E+000	1.214E+000	4.030E+000	1.941E+000	0.39	1.2163
BI-214	10154	8.681E-002pCi/g	3.647E-002	3.619E-002	1.088E+000	5.336E-001	0.08	0.0365
CD-109	9254	0.000E+000pCi/g	3.288E+000	3.288E+000	1.089E+001	5.402E+000	0.00	3.2880
CD-113M	17462	-1.456E+003pCi/g	1.073E+003	1.069E+003	3.536E+003	1.727E+003	-0.41	1,072.9969
CE-139	9241	7.398E-002pCi/g	7.038E-002	7.003E-002	2.323E-001	1.140E-001	0.32	0.0704
CE-141	9235	1.679E-002pCi/g	1.287E-001	1.287E-001	3.270E-001	1.601E-001	0.05	0.1287
CE-144	9221	-5.823E-001pCi/g	1.611E+000	1.610E+000	2.809E+000	1.390E+000	-0.21	1.6107
CF-249	9215	-3.279E-002pCi/g	1.794E-001	1.794E-001	6.001E-001	2.950E-001	-0.05	0.1794
CF-251	13690	-4.067E-001pCi/g	3.994E-001	3.978E-001	1.002E+000	4.903E-001	-0.41	0.3994
CO-56	8704	1.139E-001pCi/g	1.826E-001	1.825E-001	3.036E-001	1.454E-001	0.38	0.1826
CO-57	13694	4.528E-001pCi/g	4.266E-001	4.260E-001	1.102E+000	5.361E-001	0.41	0.4266
CO-58	8698	-1.658E-001pCi/g	1.376E-001	1.373E-001	4.558E-001	2.217E-001	-0.36	0.1376
CO-60	8692	1.604E+001pCi/g	8.400E-001	2.396E-001	9.914E-002	4.016E-002	161.75	0.8400
CR-51	8604	-9.651E-001pCi/g	1.169E+000	1.168E+000	3.438E+000	1.690E+000	-0.28	1.1689
CS-134	8553	6.593E-002pCi/g	8.889E-002	8.882E-002	5.089E-001	2.495E-001	0.13	0.0889
CS-136	8546	1.258E-001pCi/g	1.227E-001	1.225E-001	4.083E-001	1.980E-001	0.31	0.1227
CS-137	8539	2.826E+001pCi/g	1.520E+000	3.844E-001	2.878E-001	1.379E-001	98.20	1.5198
EU-152	7145	5.245E-001pCi/g	5.014E-001	5.007E-001	1.782E+000	8.797E-001	0.29	0.5014
EU-154	7138	4.532E-001pCi/g	3.576E-001	3.568E-001	3.623E+000	1.758E+000	0.13	0.3576
EU-155	7131	3.186E-001pCi/g	4.804E-001	4.800E-001	1.590E+000	7.880E-001	0.20	0.4804
FE-59	7073	-4.662E-001pCi/g	2.724E-001	2.714E-001	8.335E-001	4.027E-001	-0.56	0.2724
GA-68	18005	-2.864E+000pCi/g	6.167E+000	6.165E+000	1.352E+001	6.483E+000	-0.21	6.1671
GD-153	6824	-2.389E-001pCi/g	3.642E-001	3.639E-001	1.205E+000	5.975E-001	-0.20	0.3642
HF-181	6495	2.232E-002pCi/g	9.381E-002	9.380E-002	5.455E-001	2.678E-001	0.04	0.0938
HG-203	6466	-1.176E-001pCi/g	9.784E-002	9.761E-002	3.233E-001	1.585E-001	-0.36	0.0978
I-131	6380	1.345E-001pCi/g	1.325E-001	1.323E-001	2.783E-001	1.352E-001	0.48	0.1325
IR-192	6303	1.051E-001pCi/g	1.544E-001	1.543E-001	5.121E-001	2.528E-001	0.21	0.1544
K-40	6148	-3.414E-001pCi/g	3.403E+000	3.403E+000	1.694E+000	7.511E-001	-0.20	3.4027
LA-140	6096	6.964E-002pCi/g	2.842E-002	2.818E-002	6.304E-002	1.993E-002	1.10	0.0284
MN-54	5382	9.032E-003pCi/g	1.343E-001	1.343E-001	3.074E-001	1.474E-001	0.03	0.1343
NA-22	5201	7.656E-002pCi/g	4.569E-002	4.553E-002	1.483E-001	6.510E-002	0.52	0.0457
NB-94	5160	-6.911E-003pCi/g	8.527E-002	8.527E-002	2.509E-001	1.199E-001	-0.03	0.0853
NB-95	5154	-1.314E-001pCi/g	1.080E-001	1.078E-001	3.580E-001	1.732E-001	-0.37	0.1080
ND-147	5083	2.116E-001pCi/g	7.933E-001	7.932E-001	1.870E+000	9.017E-001	0.11	0.7933
NP-237	4757	-5.339E-001pCi/g	9.394E-001	9.389E-001	3.110E+000	1.543E+000	-0.17	0.9394
NP-239	4751	2.951E-001pCi/g	4.471E-001	4.467E-001	1.480E+000	7.333E-001	0.20	0.4471
PA-231	4541	0.000E+000pCi/g	1.548E+000	1.548E+000	1.296E+001	6.385E+000	0.00	1.5484
PA-233	4535	2.505E-001pCi/g	3.660E-001	3.657E-001	1.214E+000	5.993E-001	0.21	0.3660
PA-234	4528	9.127E-002pCi/g	1.542E-001	1.541E-001	1.714E+000	8.480E-001	0.05	0.1542
PA-234M	19453	2.654E+001pCi/g	1.513E+001	1.507E+001	5.612E+001	2.718E+001	0.47	15.1341
PB-210	4467	8.473E+002pCi/g	5.040E+001	8.041E+000	1.484E+001	7.350E+000	57.08	50.3970

PB-212	4454	5.507E-001pCi/g	1.742E-001	1.705E-001	3.941E-001	1.917E-001	1.40	0.1742
PB-214	4448	4.656E-001pCi/g	1.811E-001	1.795E-001	4.906E-001	2.371E-001	0.95	0.1811
PM-144	19585	-9.279E-002pCi/g	8.379E-002	8.365E-002	2.603E-001	1.247E-001	-0.36	0.0838
PM-146	2464	3.553E-001pCi/g	2.541E-001	2.534E-001	6.570E-001	3.117E-001	0.54	0.2541
RH-106	1882	0.000E+000pCi/g	4.336E-001	4.336E-001	5.120E+000	2.511E+000	0.00	0.4336
RU-103	1828	-1.980E-002pCi/g	1.475E-001	1.475E-001	2.961E-001	1.436E-001	-0.07	0.1475
SB-124	1784	1.062E-001pCi/g	8.303E-002	8.285E-002	5.042E-001	2.473E-001	0.21	0.0830
SB-125	1777	4.580E-001pCi/g	3.330E-001	3.322E-001	8.845E-001	4.300E-001	0.52	0.3330
SC-46	1739	-2.124E-001pCi/g	1.825E-001	1.822E-001	6.042E-001	2.955E-001	-0.35	0.1825
SN-113	1570	1.126E-001pCi/g	1.827E-001	1.826E-001	6.081E-001	2.988E-001	0.19	0.1827
SN-126	17459	-1.643E+000pCi/g	3.686E+000	3.685E+000	1.217E+001	6.066E+000	-0.13	3.6865
TA-182	1301	4.928E-001pCi/g	2.524E-001	2.512E-001	1.407E+000	6.803E-001	0.35	0.2524
TC-99M	17412	-2.091E-002pCi/g	1.038E-001	1.038E-001	3.452E-001	1.707E-001	-0.06	0.1038
TH-227	1058	5.331E+000pCi/g	2.061E+000	2.040E+000	6.682E+000	3.307E+000	0.80	2.0609
TH-229	1046	-1.252E+000pCi/g	1.725E+000	1.722E+000	4.349E+000	2.130E+000	-0.29	1.7249
TH-234	1027	-4.940E+000pCi/g	6.015E+000	6.009E+000	3.121E+001	1.555E+001	-0.16	6.0150
TL-208	929	4.162E-001pCi/g	1.180E-001	1.160E-001	2.299E-001	1.095E-001	1.81	0.1180
U-235	281	4.038E-001pCi/g	3.951E-001	3.946E-001	2.769E+000	1.369E+000	0.15	0.3951
Y-88	74	5.514E-002pCi/g	1.992E-002	1.971E-002	3.695E-001	1.776E-001	0.15	0.0199
ZN-65	31	0.000E+000pCi/g	1.231E-001	1.231E-001	1.061E+000	5.145E-001	0.00	0.1231
ZR-95	7	7.816E-003pCi/g	2.150E-001	2.150E-001	4.933E-001	2.360E-001	0.02	0.2150

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-272277~2-A	LCS 160-272277~2-A	CS-137	2.826E+001	pCi/g	2.945E+001	95.99%	-0.5385
		CO-60	1.604E+001	pCi/g	1.646E+001	97.45%	-0.3492
		AM-241	9.682E+001	pCi/g	9.708E+001	99.74%	-0.0356

Sample Duplicate Information

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

Blanks Information

SampID	WRKNO	Analyte	Activity	UncTotal	ZFactor

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 272277 **Operator:**

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-272277~2-	LCS	341.90g	1.00	GammaVision	GV05	9 / 29 / 16 19:17	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	6.948E-001pCi/g	4.428E-001	4.413E-001	1.386E+000	6.661E-001	0.50	0.4428
AG-108M	10982	-4.815E-002pCi/g	1.360E-001	1.359E-001	3.314E-001	1.611E-001	-0.15	0.1360
AG-110M	10973	-6.551E-002pCi/g	5.828E-002	5.819E-002	7.502E-001	3.646E-001	-0.09	0.0583
AM-241	10818	9.669E+001pCi/g	5.084E+000	8.185E-001	1.163E+000	5.751E-001	83.11	5.0845
BA-133	10469	-1.677E-001pCi/g	1.639E-001	1.637E-001	5.438E-001	2.661E-001	-0.31	0.1639
BA-140	10463	7.654E-001pCi/g	4.133E-001	4.114E-001	9.742E-001	4.664E-001	0.79	0.4133
BE-7	10435	-5.190E-001pCi/g	1.221E+000	1.221E+000	3.698E+000	1.806E+000	-0.14	1.2210
BI-207	10195	1.327E-001pCi/g	2.286E-001	2.285E-001	5.028E-001	2.394E-001	0.26	0.2286
BI-210M	10173	1.105E-001pCi/g	1.761E-001	1.760E-001	4.963E-001	2.426E-001	0.22	0.1761
BI-212	10160	-8.056E-001pCi/g	1.326E+000	1.326E+000	4.824E+000	2.326E+000	-0.17	1.3264
BI-214	10154	-3.129E-001pCi/g	1.874E-001	1.867E-001	1.276E+000	6.260E-001	-0.25	0.1874
CD-109	9254	1.605E+000pCi/g	2.280E+000	2.278E+000	7.558E+000	3.734E+000	0.21	2.2797
CD-113M	17462	-1.293E+003pCi/g	1.131E+003	1.128E+003	3.745E+003	1.826E+003	-0.35	1,131.1129
CE-139	9241	-6.545E-002pCi/g	8.083E-002	8.059E-002	2.679E-001	1.316E-001	-0.24	0.0808
CE-141	9235	7.536E-003pCi/g	1.415E-001	1.415E-001	4.733E-001	2.330E-001	0.02	0.1415
CE-144	9221	1.609E-001pCi/g	5.660E-001	5.659E-001	1.890E+000	9.298E-001	0.09	0.5660
CF-249	9215	-5.097E-002pCi/g	4.175E-002	4.166E-002	6.544E-001	3.214E-001	-0.08	0.0417
CF-251	13690	2.258E-001pCi/g	3.420E-001	3.414E-001	9.101E-001	4.433E-001	0.25	0.3420
CO-56	8704	-2.777E-003pCi/g	1.256E-001	1.256E-001	3.392E-001	1.622E-001	-0.01	0.1256
CO-57	13694	0.000E+000pCi/g	3.371E-002	3.371E-002	2.220E-001	1.091E-001	0.00	0.0337
CO-58	8698	1.419E-001pCi/g	1.238E-001	1.236E-001	4.114E-001	1.985E-001	0.34	0.1238
CO-60	8692	1.577E+001pCi/g	8.296E-001	2.480E-001	5.871E-002	1.856E-002	268.60	0.8296
CR-51	8604	8.429E-001pCi/g	8.344E-001	8.332E-001	2.771E+000	1.352E+000	0.30	0.8344
CS-134	8553	-1.864E-002pCi/g	1.769E-002	1.766E-002	5.873E-001	2.880E-001	-0.03	0.0177
CS-136	8546	1.666E-002pCi/g	1.960E-002	1.958E-002	4.831E-001	2.344E-001	0.03	0.0196
CS-137	8539	2.864E+001pCi/g	1.546E+000	4.128E-001	3.089E-001	1.474E-001	92.72	1.5462
EU-152	7145	2.755E-001pCi/g	3.412E-001	3.409E-001	1.401E+000	6.875E-001	0.20	0.3412
EU-154	7138	1.747E-001pCi/g	1.106E-001	1.102E-001	3.597E+000	1.737E+000	0.05	0.1106
EU-155	7131	2.480E-001pCi/g	3.696E-001	3.694E-001	1.226E+000	6.054E-001	0.20	0.3696
FE-59	7073	1.492E-001pCi/g	1.439E-001	1.437E-001	7.280E-001	3.478E-001	0.20	0.1439
GA-68	18005	-6.353E+000pCi/g	7.244E+000	7.235E+000	1.575E+001	7.557E+000	-0.40	7.2435
GD-153	6824	5.593E-002pCi/g	1.741E-001	1.741E-001	5.826E-001	2.858E-001	0.10	0.1741
HF-181	6495	1.366E-001pCi/g	1.060E-001	1.057E-001	4.948E-001	2.417E-001	0.28	0.1060
HG-203	6466	2.250E-002pCi/g	1.022E-001	1.022E-001	2.611E-001	1.269E-001	0.09	0.1022
I-131	6380	2.210E-002pCi/g	1.184E-002	1.179E-002	2.971E-001	1.441E-001	0.07	0.0118
IR-192	6303	8.284E-002pCi/g	7.520E-002	7.504E-002	3.258E-001	1.592E-001	0.25	0.0752
K-40	6148	7.507E-001pCi/g	5.361E-001	5.347E-001	1.327E+000	5.540E-001	0.57	0.5361
LA-140	6096	8.699E-002pCi/g	7.949E-002	7.936E-002	1.364E-001	5.501E-002	0.64	0.0795
MN-54	5382	-1.165E-001pCi/g	1.521E-001	1.520E-001	3.439E-001	1.646E-001	-0.34	0.1521
NA-22	5201	-2.814E-002pCi/g	5.797E-002	5.795E-002	2.055E-001	9.236E-002	-0.14	0.0580
NB-94	5160	6.783E-002pCi/g	6.927E-002	6.918E-002	2.389E-001	1.130E-001	0.28	0.0693
NB-95	5154	-1.620E-001pCi/g	1.191E-001	1.188E-001	3.935E-001	1.900E-001	-0.41	0.1191
ND-147	5083	-6.514E-001pCi/g	8.776E-001	8.768E-001	2.138E+000	1.031E+000	-0.30	0.8776
NP-237	4757	-4.627E-001pCi/g	7.177E-001	7.172E-001	2.379E+000	1.176E+000	-0.19	0.7177
NP-239	4751	2.276E-001pCi/g	3.340E-001	3.337E-001	1.108E+000	5.467E-001	0.21	0.3340
PA-231	4541	0.000E+000pCi/g	1.373E+000	1.373E+000	1.362E+001	6.701E+000	0.00	1.3729
PA-233	4535	2.236E-001pCi/g	3.060E-001	3.057E-001	1.017E+000	4.997E-001	0.22	0.3060
PA-234	4528	2.928E-001pCi/g	4.437E-001	4.434E-001	1.312E+000	6.465E-001	0.22	0.4437
PA-234M	19453	2.108E+001pCi/g	1.857E+001	1.854E+001	6.416E+001	3.107E+001	0.33	18.5748
PB-210	4467	8.671E+002pCi/g	5.159E+001	8.329E+000	1.461E+001	7.229E+000	59.34	51.5925

PB-212	4454	7.463E-001pCi/g	1.602E-001	1.528E-001	3.656E-001	1.769E-001	2.04	0.1602
PB-214	4448	2.370E-001pCi/g	2.355E-001	2.351E-001	7.474E-001	3.643E-001	0.32	0.2355
PM-144	19585	7.285E-002pCi/g	5.436E-002	5.422E-002	2.571E-001	1.222E-001	0.28	0.0544
PM-146	2464	1.040E-001pCi/g	3.321E-001	3.321E-001	7.921E-001	3.765E-001	0.13	0.3321
RA-226	1950	-4.839E-001pCi/g	3.042E+000	3.042E+000	5.837E+000	2.855E+000	-0.08	3.0419
RH-106	1882	-3.016E-001pCi/g	9.937E-001	9.936E-001	3.367E+000	1.626E+000	-0.09	0.9937
RU-103	1828	-6.222E-002pCi/g	1.352E-001	1.352E-001	3.240E-001	1.568E-001	-0.19	0.1352
SB-124	1784	-4.848E-002pCi/g	4.616E-002	4.609E-002	5.906E-001	2.896E-001	-0.08	0.0462
SB-125	1777	3.726E-001pCi/g	5.015E-001	5.012E-001	9.624E-001	4.671E-001	0.39	0.5015
SC-46	1739	-1.934E-001pCi/g	1.709E-001	1.706E-001	5.668E-001	2.757E-001	-0.34	0.1709
SN-113	1570	-1.832E-001pCi/g	6.511E-002	6.443E-002	6.636E-001	3.257E-001	-0.28	0.0651
SN-126	17459	-3.558E-001pCi/g	8.245E-001	8.243E-001	2.749E+000	1.352E+000	-0.13	0.8245
TA-182	1301	6.142E-001pCi/g	5.525E-001	5.517E-001	1.835E+000	8.906E-001	0.33	0.5525
TC-99M	17412	-6.331E-002pCi/g	7.898E-002	7.890E-002	2.620E-001	1.290E-001	-0.24	0.0790
TH-227	1058	1.965E+000pCi/g	1.983E+000	1.980E+000	6.552E+000	3.239E+000	0.30	1.9825
TH-229	1046	3.332E-001pCi/g	3.014E-001	3.002E-001	4.053E+000	1.977E+000	0.08	0.3014
TH-234	1027	5.142E-001pCi/g	1.278E+000	1.278E+000	6.351E+000	3.118E+000	0.08	1.2779
TL-208	929	3.882E-001pCi/g	9.932E-002	9.725E-002	2.123E-001	9.976E-002	1.83	0.0993
U-235	281	-5.267E-001pCi/g	7.677E-001	7.672E-001	2.130E+000	1.049E+000	-0.25	0.7677
Y-88	74	1.200E-001pCi/g	1.531E-001	1.529E-001	3.472E-001	1.653E-001	0.35	0.1531
ZN-65	31	-4.722E-001pCi/g	4.068E-001	4.061E-001	1.349E+000	6.559E-001	-0.35	0.4068
ZR-95	7	4.516E-001pCi/g	1.936E-001	1.922E-001	4.383E-001	2.068E-001	1.03	0.1936

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-272277~2-A	LCS 160-272277~2-A	CS-137	2.864E+001	pCi/g	2.944E+001	97.28%	-0.3615
		CO-60	1.577E+001	pCi/g	1.646E+001	95.82%	-0.5732
		AM-241	9.669E+001	pCi/g	9.708E+001	99.60%	-0.0539

Sample Duplicate Information

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

Blanks Information

SampID	WRKNO	Analyte	Activity	UncTotal	ZFactor

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 272277 **Operator:**

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-272277~2-	LCS	341.90g	1.00	GammaVision	GV10	9 / 30 / 16 19:13	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	5.161E-001pCi/g	4.930E-001	4.923E-001	1.066E+000	5.139E-001	0.48	0.4930
AG-108M	10982	-1.283E-001pCi/g	3.696E-002	3.637E-002	2.872E-001	1.401E-001	-0.45	0.0370
AG-110M	10973	-2.436E-001pCi/g	2.130E-001	2.126E-001	7.050E-001	3.451E-001	-0.35	0.2130
AM-241	10818	9.775E+001pCi/g	5.141E+000	8.314E-001	1.213E+000	6.008E-001	80.58	5.1409
BA-133	10469	7.040E-002pCi/g	1.351E-001	1.350E-001	4.510E-001	2.211E-001	0.16	0.1351
BA-140	10463	1.818E-001pCi/g	1.964E-001	1.962E-001	8.653E-001	4.175E-001	0.21	0.1964
BE-7	10435	-6.992E-001pCi/g	1.118E+000	1.117E+000	3.720E+000	1.828E+000	-0.19	1.1175
BI-207	10195	8.667E-002pCi/g	7.816E-002	7.803E-002	2.212E-001	1.066E-001	0.39	0.0782
BI-210M	10173	6.373E-002pCi/g	1.358E-001	1.357E-001	3.452E-001	1.681E-001	0.18	0.1358
BI-212	10160	1.530E+000pCi/g	1.367E+000	1.365E+000	4.535E+000	2.206E+000	0.34	1.3671
BI-214	10154	5.778E-001pCi/g	1.375E-001	1.341E-001	3.590E-001	1.707E-001	1.61	0.1375
CD-109	9254	1.642E+000pCi/g	2.301E+000	2.299E+000	7.619E+000	3.770E+000	0.22	2.3006
CD-113M	17462	9.148E+000pCi/g	9.992E+002	9.992E+002	3.367E+003	1.646E+003	0.00	999.2489
CE-139	9241	-2.055E-002pCi/g	6.937E-002	6.934E-002	2.318E-001	1.139E-001	-0.09	0.0694
CE-141	9235	1.025E-001pCi/g	7.847E-002	7.830E-002	2.128E-001	1.033E-001	0.48	0.0785
CE-144	9221	-4.688E-001pCi/g	5.253E-001	5.247E-001	1.741E+000	8.573E-001	-0.27	0.5253
CF-249	9215	1.362E-001pCi/g	1.495E-001	1.494E-001	4.985E-001	2.448E-001	0.27	0.1495
CF-251	13690	-3.095E-001pCi/g	3.513E-001	3.502E-001	9.286E-001	4.543E-001	-0.33	0.3513
CO-56	8704	1.879E-002pCi/g	1.572E-002	1.569E-002	2.803E-001	1.350E-001	0.07	0.0157
CO-57	13694	9.703E-002pCi/g	5.787E-002	5.764E-002	1.624E-001	7.956E-002	0.60	0.0579
CO-58	8698	2.483E-003pCi/g	9.680E-002	9.680E-002	3.289E-001	1.594E-001	0.01	0.0968
CO-60	8692	1.614E+001pCi/g	8.382E-001	2.145E-001	1.235E-001	5.442E-002	130.66	0.8382
CR-51	8604	-3.859E-001pCi/g	8.135E-001	8.132E-001	2.716E+000	1.332E+000	-0.14	0.8135
CS-134	8553	1.234E-001pCi/g	1.022E-001	1.020E-001	4.481E-001	2.199E-001	0.28	0.1022
CS-136	8546	1.085E-001pCi/g	7.572E-002	7.546E-002	2.841E-001	1.370E-001	0.38	0.0757
CS-137	8539	2.837E+001pCi/g	1.515E+000	3.427E-001	2.201E-001	1.050E-001	128.88	1.5151
EU-152	7145	4.455E-001pCi/g	3.696E-001	3.689E-001	1.216E+000	5.980E-001	0.37	0.3696
EU-154	7138	-8.727E-001pCi/g	8.178E-001	8.165E-001	2.720E+000	1.317E+000	-0.32	0.8178
EU-155	7131	2.450E-001pCi/g	3.372E-001	3.369E-001	1.118E+000	5.521E-001	0.22	0.3372
FE-59	7073	2.567E-001pCi/g	2.385E-001	2.382E-001	5.017E-001	2.396E-001	0.51	0.2385
GA-68	18005	-3.762E+000pCi/g	5.213E+000	5.209E+000	1.136E+001	5.457E+000	-0.33	5.2128
GD-153	6824	-1.804E-001pCi/g	2.541E-001	2.539E-001	8.419E-001	4.162E-001	-0.21	0.2541
HF-181	6495	9.232E-002pCi/g	1.044E-001	1.043E-001	4.959E-001	2.437E-001	0.19	0.1044
HG-203	6466	9.088E-002pCi/g	8.062E-002	8.045E-002	2.668E-001	1.306E-001	0.34	0.0806
I-131	6380	1.416E-002pCi/g	1.182E-002	1.180E-002	2.746E-001	1.339E-001	0.05	0.0118
IR-192	6303	-3.206E-003pCi/g	3.257E-003	3.251E-003	5.126E-001	2.534E-001	-0.01	0.0033
K-40	6148	-6.666E-002pCi/g	7.052E-001	7.052E-001	1.635E+000	7.434E-001	-0.04	0.7052
LA-140	6096	2.337E-002pCi/g	2.000E-002	1.996E-002	2.006E-001	9.142E-002	0.12	0.0200
MN-54	5382	1.200E-001pCi/g	1.052E-001	1.050E-001	2.364E-001	1.131E-001	0.51	0.1052
NA-22	5201	4.984E-002pCi/g	3.571E-002	3.562E-002	1.182E-001	5.202E-002	0.42	0.0357
NB-94	5160	3.947E-002pCi/g	6.204E-002	6.201E-002	2.207E-001	1.058E-001	0.18	0.0620
NB-95	5154	-1.353E-001pCi/g	9.204E-002	9.177E-002	3.033E-001	1.468E-001	-0.45	0.0920
ND-147	5083	-8.055E-001pCi/g	7.738E-001	7.724E-001	1.795E+000	8.692E-001	-0.45	0.7738
NP-237	4757	-4.782E-001pCi/g	6.851E-001	6.846E-001	2.269E+000	1.123E+000	-0.21	0.6851
NP-239	4751	-2.392E-001pCi/g	3.314E-001	3.311E-001	1.098E+000	5.427E-001	-0.22	0.3314
PA-231	4541	-2.858E+000pCi/g	4.644E+000	4.642E+000	1.540E+001	7.616E+000	-0.19	4.6444
PA-233	4535	-3.087E-003pCi/g	1.223E-001	1.223E-001	1.280E+000	6.331E-001	0.00	0.1223
PA-234	4528	6.645E-001pCi/g	3.995E-001	3.981E-001	5.016E-001	2.427E-001	1.32	0.3995
PA-234M	19453	1.019E+001pCi/g	7.871E+000	7.854E+000	5.194E+001	2.527E+001	0.20	7.8710
PB-210	4467	8.424E+002pCi/g	5.010E+001	7.962E+000	1.486E+001	7.359E+000	56.69	50.1004

PB-212	4454	7.213E-001pCi/g	1.549E-001	1.477E-001	3.494E-001	1.699E-001	2.06	0.1549
PB-214	4448	3.560E-001pCi/g	1.635E-001	1.624E-001	4.269E-001	2.062E-001	0.83	0.1635
PM-144	19585	4.197E-002pCi/g	5.362E-002	5.358E-002	2.115E-001	1.012E-001	0.20	0.0536
PM-146	2464	1.534E-001pCi/g	1.432E-001	1.429E-001	6.480E-001	3.101E-001	0.24	0.1432
RA-226	1950	4.820E-001pCi/g	1.940E+000	1.940E+000	5.198E+000	2.545E+000	0.09	1.9401
RH-106	1882	-1.076E+000pCi/g	8.905E-001	8.888E-001	2.950E+000	1.433E+000	-0.36	0.8905
RU-103	1828	5.218E-002pCi/g	9.724E-002	9.721E-002	2.375E-001	1.149E-001	0.22	0.0972
SB-124	1784	6.289E-002pCi/g	1.316E-001	1.316E-001	4.394E-001	2.156E-001	0.14	0.1316
SB-125	1777	-4.060E-001pCi/g	2.384E-001	2.375E-001	9.120E-001	4.454E-001	-0.45	0.2384
SC-46	1739	-1.325E-001pCi/g	1.242E-001	1.241E-001	5.329E-001	2.611E-001	-0.25	0.1242
SN-113	1570	1.363E-001pCi/g	1.516E-001	1.514E-001	5.030E-001	2.469E-001	0.27	0.1516
SN-126	17459	7.980E-001pCi/g	7.805E-001	7.794E-001	2.583E+000	1.272E+000	0.31	0.7805
TA-182	1301	3.939E-001pCi/g	3.736E-001	3.730E-001	1.242E+000	6.027E-001	0.32	0.3736
TC-99M	17412	-6.172E-002pCi/g	7.271E-002	7.262E-002	2.410E-001	1.188E-001	-0.26	0.0727
TH-227	1058	1.284E+000pCi/g	1.960E+000	1.958E+000	6.493E+000	3.214E+000	0.20	1.9597
TH-229	1046	1.458E+000pCi/g	1.568E+000	1.564E+000	3.942E+000	1.930E+000	0.37	1.5684
TH-234	1027	-1.796E+000pCi/g	5.751E+000	5.750E+000	6.531E+000	3.215E+000	-0.27	5.7506
TL-208	929	1.957E-001pCi/g	1.575E-001	1.572E-001	2.636E-001	1.271E-001	0.74	0.1575
U-235	281	2.796E-001pCi/g	5.431E-001	5.429E-001	1.808E+000	8.902E-001	0.15	0.5431
Y-88	74	-2.025E-001pCi/g	1.338E-001	1.334E-001	3.814E-001	1.849E-001	-0.53	0.1338
ZN-65	31	2.825E-001pCi/g	2.450E-001	2.446E-001	8.132E-001	3.940E-001	0.35	0.2450
ZR-95	7	-1.550E-001pCi/g	1.946E-001	1.944E-001	4.389E-001	2.107E-001	-0.35	0.1946

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-272277~2-A	LCS 160-272277~2-A	CS-137	2.837E+001	pCi/g	2.944E+001	96.35%	-0.4918
		CO-60	1.614E+001	pCi/g	1.645E+001	98.11%	-0.2592
		AM-241	9.775E+001	pCi/g	9.708E+001	100.69%	0.0929

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

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)

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

Source Prepared by: _____
Z. Dimitrova, Radiochemist

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

Reagent

Tuna Can_00006

Eckert & Ziegler
Analytics

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

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

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

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

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

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

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

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.
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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_00035

Standard ID Number: U-232_00032
True Value = 78.302 Dpm/mL
Date Analyzed: 7/13/2016

Radionuclide: U-232

	Replicates	
#1	81.64	Dpm/mL
#2	78.78	Dpm/mL
#3	74.25	Dpm/mL

Mean = 78.2233333

1 sigma = 3.72631632 1.96 sigma = 7.30358

True Value minus 5% = 74.3869 (True Value - 5%)
True Value plus 5% = 82.2171 (True Value + 5%)

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

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

Standard Reverification Acceptable? Yes

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

1st Reviewed By/Date: Amanda Leigh Dick 07/14/16 ALD 7/14

2nd Reviewed By/Date: RM 7.15.16

Decay Calculations

Raw Sample/Standard Information

Initial Date/Time (t_0):	8/25/2011 0:00		
Decayto Date/Time (t):	7/13/16 0:00		
Initial Activity (A_0):	82.25 dpm		
Initial Aliquot:	1 mL		
Initial Conc:	82.25 dpm/mL		
***Soln. Density:**	1 g/mL		
Nuclide:	U-232		
Half-Life (days):	25165.725	decay days	fraction
****Decay Factor:**	0.9521	1784.00	0.07089
Decay Corr Activity:	7.8306E+01 dpm		
Decay Corr Conc:	7.8306E+01 dpm/mL		

Conversion/Calculations

Final Activity Unit:	dpm
Activity Unit Factor:	1.00000
Final Volume Unit:	mL
Volume Unit Factor:	1.000
Final Concentration:	7.8306E+01 dpm/mL
Aliquot Volume:	1.0000E+00 mL
Final Activity (A):	7.8306E+01 dpm

** Uses basic decay equation: $A = A_0 * \exp(-\ln(2)*(t-t_0)/(\text{half-life})$

* Soln. Density to be used when converting from liquid expressed in mass (g) units to liquid units (mL), and is only applied in that case.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:22:33AM 7/14/2016

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_00032 (unclean)
AnalysisResultsID: 171222
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

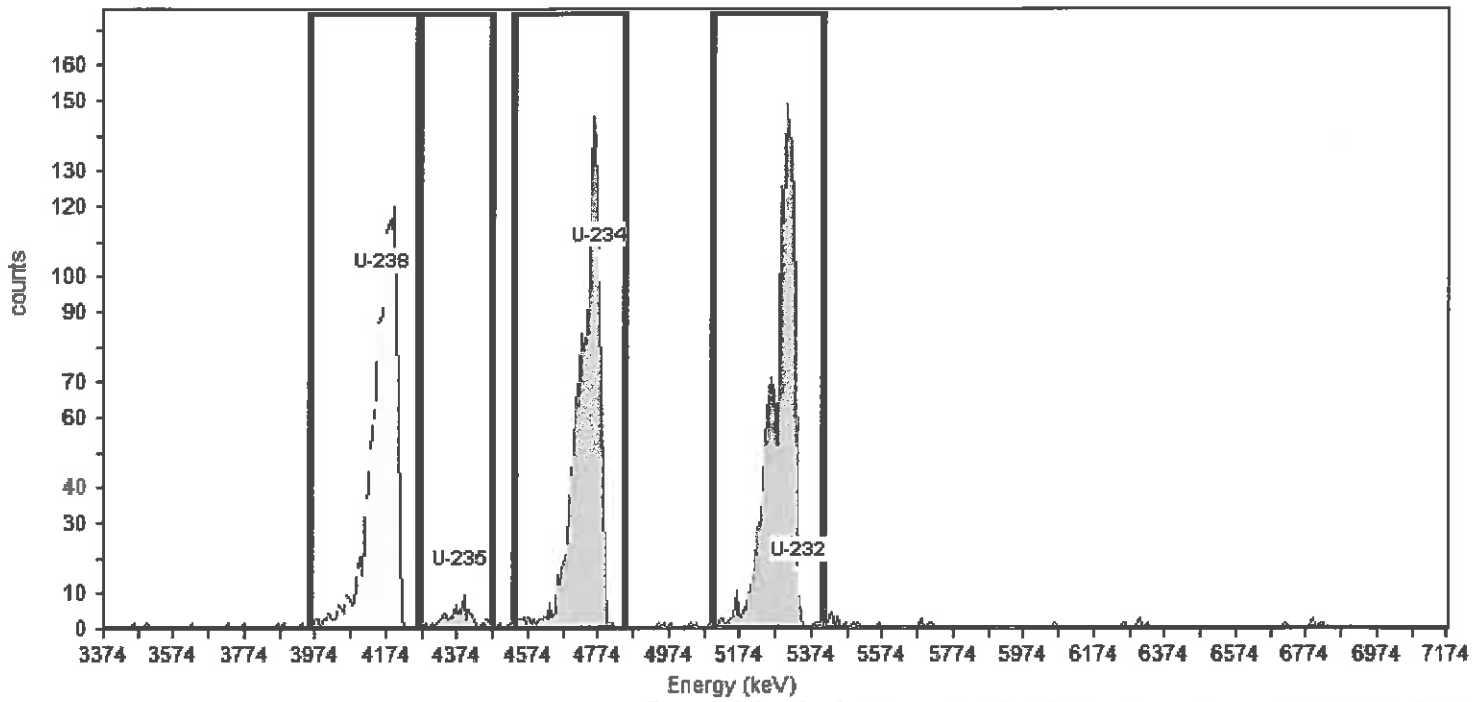
Tracer Name: UNAT_00009
Tracer Activity: 72.26 DPM / mL x (Vol.) 0.10 mL = 7.23 DPM
Tracer Ref. Date: 3/30/2008 4:33:01PM

Tracer Nuclide: U-238
Tracer Recovery: 68.52%

Acquisition

Detector: AV227 SN: 50-120DD5
Acquisition Start Date: 7/13/2016 11:16:29AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 6/24/2016 4:15:27PM
Bkgd Info: Sample: ICB;AV227; Det: AV227; Spectrum #1; 6/24/2016 4:15:27 PM

Energy Calibration: IC-9817;AV227-20151018
Efficiency Calibration:IC-9817;AV227-20151018
Calibration Date: 10/18/2015 9:20:24PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.29% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI_U-232
Decay Correction:7/13/2016 11:14:26AM
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	69.7	100.0	1202	0.0000	1202.00	4.952E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	90.0	80.2	63	0.0000	63.00	4.723E+000	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	74.4	99.8	1279	1.0000	1278.00	7.699E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	62.9	100.1	1363	4.0000	1359.00	8.164E+001	DPM/mL

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:22:42AM 7/14/2016

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_00032 (unclean)
AnalysisResultsID: 171223
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

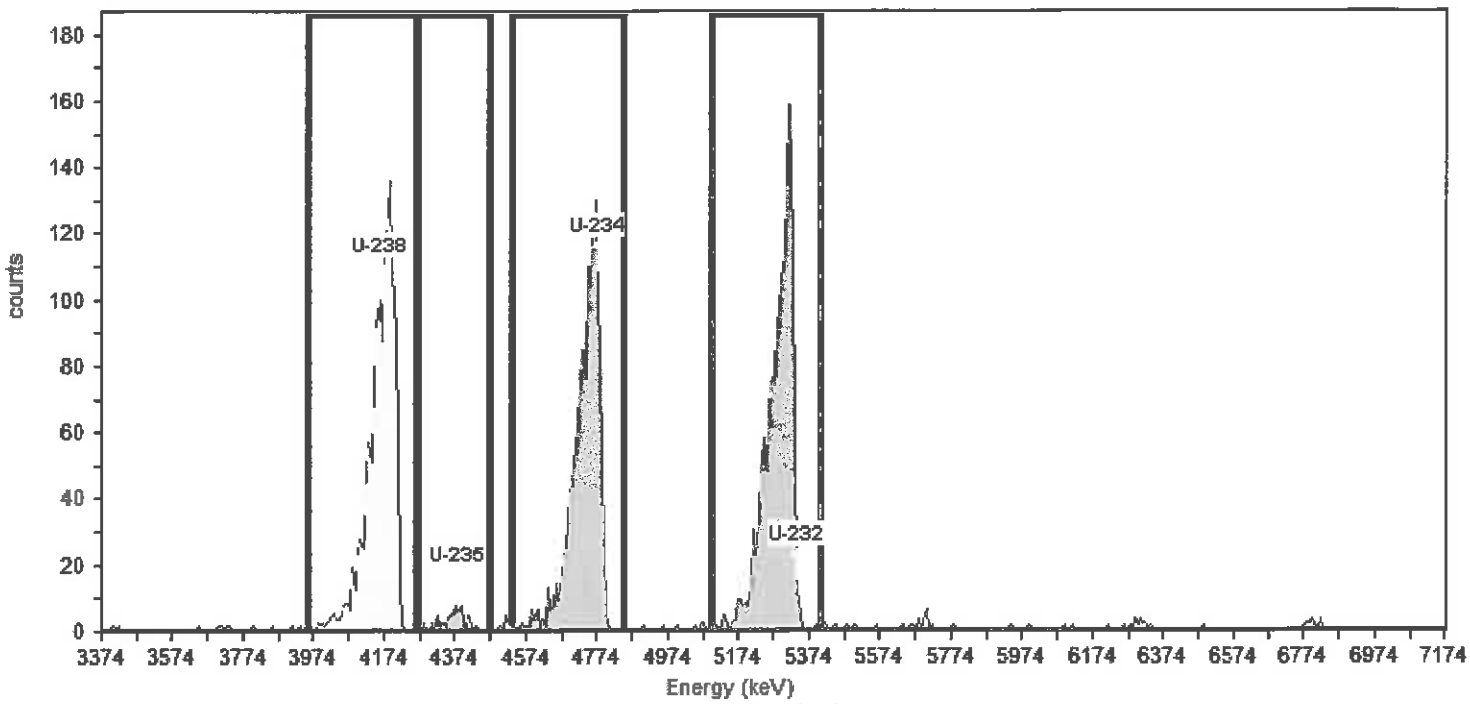
Tracer Name: UNAT_00009
Tracer Activity: 72.26 DPM / mL x (Vol.) 0.10 mL = 7.23 DPM
Tracer Ref. Date: 3/30/2008 4:33:01PM

Tracer Nuclide: U-238
Tracer Recovery: 73.96%

Acquisition

Detector: AV228 SN: 51-005Q6
Acquisition Start Date: 7/13/2016 11:16:29AM
Live Time: 960.00 min.
Real Time: 960.12 min.
Background Date: 6/24/2016 4:15:28PM
Bkgd Info: Sample: ICB;AV228; Det: AV228; Spectrum #1; 6/24/2016 4:15:28 PM

Energy Calibration: IC-9884;AV228-20151018
Efficiency Calibration:IC-9884;AV228-20151018
Calibration Date: 10/18/2015 9:20:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.26% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI_U-232
Decay Correction:7/13/2016 11:14:26AM
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	73.9	100.0	1298	2.0000	1296.00	5.345E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	36.6	80.2	53	0.0000	53.00	3.685E+000	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	72.6	99.8	1246	3.0000	1243.00	6.945E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	76.4	100.1	1419	5.0000	1414.00	7.878E+001	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:22:51AM 7/14/2016

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_00032 (unclean)
AnalysisResultsID: 171224
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

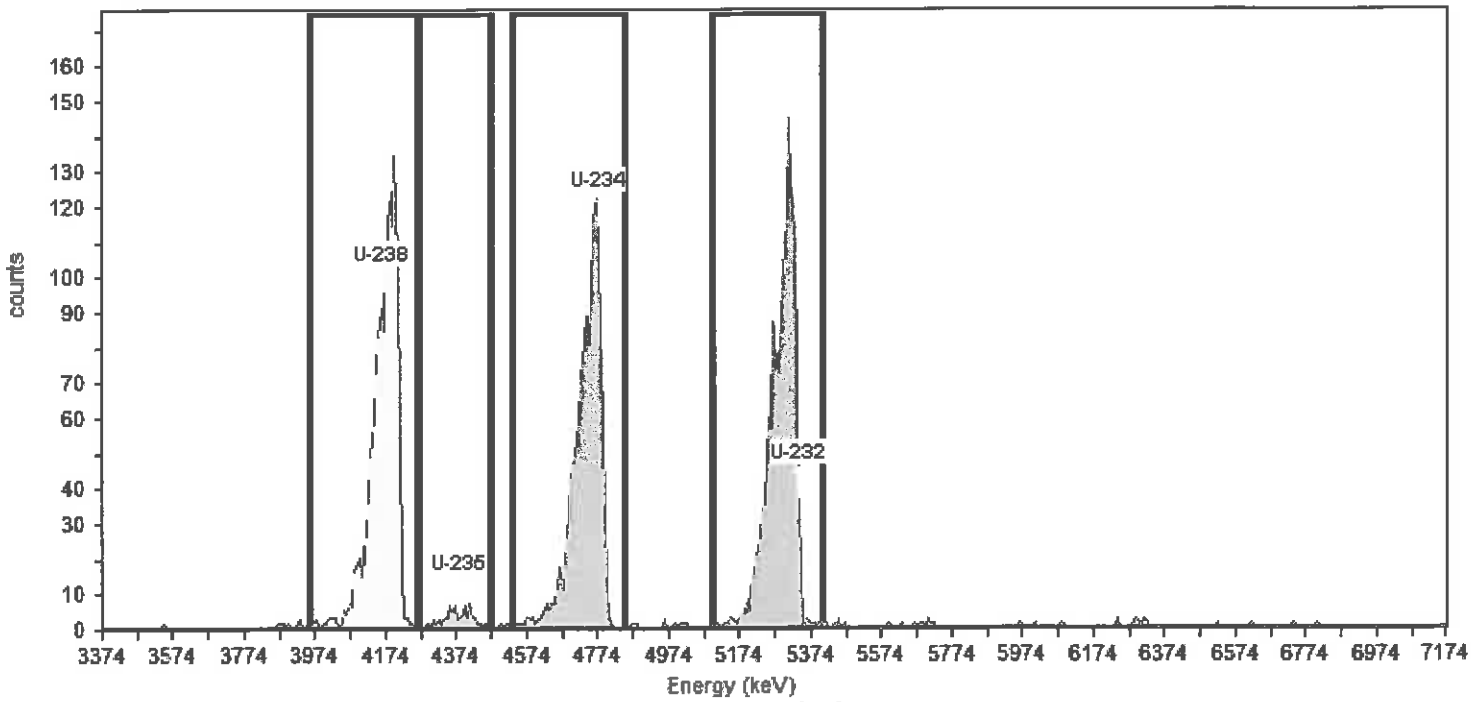
Tracer Name: UNAT_00009
Tracer Activity: 72.26 DPM / mL x (Vol.) 0.10 mL = 7.23 DPM
Tracer Ref. Date: 3/30/2008 4:33:01PM

Tracer Nuclide: U-238
Tracer Recovery: 69.93%

Acquisition

Detector: AV229 SN: 51-005EE4
Acquisition Start Date: 7/13/2016 11:16:30AM
Live Time: 960.00 min.
Real Time: 960.15 min.
Background Date: 7/7/2016 4:03:35PM
Bkgd Info: Sample: BKG;AV229; Det: AV229; Spectrum #1; 7/7/2016 4:03:35 PM

Energy Calibration: IC-9885;AV229-20151018
Efficiency Calibration:IC-9885;AV229-20151018
Calibration Date: 10/18/2015 9:20:33PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.18% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI_U-232
Decay Correction:7/13/2016 11:14:26AM
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	74.2	100.0	1274	4.0000	1270.00	5.053E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	33.2	80.2	63	0.0000	63.00	4.470E+000	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	79.5	99.8	1214	4.0000	1210.00	6.899E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	76.8	100.1	1322	16.0000	1306.00	7.425E+001	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

U-232 Unclean Tracer (re-cert exp: 8/16)

Actinide Prep Ver. by Columns

Batch No. : _____

Balance ID : _____

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
1	Ver. 1	0.1	227	
2	1 2	1	228	
3	1 3		229	
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-00012
Vol (mL) : 0.1
Ref Activity (dpm/mL) : 234 - 10.69, 235 - 3.37, 238 - 72.26
Act Ref Date : 03-30-08

Samples Spiked and Traced By: SUB 7/11/16 (Initials / Date)

Verification Signature & Date: CME 7/11/16 (Initials / Date)

LCS Standard ☐ N/A (Initials / Date)

Isotope : U-232 Unclean
Std Sol'n ID. : U-232-00032
Vol (mL) : 0.1
Ref Activity (dpm/mL) : 92.2456
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 : 7/11/16

Reviewed by: _____
Date: _____

\\Slsvr01\RAD\MasterForms\RAD-0045 Rev(3)

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

U - 232 - 00032

Reagent ID: U-232_00032

Description:	U-232 Unclean tracer	Expiration Date:	08/06/2016
No. of Bottles:	1	Laboratory:	TestAmerica St. Louis
Storage Location:	RAD Actinide STDs	Prepared By:	Bernsen, Sarah C
Reagent Volume:	500.000 mL	Solvent:	2M HNO3
Creation Date:	07/16/2015	Solvent Lot:	n/a
Open Date:			
Container(s):	684064		
Comment:			

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
U-232	U-232_00009	03/24/2017	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		03/24/17				4.00000	mL

Uranium only via UTEVA

Batch:_____ ST-RC-0238

*All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

UTEVA lot: _____

U-232 ver.

11.4.4	UTEVA cartridge	
11.4.5	5mL 3M HNO_3	COMPLETED ☐
11.4.6	Load sample	
11.4.7	25mL 3M HNO_3	COMPLETED ☐
11.4.8	5mL 9M HCl	COMPLETED ☐
11.4.9	20mL 5M HCl / 0.05M oxalic	COMPLETED ☐
11.4.10-11.4.11	Elute into clean tube with 15mL 1M HCl	COMPLETED ☐

Uranium only via UTEVA

ST-RC-0238

Batch: ~~_____~~

*All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

UTEVA lot: U7SR15G

11.4.4	UTEVA cartridge	
11.4.5	5mL 3M HNO_3	COMPLETED ☐
11.4.6	Load sample	
11.4.7	25mL 3M HNO_3	COMPLETED ☐
11.4.8	5mL 9M HCl	COMPLETED ☐
11.4.9	20mL 5M HCl / 0.05M oxalic	COMPLETED ☐
11.4.10-11.4.11	Elute into clean tube with 15mL 1M HCl	COMPLETED ☐

U-232 ver.

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 Crt: 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_00012

St. Louis Radiological Standard Reverification Form

Standard ID Number: UNAT_00011
True Value = 70.69 DPM/L or g
Date Analyzed: 5/5/2016

Radionuclide: U-234

	Replicates	
#1	66.49	DPM/L or g
#2	71.93	DPM/L or g
#3	67.79	DPM/L or g

Mean = 68.73667

1 sigma = 2.840868 1.96 sigma = 5.568102

True Value minus 5% = 67.1555 (True Value - 5%)
True Value plus 5% = 74.2245 (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: Amanda Dick 05/09/2016

SOP Reference: STL-QA-0002, Current Revision

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:10:46AM 5/9/2016

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: UNAT_00011
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

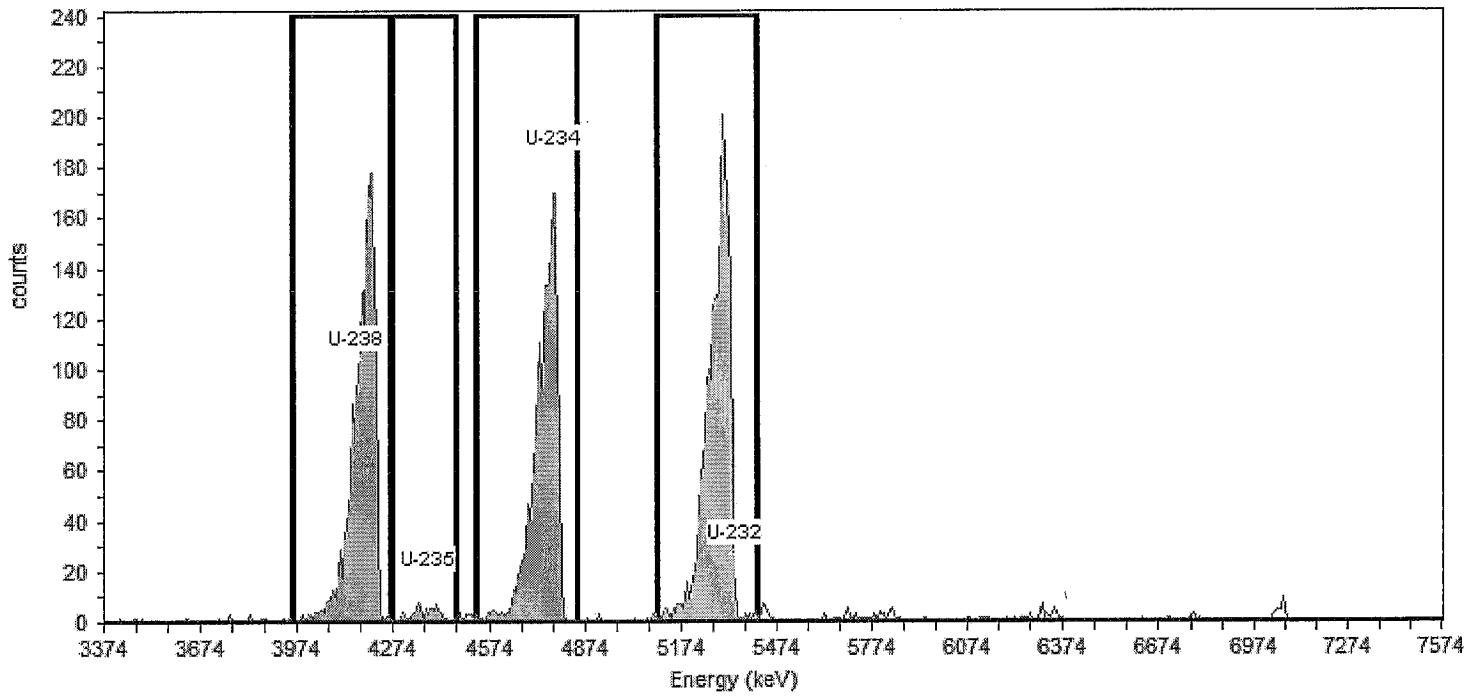
Tracer Name: U-232_00032
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/25/2011 12:03:08PM

Tracer Nuclide: U-232
Tracer Recovery: 100.46%

Acquisition

Detector: AV194 SN: 50-119J2
Acquisition Start Date: 5/5/2016 10:51:35AM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 4/22/2016 10:41:10AM
Bkgd Info: Sample: ICB;AV194; Det: AV194; Spectrum #1; 4/22/2016 10:41:10 AM

Energy Calibration: IC-9520;AV194-20151017
Efficiency Calibration:IC-9520;AV194-20151017
Calibration Date: 10/18/2015 3:55:14PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.83% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:5/5/2016 10:49:41AM
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	77.8	100.0	1645	1.0000	1644.00	6.865E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	22.2	80.2	60	3.0000	57.00	2.968E+000	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	74.8	99.8	1590	1.0000	1589.00	6.649E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	76.2	100.1	1892	8.0000	1884.00	8.262E+001	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:10:20AM 5/9/2016

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: UNAT_00011
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

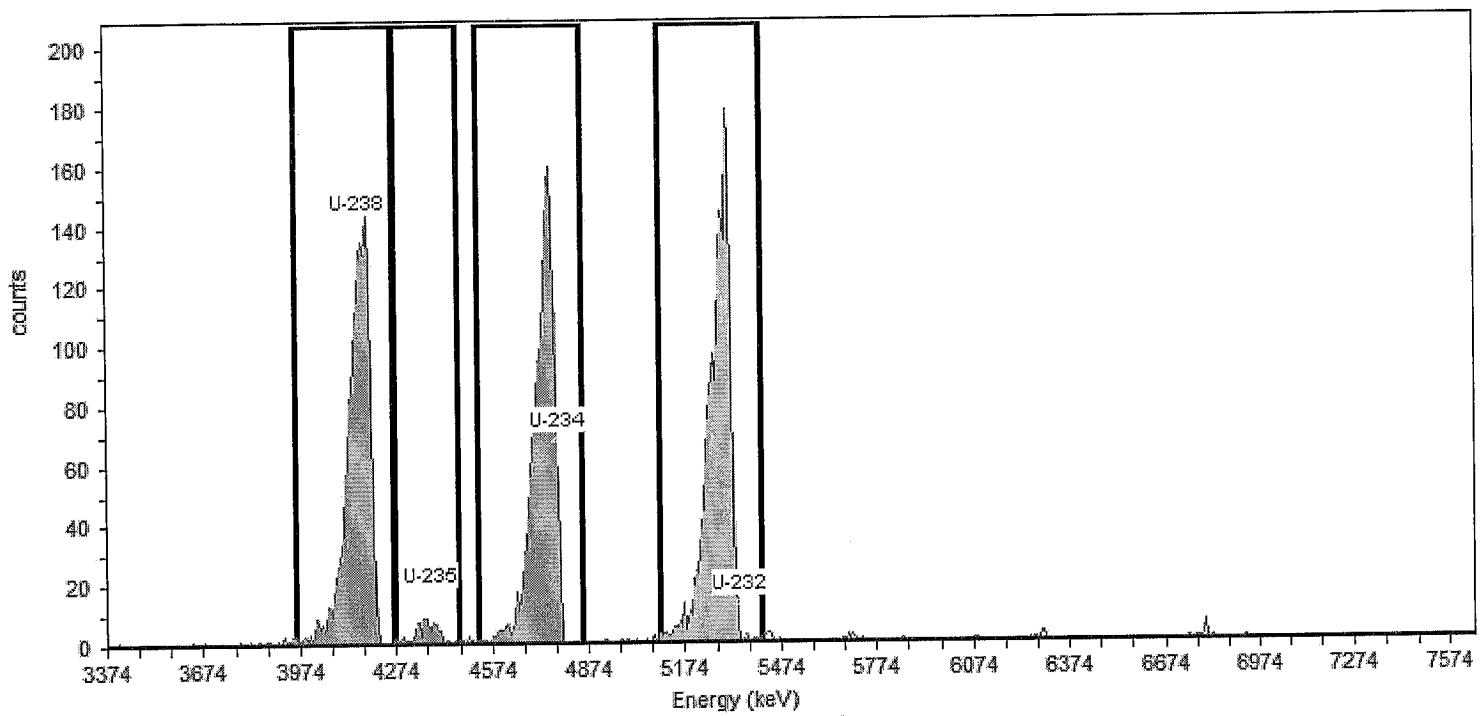
Tracer Name: U-232_00032
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/25/2011 12:03:08PM

Tracer Nuclide: U-232
Tracer Recovery: 83.14%

Acquisition

Detector: AV195 SN: 50-117AA2
Acquisition Start Date: 5/5/2016 10:51:35AM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 4/22/2016 10:41:10AM
Bkgd Info: Sample: ICB;AV195; Det: AV195; Spectrum #1; 4/22/2016 10:41:10 AM

Energy Calibration: IC-9792;AV195-20151017a
Efficiency Calibration:IC-9792;AV195-20151017a
Calibration Date: 10/18/2015 3:55:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.85% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:5/5/2016 10:49:41AM
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	73.6	100.0	1490	0.0000	1490.00	7.223E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	78.5	80.2	77	0.0000	77.00	4.654E+000	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	69.4	99.8	1484	3.0000	1481.00	7.193E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	73.2	100.1	1633	10.0000	1623.00	6.838E+001	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:09:54AM 5/9/2016

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: UNAT_00011
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

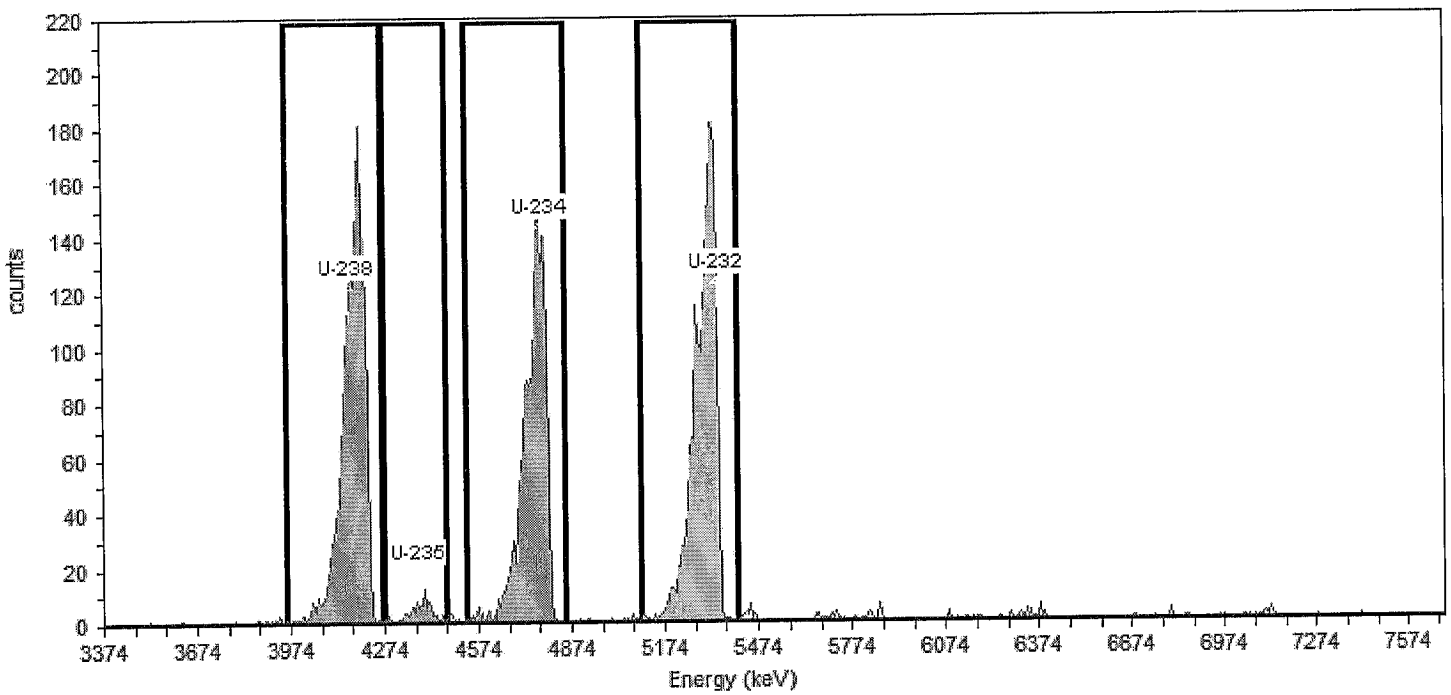
Tracer Name: U-232_00032
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/25/2011 12:03:08PM

Tracer Nuclide: U-232
Tracer Recovery: 95.37%

Acquisition

Detector: AV197 SN: 50-117Z5
Acquisition Start Date: 5/5/2016 10:51:35AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 4/25/2016 9:56:18AM
Bkgd Info: Sample: ICB;AV197; Det: AV197; Spectrum #1; 4/25/2016 9:56:18 AM

Energy Calibration: IC-9794;AV197-20151017
Efficiency Calibration:IC-9794;AV197-20151017
Calibration Date: 10/18/2015 3:55:22PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.48% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:5/5/2016 10:49:41AM
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-234	4776.4	4,775.8	0.6	4530.3	4851.0	73.5	99.8	1519	3.0000	1516.00	6.779E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	78.8	100.1	1769	6.0000	1763.00	7.844E+001	DPM/mL
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	72.8	100.0	1655	0.0000	1655.00	7.385E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	62.5	80.2	77	0.0000	77.00	4.284E+000	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

UNAT verification

Aliquot Only

Batch No. : _____

Balance ID : _____

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
BC: 115 1	verification-1	0.1	194	BC:199
BC: 116 2	2	1	195	BC:200
BC: 117 3	3	1	197	BC:201
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 : U-232

Std Sol'n No. : U-232-00032

Vol (mL) : 0.1

Ref Activity (dpm/mL) : _____

Act Ref Date : _____

Samples Spiked and Traced By: SUB 5/2/16 (Initials / Date)

Verification Signature & Date: JMR 5/2/16 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : UNAT

Std Sol'n ID. : UNAT-00011

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 234-78.169 / 235-3.370 / 238-72.2649

Act Ref Date : 03-30-08

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-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 : _____

Reviewed by: _____

Date: _____

\\Slsvr01\RAD\MasterForms\RAD-0045 Rev(3)

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Reagent ID: UNAT_00011

Description:	UNAT spike	Expiration Date:	05/20/2016
No. of Bottles:	1	Laboratory:	TestAmerica St. Louis
Storage Location:	RAD Actinide STDs	Prepared By:	Bernsen, Sarah C
Reagent Volume:	200.000 mL	Solvent:	1M HNO3
Creation Date:	04/28/2015	Solvent Lot:	n/a
Open Date:			
Container(s):	622074		
Comment:			

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
U-234	UNAT Parent_00001	05/20/2016	706.91200	dpm/mL	70.69123	dpm/mL
U-235	UNAT Parent_00001	05/20/2016	33.70600	dpm/mL	3.37064	dpm/mL
U-238	UNAT Parent_00001	05/20/2016	722.65000	dpm/mL	72.26499	dpm/mL

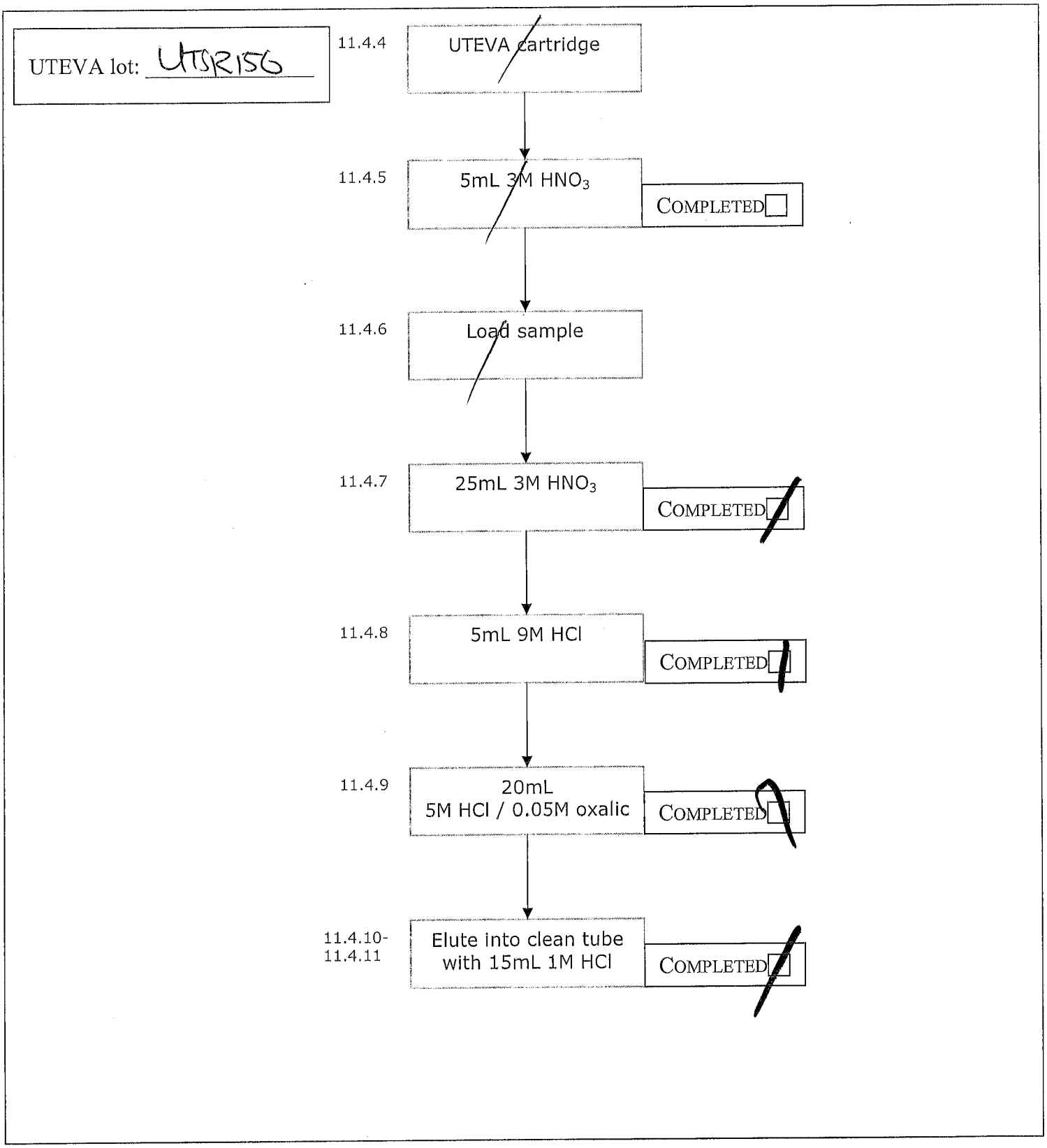
Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
UNAT Parent_00001	UNAT Parent		05/20/16				20.00000	mL

Uranium only via UTEVA

Batch: _____ ST-RC-0238

*All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)



St. Louis Radiological Standard Reverification Form

Standard ID Number: UNAT_00011
True Value = 72.2649 DPM/L or g
Date Analyzed: 5/5/2016

Radionuclide: U-238

	Replicates	
#1	68.65	DPM/L or g
#2	72.23	DPM/L or g
#3	73.85	DPM/L or g

Mean = 71.57667

1 sigma = 2.660852 1.96 sigma = 5.21527

True Value minus 5% = 68.65166 (True Value - 5%)
True Value plus 5% = 75.87815 (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: Amanda Dick 05/09/2016

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
11:10:46AM 5/9/2016

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: UNAT_00011
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

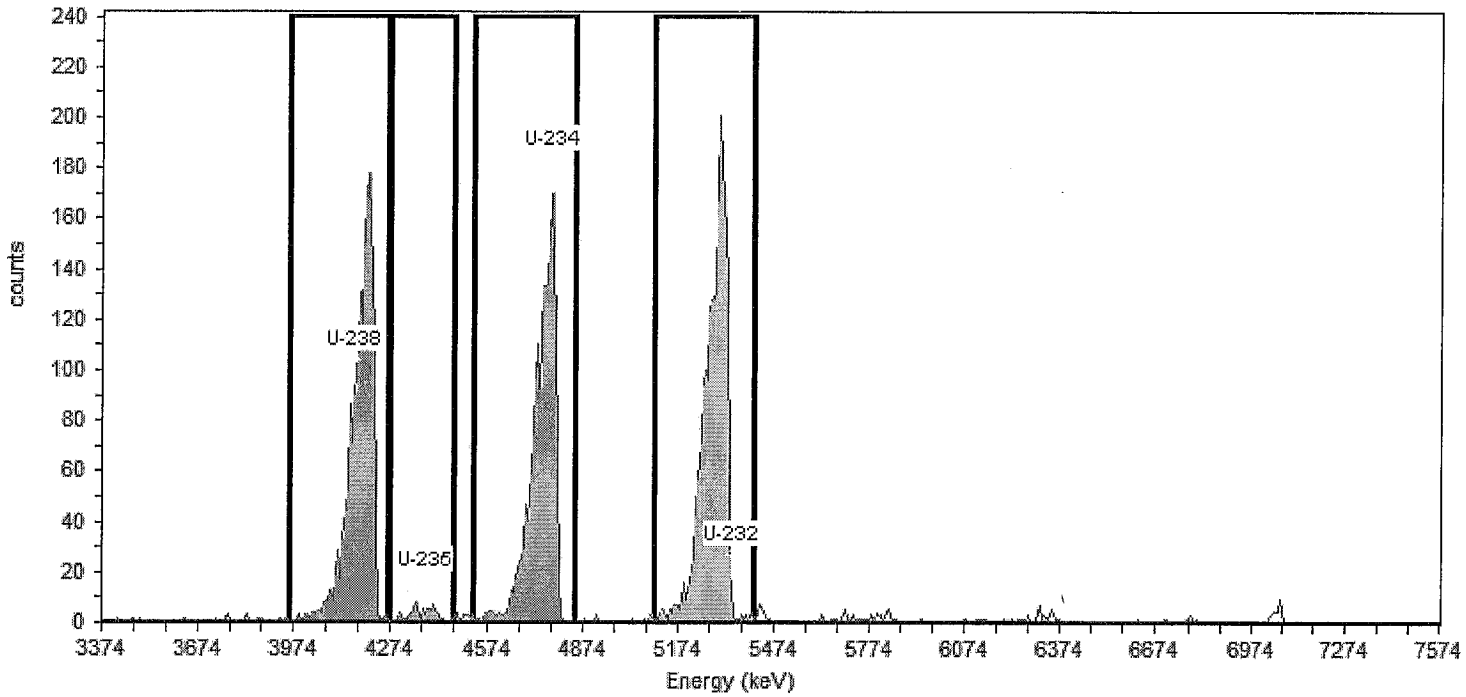
Tracer Name: U-232_00032
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/25/2011 12:03:08PM

Tracer Nuclide: U-232
Tracer Recovery: 100.46%

Acquisition

Detector: AV194 SN: 50-119J2
Acquisition Start Date: 5/5/2016 10:51:35AM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 4/22/2016 10:41:10AM
Bkgd Info: Sample: ICB;AV194; Det: AV194; Spectrum #1; 4/22/2016 10:41:10 AM

Energy Calibration: IC-9520;AV194-20151017
Efficiency Calibration:IC-9520;AV194-20151017
Calibration Date: 10/18/2015 3:55:14PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.83% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:5/5/2016 10:49:41AM
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	77.8	100.0	1645	1.0000	1644.00	6.865E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	22.2	80.2	60	3.0000	57.00	2.968E+000	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	74.8	99.8	1590	1.0000	1589.00	6.649E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	76.2	100.1	1892	8.0000	1884.00	8.262E+001	DPM/mL

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:10:20AM 5/9/2016

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: UNAT_00011
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

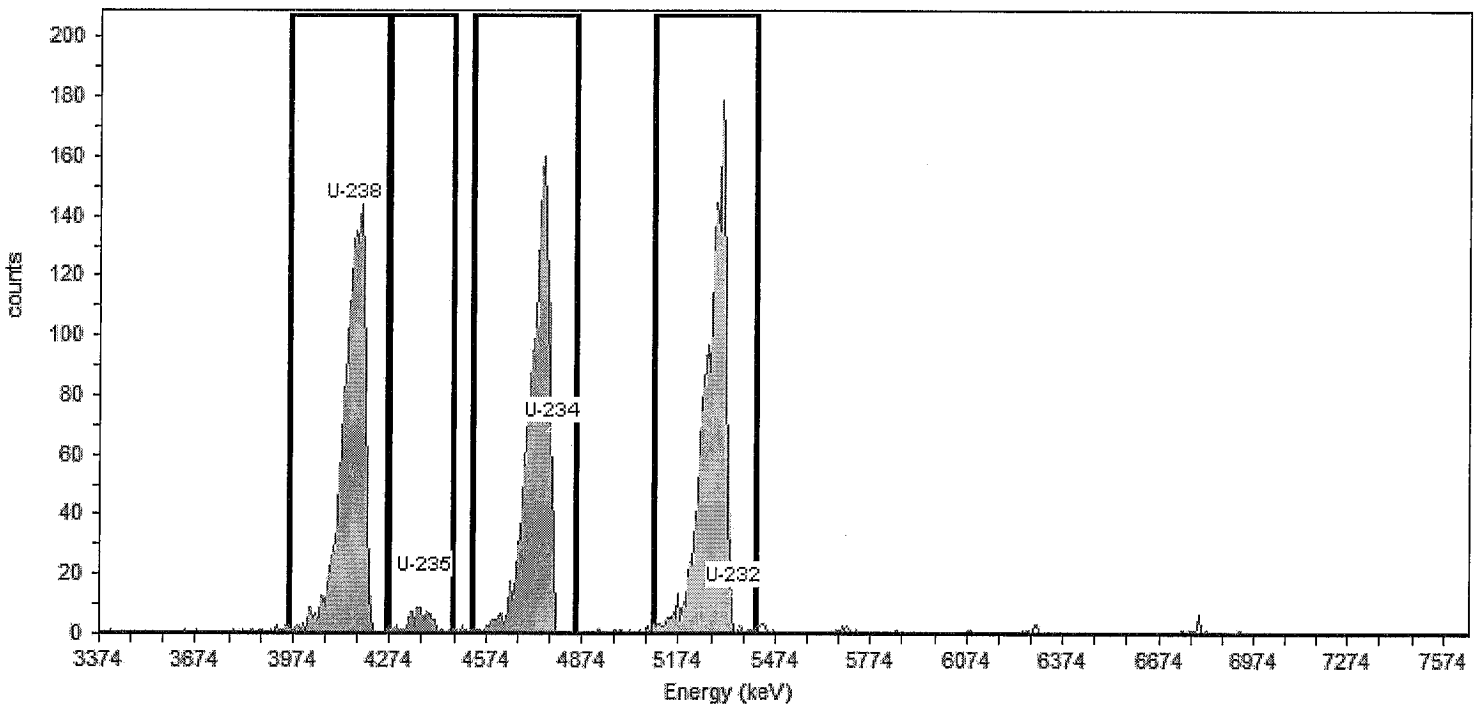
Tracer Name: U-232_00032
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/25/2011 12:03:08PM

Tracer Nuclide: U-232
Tracer Recovery: 83.14%

Acquisition

Detector: AV195 SN: 50-117AA2
Acquisition Start Date: 5/5/2016 10:51:35AM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 4/22/2016 10:41:10AM
Bkgd Info: Sample: ICB;AV195; Det: AV195; Spectrum #1; 4/22/2016 10:41:10 AM

Energy Calibration: IC-9792;AV195-20151017a
Efficiency Calibration:IC-9792;AV195-20151017a
Calibration Date: 10/18/2015 3:55:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.85% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:5/5/2016 10:49:41AM
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	73.6	100.0	1490	0.0000	1490.00	7.223E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	78.5	80.2	77	0.0000	77.00	4.654E+000	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	69.4	99.8	1484	3.0000	1481.00	7.193E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	73.2	100.1	1633	10.0000	1623.00	6.838E+001	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:09:54AM 5/9/2016

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: UNAT_00011
:
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

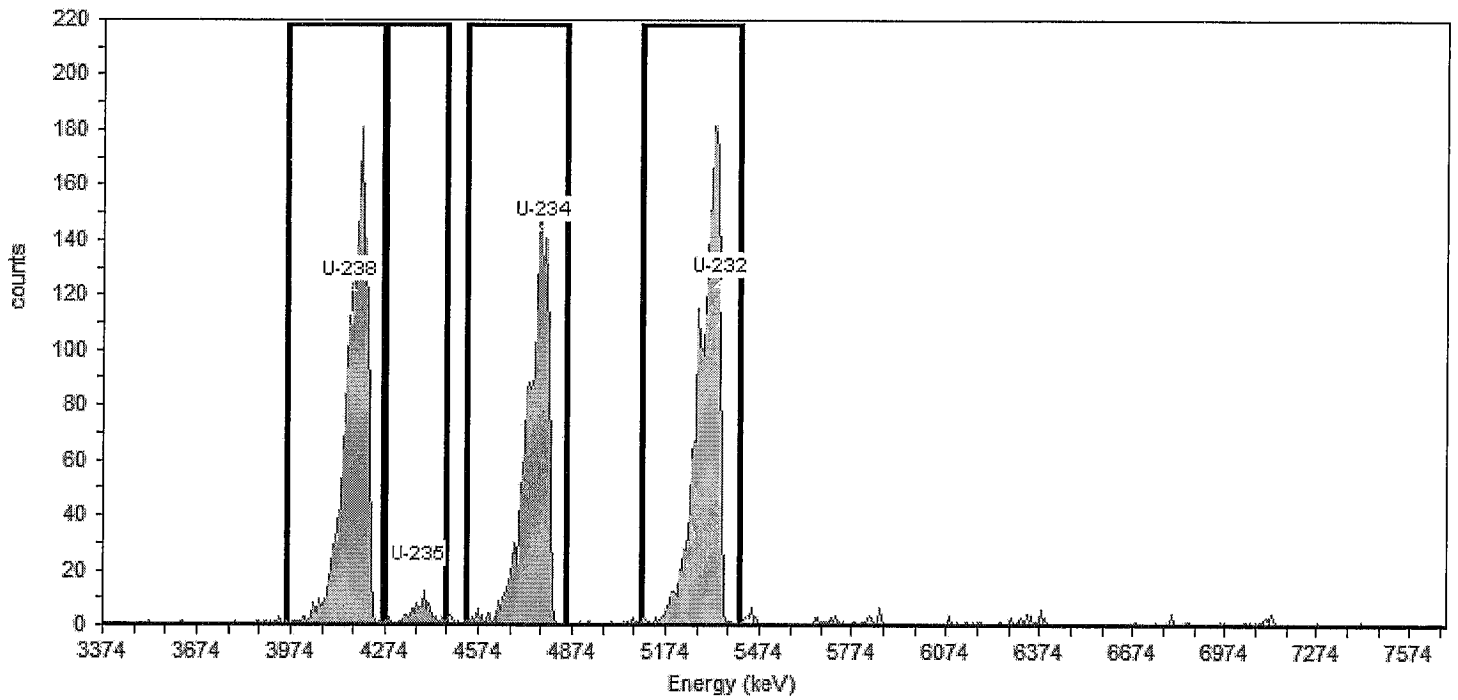
Tracer Name: U-232_00032
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/25/2011 12:03:08PM

Tracer Nuclide: U-232
Tracer Recovery: 95.37%

Acquisition

Detector: AV197 SN: 50-117Z5
Acquisition Start Date: 5/5/2016 10:51:35AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 4/25/2016 9:56:18AM
Bkgd Info: Sample: ICB;AV197; Det: AV197; Spectrum #1; 4/25/2016 9:56:18 AM

Energy Calibration: IC-9794;AV197-20151017
Efficiency Calibration:IC-9794;AV197-20151017
Calibration Date: 10/18/2015 3:55:22PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 24.48% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:5/5/2016 10:49:41AM
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-234	4776.4	4,775.8	0.6	4530.3	4851.0	73.5	99.8	1519	3.0000	1516.00	6.779E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	78.8	100.1	1769	6.0000	1763.00	7.844E+001	DPM/mL
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	72.8	100.0	1655	0.0000	1655.00	7.385E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	62.5	80.2	77	0.0000	77.00	4.284E+000	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

UNAT verification

Aliquot Only

Batch No. : _____

Balance ID : _____

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
BC: 115 1	verification-1	0.1	194	BC:199
BC: 116 2	2	1	195	BC:200
BC: 117 3	3	1	197	BC:201
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 : U-232

Std Sol'n No. : U-232-00032

Vol (mL) : 0.1

Ref Activity (dpm/mL) : _____

Act Ref Date : _____

Samples Spiked and Traced By: SLB 5/2/14 (Initials / Date)

Verification Signature & Date: JMC 5/2/16 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : UNAT

Std Sol'n ID. : UNAT-00011

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 234-72.169 / 235-3.310 / 238-72.2649

Act Ref Date : 03-30-08

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 : SLB

Date : _____

Reviewed by: _____

Date: _____

\\Slsvr01\RAD\MasterForms\RAD-0045 Rev(3)

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

UNAT_00011

Reagent ID: UNAT_00011

Description:	UNAT spike	Expiration Date:	05/20/2016
No. of Bottles:	1	Laboratory:	TestAmerica St. Louis
Storage Location:	RAD Actinide STDs	Prepared By:	Bernsen, Sarah C
Reagent Volume:	200.000 mL	Solvent:	1M HNO3
Creation Date:	04/28/2015	Solvent Lot:	n/a
Open Date:			
Container(s):	622074		
Comment:			

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
U-234	UNAT Parent_00001	05/20/2016	706.91200	dpm/mL	70.69123	dpm/mL
U-235	UNAT Parent_00001	05/20/2016	33.70600	dpm/mL	3.37064	dpm/mL
U-238	UNAT Parent_00001	05/20/2016	722.65000	dpm/mL	72.26499	dpm/mL

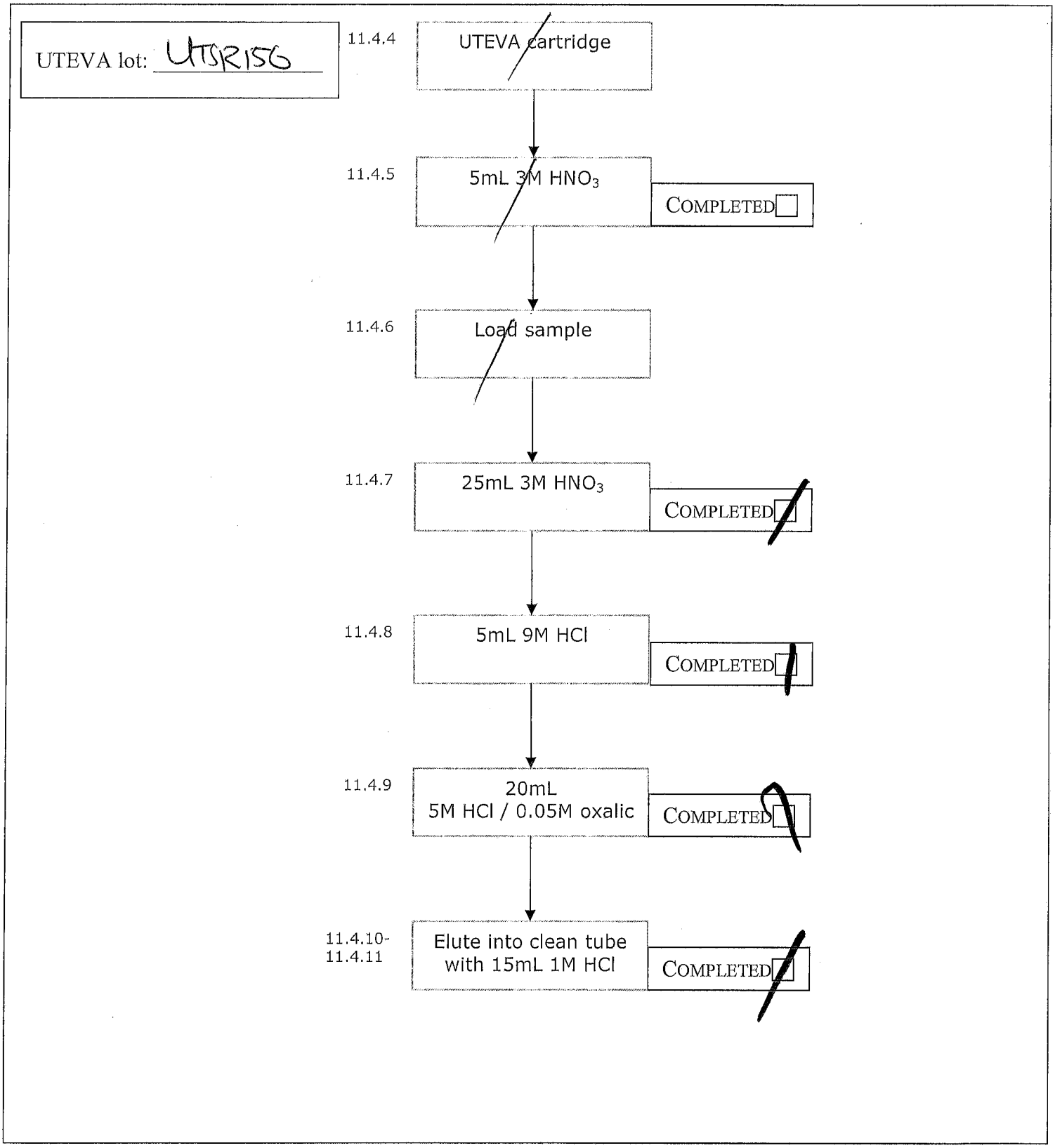
Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
UNAT Parent_00001	UNAT Parent		05/20/16				20.00000	mL

Uranium only via UTEVA

Batch: _____ ST-RC-0238

*All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)



Method 8260C Low Level

Volatile Organic Compounds (GC/MS) by Method 8260C Low Level

FORM II
GC/MS VOA SURROGATE RECOVERY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): RTX-VMS40 ID: 0.18(mm)

Client Sample ID	Lab Sample ID	DBFM #	DCA #	TOL #	BFB #
TB-021517	160-21079-1	99	95	105	106
GW-BR05RB-021517	160-21079-2	97	96	106	102
GW-BR11JC-021517	160-21079-3	101	96	106	106
GW-BR02JC-021517	160-21079-4	103	100	106	107
GW-BR02RB-021517	160-21079-5	97	94	104	102
GW-NB71-021517	160-21079-6	101	98	107	105
GW-BR04RB-021517	160-21079-7	95	96	105	105
GW-BR04RB-021517-FD	160-21079-8	94	96	106	105
GW-NB80-021517	160-21079-9	102	98	107	105
GW-NB50-021517	160-21079-10	99	102	105	104
GW-NB57A-021517	160-21079-11	105	102	108	105
	MB 160-293176/8	95	95	106	106
	LCS 160-293176/5	101	97	105	106
	LCSD 160-293176/6	101	96	104	106
GW-BR04RB-021517 MS	160-21079-7 MS	100	92	105	104
GW-BR04RB-021517 MSD	160-21079-7 MSD	98	92	106	105

	QC LIMITS
DBFM = Dibromofluoromethane (Surr)	81-124
DCA = 1,2-Dichloroethane-d4 (Surr)	75-129
TOL = Toluene-d8 (Surr)	87-128
BFB = 4-Bromofluorobenzene (Surr)	81-130

Column to be used to flag recovery values

FORM II 8260C

FORM III
GC/MS VOA LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Matrix: Water Level: Low Lab File ID: LLCS7573.D

Lab ID: LCS 160-293176/5 Client ID:

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC	QC LIMITS REC	#
1,1,1-Trichloroethane	10.0	10.1	101	85-116	
1,1,2,2-Tetrachloroethane	10.0	10.3	103	80-120	
1,1,2-Trichloroethane	10.0	10.0	100	80-120	
1,1-Dichloroethene	10.0	10.2	102	80-120	
1,1-Dichloroethane	10.0	9.80	98	80-120	
1,2,4-Trichlorobenzene	10.0	10.6	106	75-121	
1,2-Dibromo-3-Chloropropane	10.0	11.3	113	73-123	
1,2-Dichloroethane	10.0	9.78	98	80-115	
1,2-Dichloroethene, Total	20.0	20.4	102	80-120	
1,2-Dichloropropane	10.0	10.1	101	80-120	
2-Butanone	10.0	9.75	97	67-127	
2-Hexanone	10.0	10.9	109	70-123	
4-Methyl-2-pentanone	10.0	9.94	99	75-126	
Acetone	10.0	11.2	112	69-129	
Benzene	10.0	9.70	97	80-120	
Bromoform	10.0	10.6	106	80-120	
Methyl bromide	10.0	9.46	95	70-124	
Carbon disulfide	10.0	9.97	100	80-121	
Carbon tetrachloride	10.0	10.2	102	83-125	
Chlorobenzene	10.0	9.65	96	80-120	
Chlorodibromomethane	10.0	10.6	106	80-120	
Chloroethane	10.0	9.37	94	73-119	
Chloroform	10.0	9.80	98	80-120	
Chloromethane	10.0	9.55	96	72-124	
cis-1,2-Dichloroethene	10.0	10.2	102	80-120	
cis-1,3-Dichloropropene	10.0	11.5	115	80-120	
Bromodichloromethane	10.0	10.2	102	80-120	
Ethylbenzene	10.0	10.1	101	80-120	
1,2-Dibromoethane	10.0	10.6	106	80-120	
Methylene Chloride	10.0	9.62	96	80-120	
n-Butanol	250	258	103	62-128	
Styrene	10.0	11.3	113	81-133	
Tetrachloroethene	10.0	10.1	101	83-123	
Toluene	10.0	10.3	103	80-120	
trans-1,2-Dichloroethene	10.0	10.2	102	80-120	
trans-1,3-Dichloropropene	10.0	11.6	116	82-124	
Trichloroethene	10.0	9.66	97	80-120	
Vinyl acetate	10.0	13.4	134	63-140	
Vinyl chloride	10.0	9.81	98	77-122	

Column to be used to flag recovery and RPD values

FORM III 8260C

FORM III
GC/MS VOA LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Matrix: Water Level: Low Lab File ID: LLCS7574.D

Lab ID: LCSD 160-293176/6 Client ID:

COMPOUND	SPIKE ADDED (ug/L)	LCSD CONCENTRATION (ug/L)	LCSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
1,1,1-Trichloroethane	10.0	10.1	101	0	20	85-116	
1,1,2,2-Tetrachloroethane	10.0	10.4	104	2	20	80-120	
1,1,2-Trichloroethane	10.0	9.94	99	1	20	80-120	
1,1-Dichloroethene	10.0	10.1	101	1	20	80-120	
1,1-Dichloroethane	10.0	9.75	98	1	20	80-120	
1,2,4-Trichlorobenzene	10.0	10.6	106	0	20	75-121	
1,2-Dibromo-3-Chloropropane	10.0	11.2	112	1	20	73-123	
1,2-Dichloroethane	10.0	9.82	98	0	20	80-115	
1,2-Dichloroethene, Total	20.0	20.3	102	0	20	80-120	
1,2-Dichloropropane	10.0	10.1	101	0	20	80-120	
2-Butanone	10.0	10.1	101	4	20	67-127	
2-Hexanone	10.0	11.0	110	1	20	70-123	
4-Methyl-2-pentanone	10.0	9.87	99	1	20	75-126	
Acetone	10.0	10.9	109	2	20	69-129	
Benzene	10.0	9.74	97	0	20	80-120	
Bromoform	10.0	10.7	107	1	20	80-120	
Methyl bromide	10.0	9.51	95	1	20	70-124	
Carbon disulfide	10.0	9.99	100	0	20	80-121	
Carbon tetrachloride	10.0	10.0	100	2	20	83-125	
Chlorobenzene	10.0	9.62	96	0	20	80-120	
Chlorodibromomethane	10.0	10.7	107	1	20	80-120	
Chloroethane	10.0	9.35	93	0	20	73-119	
Chloroform	10.0	9.80	98	0	20	80-120	
Chloromethane	10.0	9.24	92	3	20	72-124	
cis-1,2-Dichloroethene	10.0	10.2	102	0	20	80-120	
cis-1,3-Dichloropropene	10.0	11.4	114	1	20	80-120	
Bromodichloromethane	10.0	10.1	101	1	20	80-120	
Ethylbenzene	10.0	10.0	100	1	20	80-120	
1,2-Dibromoethane	10.0	10.6	106	0	20	80-120	
Methylene Chloride	10.0	9.61	96	0	20	80-120	
n-Butanol	250	253	101	2	20	62-128	
Styrene	10.0	11.2	112	1	20	81-133	
Tetrachloroethene	10.0	10.1	101	0	20	83-123	
Toluene	10.0	10.4	104	1	20	80-120	
trans-1,2-Dichloroethene	10.0	10.1	101	0	20	80-120	
trans-1,3-Dichloropropene	10.0	11.5	115	0	20	82-124	
Trichloroethene	10.0	9.58	96	1	20	80-120	
Vinyl acetate	10.0	13.3	133	0	20	63-140	
Vinyl chloride	10.0	9.78	98	0	20	77-122	

Column to be used to flag recovery and RPD values

FORM III 8260C

FORM III
GC/MS VOA MATRIX SPIKE RECOVERY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Matrix: Water Level: Low Lab File ID: LSMP7578.D

Lab ID: 160-21079-7 MS Client ID: GW-BR04RB-021517 MS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	QC LIMITS REC	#
1,1,1-Trichloroethane	10.0	ND	10.3	103	82-124	
1,1,2,2-Tetrachloroethane	10.0	ND	9.58	96	75-121	
1,1,2-Trichloroethane	10.0	ND	9.41	94	80-120	
1,1-Dichloroethene	10.0	ND	10.2	102	80-120	
1,1-Dichloroethane	10.0	ND	9.84	98	80-122	
1,2,4-Trichlorobenzene	10.0	ND	10.5	105	74-120	
1,2-Dibromo-3-Chloropropane	10.0	ND	9.68	97	64-130	
1,2-Dichloroethane	10.0	ND	9.49	95	80-120	
1,2-Dichloroethene, Total	20.0	ND	20.4	102	80-120	
1,2-Dichloropropane	10.0	ND	10.1	101	80-120	
2-Butanone	10.0	ND	8.42	84	53-145	
2-Hexanone	10.0	ND	8.79	88	59-132	
4-Methyl-2-pentanone	10.0	ND	8.35	84	70-131	
Acetone	10.0	ND	9.61	96	50-137	
Benzene	10.0	ND	9.98	100	80-120	
Bromoform	10.0	ND	9.68	97	81-121	
Methyl bromide	10.0	ND	7.32	73	55-137	
Carbon disulfide	10.0	ND	10.2	102	80-121	
Carbon tetrachloride	10.0	ND	10.3	103	77-131	
Chlorobenzene	10.0	ND	9.82	98	80-120	
Chlorodibromomethane	10.0	ND	10.1	101	84-123	
Chloroethane	10.0	ND	9.52	95	71-126	
Chloroform	10.0	ND	9.72	97	80-120	
Chloromethane	10.0	ND	10.1	101	62-132	
cis-1,2-Dichloroethene	10.0	ND	10.2	102	80-120	
cis-1,3-Dichloropropene	10.0	ND	10.7	107	83-127	
Bromodichloromethane	10.0	ND	9.97	100	80-120	
Ethylbenzene	10.0	ND	10.4	104	84-125	
1,2-Dibromoethane	10.0	ND	9.52	95	82-122	
Methylene Chloride	10.0	ND	9.54	95	80-120	
n-Butanol	250	ND	216	86	58-144	
Styrene	10.0	ND	11.3	113	77-139	
Tetrachloroethene	10.0	ND	10.4	104	80-126	
Toluene	10.0	ND	10.5	105	85-123	
trans-1,2-Dichloroethene	10.0	ND	10.2	102	80-120	
trans-1,3-Dichloropropene	10.0	ND	10.7	107	83-125	
Trichloroethene	10.0	ND	9.78	98	81-125	
Vinyl acetate	10.0	ND	13.2	132	58-150	
Vinyl chloride	10.0	ND	9.83	98	70-129	

Column to be used to flag recovery and RPD values

FORM III 8260C

FORM III
GC/MS VOA MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Matrix: Water Level: Low Lab File ID: LSMP7579.D

Lab ID: 160-21079-7 MSD Client ID: GW-BR04RB-021517 MSD

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
1,1,1-Trichloroethane	10.0	10.2	102	1	20	82-124	
1,1,2,2-Tetrachloroethane	10.0	9.47	95	1	20	75-121	
1,1,2-Trichloroethane	10.0	9.22	92	2	20	80-120	
1,1-Dichloroethene	10.0	10.2	102	1	20	80-120	
1,1-Dichloroethane	10.0	9.79	98	1	20	80-122	
1,2,4-Trichlorobenzene	10.0	10.4	104	1	20	74-120	
1,2-Dibromo-3-Chloropropane	10.0	9.89	99	2	20	64-130	
1,2-Dichloroethane	10.0	9.27	93	2	20	80-120	
1,2-Dichloroethene, Total	20.0	20.3	102	0	20	80-120	
1,2-Dichloropropane	10.0	9.88	99	2	20	80-120	
2-Butanone	10.0	7.95	80	6	20	53-145	
2-Hexanone	10.0	9.06	91	3	20	59-132	
4-Methyl-2-pentanone	10.0	8.40	84	1	20	70-131	
Acetone	10.0	8.85	88	8	20	50-137	
Benzene	10.0	9.77	98	2	20	80-120	
Bromoform	10.0	9.57	96	1	20	81-121	
Methyl bromide	10.0	8.17	82	11	20	55-137	
Carbon disulfide	10.0	10.0	100	1	20	80-121	
Carbon tetrachloride	10.0	10.2	102	1	20	77-131	
Chlorobenzene	10.0	9.72	97	1	20	80-120	
Chlorodibromomethane	10.0	9.86	99	2	20	84-123	
Chloroethane	10.0	9.39	94	1	20	71-126	
Chloroform	10.0	9.58	96	1	20	80-120	
Chloromethane	10.0	9.64	96	4	20	62-132	
cis-1,2-Dichloroethene	10.0	10.1	101	1	20	80-120	
cis-1,3-Dichloropropene	10.0	10.7	107	0	20	83-127	
Bromodichloromethane	10.0	9.89	99	1	20	80-120	
Ethylbenzene	10.0	10.3	103	1	20	84-125	
1,2-Dibromoethane	10.0	9.54	95	0	20	82-122	
Methylene Chloride	10.0	9.47	95	1	20	80-120	
n-Butanol	250	215	86	0	20	58-144	
Styrene	10.0	11.3	113	1	20	77-139	
Tetrachloroethene	10.0	10.3	103	1	20	80-126	
Toluene	10.0	10.5	105	0	20	85-123	
trans-1,2-Dichloroethene	10.0	10.2	102	0	20	80-120	
trans-1,3-Dichloropropene	10.0	10.7	107	0	20	83-125	
Trichloroethene	10.0	9.64	96	1	20	81-125	
Vinyl acetate	10.0	13.1	131	0	20	58-150	
Vinyl chloride	10.0	9.79	98	0	20	70-129	

Column to be used to flag recovery and RPD values

FORM III 8260C

FORM IV
GC/MS VOA METHOD BLANK SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Lab File ID: LBLK7576.D Lab Sample ID: MB 160-293176/8

Matrix: Water Heated Purge:(Y/N) Y

Instrument ID: VMSL Date Analyzed: 02/20/2017 11:47

GC Column: RTX-VMS40 ID: 0.18(mm)

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 160-293176/5	LLCS7573.D	02/20/2017 10:32
	LCSD 160-293176/6	LLCS7574.D	02/20/2017 10:57
GW-BR04RB-021517	160-21079-7	LSMP7577.D	02/20/2017 12:13
GW-BR04RB-021517 MS	160-21079-7 MS	LSMP7578.D	02/20/2017 12:38
GW-BR04RB-021517 MSD	160-21079-7 MSD	LSMP7579.D	02/20/2017 13:04
TB-021517	160-21079-1	LSMP7584.D	02/20/2017 15:10
GW-BR05RB-021517	160-21079-2	LSMP7585.D	02/20/2017 15:35
GW-BR11JC-021517	160-21079-3	LSMP7586.D	02/20/2017 16:01
GW-BR02JC-021517	160-21079-4	LSMP7587.D	02/20/2017 16:26
GW-BR02RB-021517	160-21079-5	LSMP7588.D	02/20/2017 16:51
GW-NB71-021517	160-21079-6	LSMP7589.D	02/20/2017 17:17
GW-BR04RB-021517-FD	160-21079-8	LSMP7590.D	02/20/2017 17:42
GW-NB80-021517	160-21079-9	LSMP7591.D	02/20/2017 18:07
GW-NB50-021517	160-21079-10	LSMP7592.D	02/20/2017 18:32
GW-NB57A-021517	160-21079-11	LSMP7593.D	02/20/2017 18:57

FORM V
GC/MS VOA INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Lab File ID: LBFB7556.D BFB Injection Date: 02/14/2017

Instrument ID: VMSL BFB Injection Time: 11:34

Analysis Batch No.: 292232

M/E	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
50	15.0 - 40.0 % of mass 95	18.6	
75	30.0 - 60.0 % of mass 95	47.4	
95	Base Peak, 100% relative abundance	100.0	
96	5.0 - 9.0 % of mass 95	7.0	
173	Less than 2.0 % of mass 174	0.0	(0.0) 1
174	50.0 - 120.00 % of mass 95	83.2	
175	5.0 - 9.0 % of mass 174	6.2	(7.4) 1
176	95.0 - 101.0 % of mass 174	80.3	(96.5) 1
177	5.0 - 9.0 % of mass 176	5.3	(6.6) 2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS AND STANDARDS:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
	IC 160-292232/6	LICL7558.D	02/14/2017	12:23
	IC 160-292232/7	LICL7559.D	02/14/2017	12:49
	IC 160-292232/8	LICL7560.D	02/14/2017	13:14
	IC 160-292232/9	LICL7561.D	02/14/2017	13:39
	ICIS 160-292232/10	LICL7562.D	02/14/2017	14:05
	IC 160-292232/11	LICL7563.D	02/14/2017	14:30
	IC 160-292232/12	LICL7564.D	02/14/2017	14:56
	ICV 160-292232/14	LICV7566.D	02/14/2017	15:47

FORM V
GC/MS VOA INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Lab File ID: LBFB7571.D BFB Injection Date: 02/20/2017

Instrument ID: VMSL BFB Injection Time: 09:43

Analysis Batch No.: 293176

M/E	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
50	15.0 - 40.0 % of mass 95	18.6	
75	30.0 - 60.0 % of mass 95	47.8	
95	Base Peak, 100% relative abundance	100.0	
96	5.0 - 9.0 % of mass 95	6.9	
173	Less than 2.0 % of mass 174	0.0	(0.0) 1
174	50.0 - 120.00 % of mass 95	82.8	
175	5.0 - 9.0 % of mass 174	6.1	(7.4) 1
176	95.0 - 101.0 % of mass 174	80.0	(96.7) 1
177	5.0 - 9.0 % of mass 176	5.4	(6.8) 2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS AND STANDARDS:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
	CCVIS 160-293176/4	LCCV7572.D	02/20/2017	10:07
	LCS 160-293176/5	LLCS7573.D	02/20/2017	10:32
	LCSD 160-293176/6	LLCS7574.D	02/20/2017	10:57
	MB 160-293176/8	LBLK7576.D	02/20/2017	11:47
GW-BR04RB-021517	160-21079-7	LSMP7577.D	02/20/2017	12:13
GW-BR04RB-021517 MS	160-21079-7 MS	LSMP7578.D	02/20/2017	12:38
GW-BR04RB-021517 MSD	160-21079-7 MSD	LSMP7579.D	02/20/2017	13:04
TB-021517	160-21079-1	LSMP7584.D	02/20/2017	15:10
GW-BR05RB-021517	160-21079-2	LSMP7585.D	02/20/2017	15:35
GW-BR11JC-021517	160-21079-3	LSMP7586.D	02/20/2017	16:01
GW-BR02JC-021517	160-21079-4	LSMP7587.D	02/20/2017	16:26
GW-BR02RB-021517	160-21079-5	LSMP7588.D	02/20/2017	16:51
GW-NB71-021517	160-21079-6	LSMP7589.D	02/20/2017	17:17
GW-BR04RB-021517-FD	160-21079-8	LSMP7590.D	02/20/2017	17:42
GW-NB80-021517	160-21079-9	LSMP7591.D	02/20/2017	18:07
GW-NB50-021517	160-21079-10	LSMP7592.D	02/20/2017	18:32
GW-NB57A-021517	160-21079-11	LSMP7593.D	02/20/2017	18:57

FORM VIII
GC/MS VOA INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Sample No.: ICIS 160-292232/10 Date Analyzed: 02/14/2017 14:05

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm)

Lab File ID (Standard): LICL7562.D Heated Purge: (Y/N) Y

Calibration ID: 12338

		FB		CBNZd5		DCBd4	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MID-POINT		1825688	8.91	1220244	11.75	601374	13.92
UPPER LIMIT		3651376	9.41	2440488	12.25	1202748	14.42
LOWER LIMIT		912844	8.41	610122	11.25	300687	13.42
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICV 160-292232/14		1824048	8.91	1183461	11.75	562114	13.92

FB = Fluorobenzene
CBNZd5 = Chlorobenzene-d5
DCBd4 = 1,4-Dichlorobenzene-d4

Area Limit = 50%-200% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII 8260C

FORM VIII
GC/MS VOA INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Sample No.: CCVIS 160-293176/4 Date Analyzed: 02/20/2017 10:07

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm)

Lab File ID (Standard): LCCV7572.D Heated Purge: (Y/N) Y

Calibration ID: 12338

		FB		CBNZd5		DCBd4	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		1873238	8.90	1253864	11.75	615187	13.92
UPPER LIMIT		3746476	9.40	2507728	12.25	1230374	14.42
LOWER LIMIT		936619	8.40	626932	11.25	307594	13.42
LAB SAMPLE ID	CLIENT SAMPLE ID						
LCS 160-293176/5		1926482	8.90	1293973	11.75	637053	13.92
LCSD 160-293176/6		1908472	8.91	1271853	11.75	613039	13.92
MB 160-293176/8		1777137	8.91	1153349	11.75	547149	13.92
160-21079-7	GW-BR04RB-021517	1810431	8.91	1205598	11.75	582073	13.92
160-21079-7 MS	GW-BR04RB-021517 MS	1888573	8.91	1266835	11.75	614732	13.92
160-21079-7 MSD	GW-BR04RB-021517 MSD	1925255	8.91	1283066	11.75	624440	13.92
160-21079-1	TB-021517	1715977	8.90	1135609	11.75	531550	13.92
160-21079-2	GW-BR05RB-021517	1732487	8.91	1130292	11.75	541126	13.92
160-21079-3	GW-BR11JC-021517	1685810	8.90	1118575	11.75	518956	13.92
160-21079-4	GW-BR02JC-021517	1667324	8.90	1112415	11.75	530392	13.92
160-21079-5	GW-BR02RB-021517	1692860	8.90	1096944	11.75	504058	13.92
160-21079-6	GW-NB71-021517	1615055	8.91	1053007	11.75	493905	13.92
160-21079-8	GW-BR04RB-021517-FD	1617938	8.90	1050731	11.75	481324	13.92
160-21079-9	GW-NB80-021517	1595231	8.91	1036660	11.75	482505	13.92
160-21079-10	GW-NB50-021517	1623407	8.91	1076211	11.75	497124	13.92
160-21079-11	GW-NB57A-021517	1581336	8.90	1024273	11.75	483834	13.92

FB = Fluorobenzene
CBNZd5 = Chlorobenzene-d5
DCBd4 = 1,4-Dichlorobenzene-d4

Area Limit = 50%-200% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII 8260C

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: TB-021517 | Lab Sample ID: 160-21079-1

Matrix: Water | Lab File ID: LSMP7584.D

Analysis Method: 8260C | Date Collected: 02/15/2017 07:00

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 15:10

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.10
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.13
75-35-4	1,1-Dichloroethene	ND		1.0	0.10
75-34-3	1,1-Dichloroethane	ND		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.41
107-06-2	1,2-Dichloroethane	ND		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	ND		2.0	0.14
78-87-5	1,2-Dichloropropane	ND		1.0	0.10
78-93-3	2-Butanone	ND		5.0	0.47
591-78-6	2-Hexanone	ND		5.0	0.25
108-10-1	4-Methyl-2-pentanone	ND		5.0	0.22
67-64-1	Acetone	ND		2.0	0.55
71-43-2	Benzene	ND		1.0	0.10
75-25-2	Bromoform	ND		1.0	0.17
74-83-9	Methyl bromide	ND		2.0	0.25
75-15-0	Carbon disulfide	ND		1.0	0.10
56-23-5	Carbon tetrachloride	ND		1.0	0.18
108-90-7	Chlorobenzene	ND		1.0	0.11
124-48-1	Chlorodibromomethane	ND		1.0	0.14
75-00-3	Chloroethane	ND		2.0	0.16
67-66-3	Chloroform	ND		1.0	0.10
74-87-3	Chloromethane	ND		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.16
75-27-4	Bromodichloromethane	ND		1.0	0.14
100-41-4	Ethylbenzene	ND		1.0	0.12
106-93-4	1,2-Dibromoethane	ND		1.0	0.13
75-09-2	Methylene Chloride	ND		1.0	0.27
71-36-3	n-Butanol	ND		50	12
100-42-5	Styrene	ND		1.0	0.13
127-18-4	Tetrachloroethene	ND		1.0	0.18
108-88-3	Toluene	ND		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: TB-021517 | Lab Sample ID: 160-21079-1

Matrix: Water | Lab File ID: LSMP7584.D

Analysis Method: 8260C | Date Collected: 02/15/2017 07:00

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 15:10

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		1.0	0.25
108-05-4	Vinyl acetate	ND		2.0	0.18
75-01-4	Vinyl chloride	ND		2.0	0.19
1330-20-7	Xylenes, Total	ND		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	95		75-129
460-00-4	4-Bromofluorobenzene (Surr)	106		81-130
1868-53-7	Dibromofluoromethane (Surr)	99		81-124
2037-26-5	Toluene-d8 (Surr)	105		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7584.D
Lims ID: 160-21079-A-1
Client ID: TB-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 15:10:30 ALS Bottle#: 13 Worklist Smp#: 15
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-015
Misc. Info.: 160-21079-a-1
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:18:46

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
3 Chloromethane	50		3.346				ND	
4 Vinyl chloride	62		3.499				ND	
6 Bromomethane	94		4.100				ND	
7 Chloroethane	64		4.310				ND	
12 1,1-Dichloroethene	96		5.371				ND	
13 Carbon disulfide	76		5.413				ND	
S 15 1,2-Dichloroethene, Total	96		5.816				ND	
20 Methylene Chloride	84		6.167				ND	
21 Acetone	43		6.237				ND	
22 trans-1,2-Dichloroethene	96		6.377				ND	
30 1,1-Dichloroethane	63		7.103				ND	
33 Vinyl acetate	43		7.340				ND	
34 cis-1,2-Dichloroethene	96		7.675				ND	
38 Chloroform	83		7.941				ND	
40 Carbon tetrachloride	117		8.094				ND	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	94	313028	9.86	
43 1,1,1-Trichloroethane	97		8.164				ND	
45 2-Butanone (MEK)	43		8.248				ND	
48 Benzene	78		8.527				ND	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	296732	9.48	
54 1,2-Dichloroethane	62		8.723				ND	
* 55 Fluorobenzene	96	8.904	8.904	0.000	98	1715977	10.0	
57 Trichloroethene	95		9.058				ND	
59 n-Butanol	56		9.295				ND	
62 1,2-Dichloropropane	63		9.561				ND	
63 Dichlorobromomethane	83		9.589				ND	
67 cis-1,3-Dichloropropene	75		10.161				ND	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	94	1609575	10.5	
69 Toluene	92		10.371				ND	
71 4-Methyl-2-pentanone (MIBK	43		10.692				ND	
72 trans-1,3-Dichloropropene	75		10.734				ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
73 Tetrachloroethene	164		10.734				ND	
75 1,1,2-Trichloroethane	83		10.888				ND	
76 Chlorodibromomethane	129		11.069				ND	
79 Ethylene Dibromide	107		11.321				ND	
80 2-Hexanone	43		11.418				ND	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	87	1135609	10.0	
82 Ethylbenzene	91		11.754				ND	
84 Chlorobenzene	112		11.767				ND	
86 m-Xylene & p-Xylene	106		11.879				ND	
88 o-Xylene	106		12.284				ND	
89 Styrene	104		12.326				ND	
90 Bromoform	173		12.396				ND	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	480963	10.6	
95 1,1,2,2-Tetrachloroethane	83		13.010				ND	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	96	531550	10.0	
115 1,2-Dibromo-3-Chloropropan	157		15.147				ND	
117 1,2,4-Trichlorobenzene	180		15.804				ND	
S 119 Xylenes, Total	106		16.500				ND	

Reagents:

I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

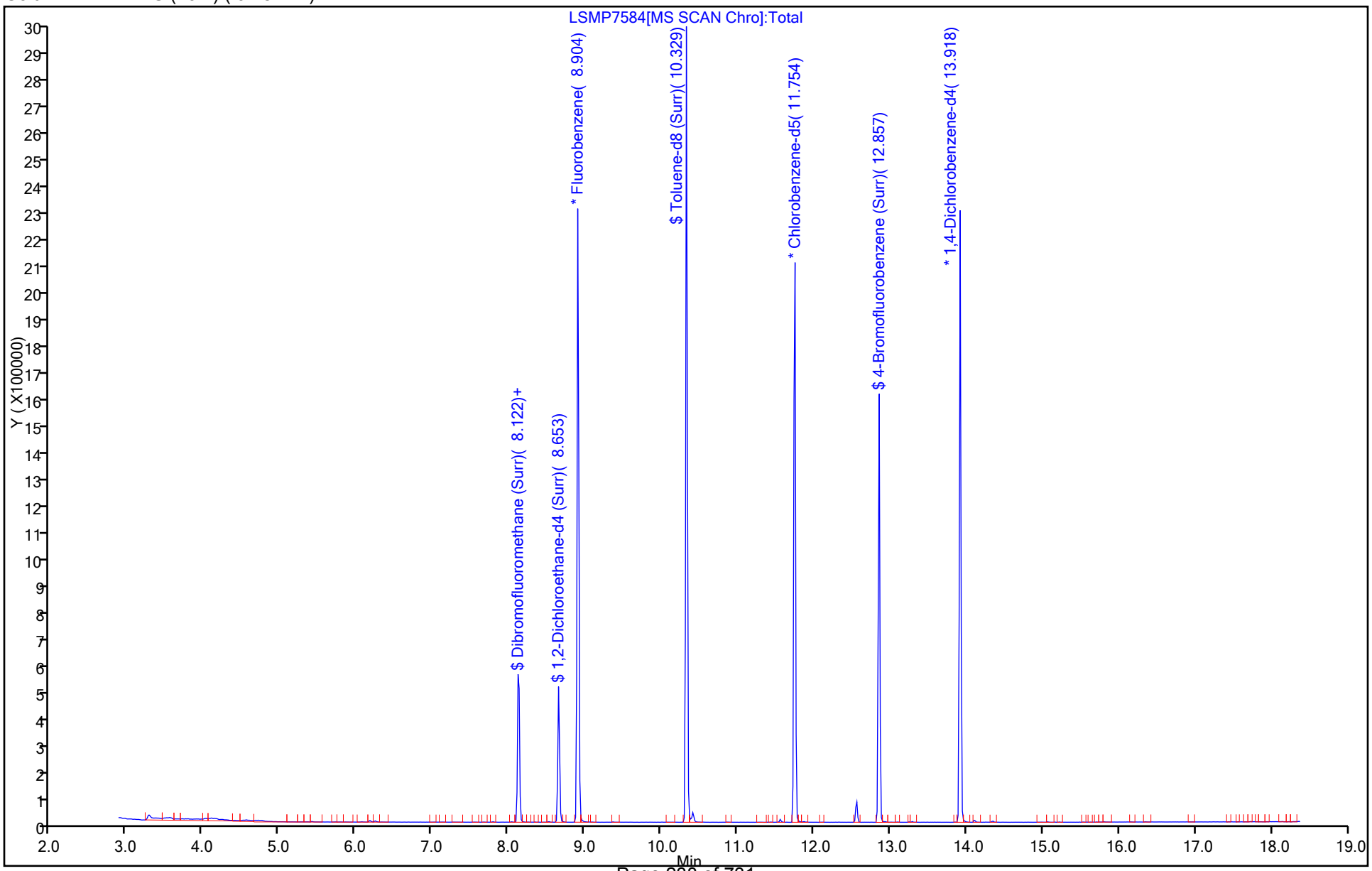
Report Date: 21-Feb-2017 08:25:08 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7584.D

Injection Date:	20-Feb-2017 15:10:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	160-21079-A-1	Lab Sample ID:	160-21079-1	Worklist Smp#:	15
Client ID:	TB-021517				
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	13
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7584.D
Lims ID: 160-21079-A-1
Client ID: TB-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 15:10:30 ALS Bottle#: 13 Worklist Smp#: 15
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-015
Misc. Info.: 160-21079-a-1
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:18:46

Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	9.86	98.59
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	9.48	94.83
$ 68 Toluene-d8 (Surr)	10.0	10.5	105.22
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.6	106.32

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR05RB-021517 | Lab Sample ID: 160-21079-2

Matrix: Water | Lab File ID: LSMP7585.D

Analysis Method: 8260C | Date Collected: 02/15/2017 08:15

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 15:35

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.10
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.13
75-35-4	1,1-Dichloroethene	ND		1.0	0.10
75-34-3	1,1-Dichloroethane	ND		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.41
107-06-2	1,2-Dichloroethane	ND		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	ND		2.0	0.14
78-87-5	1,2-Dichloropropane	ND		1.0	0.10
78-93-3	2-Butanone	ND		5.0	0.47
591-78-6	2-Hexanone	ND		5.0	0.25
108-10-1	4-Methyl-2-pentanone	ND		5.0	0.22
67-64-1	Acetone	ND		2.0	0.55
71-43-2	Benzene	ND		1.0	0.10
75-25-2	Bromoform	ND		1.0	0.17
74-83-9	Methyl bromide	ND		2.0	0.25
75-15-0	Carbon disulfide	ND		1.0	0.10
56-23-5	Carbon tetrachloride	ND		1.0	0.18
108-90-7	Chlorobenzene	ND		1.0	0.11
124-48-1	Chlorodibromomethane	ND		1.0	0.14
75-00-3	Chloroethane	ND		2.0	0.16
67-66-3	Chloroform	ND		1.0	0.10
74-87-3	Chloromethane	ND		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.16
75-27-4	Bromodichloromethane	ND		1.0	0.14
100-41-4	Ethylbenzene	ND		1.0	0.12
106-93-4	1,2-Dibromoethane	ND		1.0	0.13
75-09-2	Methylene Chloride	ND		1.0	0.27
71-36-3	n-Butanol	ND		50	12
100-42-5	Styrene	ND		1.0	0.13
127-18-4	Tetrachloroethene	ND		1.0	0.18
108-88-3	Toluene	ND		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR05RB-021517 | Lab Sample ID: 160-21079-2

Matrix: Water | Lab File ID: LSMP7585.D

Analysis Method: 8260C | Date Collected: 02/15/2017 08:15

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 15:35

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		1.0	0.25
108-05-4	Vinyl acetate	ND		2.0	0.18
75-01-4	Vinyl chloride	ND		2.0	0.19
1330-20-7	Xylenes, Total	ND		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	96		75-129
460-00-4	4-Bromofluorobenzene (Surr)	102		81-130
1868-53-7	Dibromofluoromethane (Surr)	97		81-124
2037-26-5	Toluene-d8 (Surr)	106		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7585.D
Lims ID: 160-21079-A-2
Client ID: GW-BR05RB-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 15:35:30 ALS Bottle#: 14 Worklist Smp#: 16
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-016
Misc. Info.: 160-21079-a-2
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:18:58

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
3 Chloromethane	50		3.346				ND	
4 Vinyl chloride	62		3.499				ND	
6 Bromomethane	94		4.100				ND	
7 Chloroethane	64		4.310				ND	
12 1,1-Dichloroethene	96		5.371				ND	
13 Carbon disulfide	76		5.413				ND	
S 15 1,2-Dichloroethene, Total	96		5.816				ND	
20 Methylene Chloride	84		6.167				ND	
21 Acetone	43		6.237				ND	
22 trans-1,2-Dichloroethene	96		6.377				ND	
30 1,1-Dichloroethane	63		7.103				ND	
33 Vinyl acetate	43		7.340				ND	
34 cis-1,2-Dichloroethene	96		7.675				ND	
38 Chloroform	83		7.941				ND	
40 Carbon tetrachloride	117		8.094				ND	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	94	312509	9.75	
43 1,1,1-Trichloroethane	97		8.164				ND	
45 2-Butanone (MEK)	43		8.248				ND	
48 Benzene	78		8.527				ND	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	302108	9.56	
54 1,2-Dichloroethane	62		8.723				ND	
* 55 Fluorobenzene	96	8.905	8.904	0.001	98	1732487	10.0	
57 Trichloroethene	95		9.058				ND	
59 n-Butanol	56		9.295				ND	
62 1,2-Dichloropropane	63		9.561				ND	
63 Dichlorobromomethane	83		9.589				ND	
67 cis-1,3-Dichloropropene	75		10.161				ND	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	94	1608882	10.6	
69 Toluene	92		10.371				ND	
71 4-Methyl-2-pentanone (MIBK	43		10.692				ND	
72 trans-1,3-Dichloropropene	75		10.734				ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
73 Tetrachloroethene	164		10.734				ND	
75 1,1,2-Trichloroethane	83		10.888				ND	
76 Chlorodibromomethane	129		11.069				ND	
79 Ethylene Dibromide	107		11.321				ND	
80 2-Hexanone	43		11.418				ND	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	87	1130292	10.0	
82 Ethylbenzene	91		11.754				ND	
84 Chlorobenzene	112		11.767				ND	
86 m-Xylene & p-Xylene	106		11.879				ND	
88 o-Xylene	106		12.284				ND	
89 Styrene	104		12.326				ND	
90 Bromoform	173		12.396				ND	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	469546	10.2	
95 1,1,2,2-Tetrachloroethane	83		13.010				ND	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	96	541126	10.0	
115 1,2-Dibromo-3-Chloropropan	157		15.147				ND	
117 1,2,4-Trichlorobenzene	180		15.804				ND	
S 119 Xylenes, Total	106		16.500				ND	

Reagents:

I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

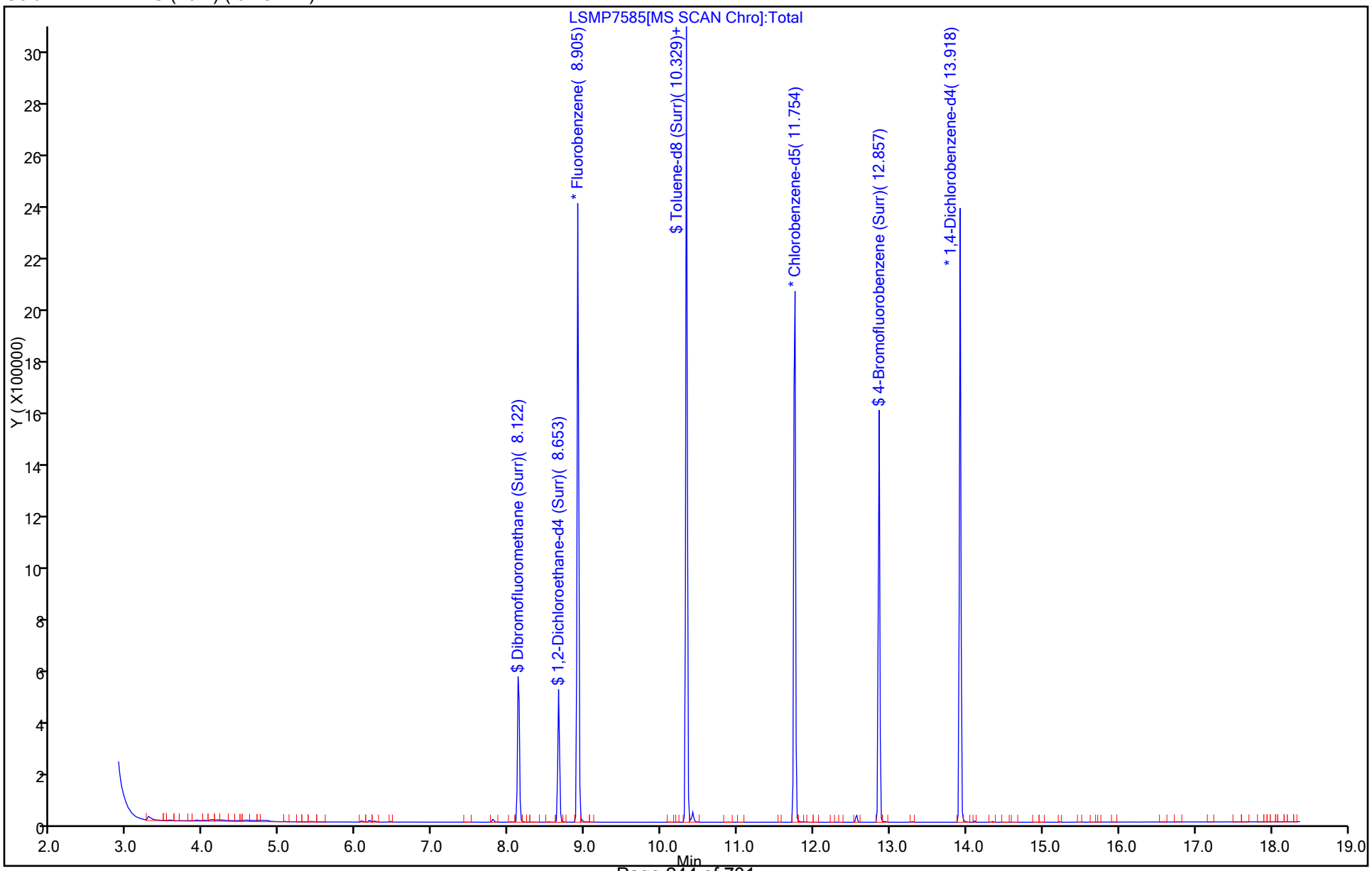
Report Date: 21-Feb-2017 08:25:07 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7585.D

Injection Date:	20-Feb-2017 15:35:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	160-21079-A-2	Lab Sample ID:	160-21079-2	Worklist Smp#:	16
Client ID:	GW-BR05RB-021517				
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	14
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File:	\\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7585.D				
Lims ID:	160-21079-A-2				
Client ID:	GW-BR05RB-021517				
Sample Type:	Client				
Inject. Date:	20-Feb-2017 15:35:30	ALS Bottle#:	14	Worklist Smp#:	16
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Sample Info:	160-0009801-016				
Misc. Info.:	160-21079-a-2				
Operator ID:	ADB	Instrument ID:	VMSL		
Method:	\\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m				
Limit Group:	MSV-8260				
Last Update:	21-Feb-2017 08:24:52	Calib Date:	14-Feb-2017 14:56:30		
Integrator:	RTE	ID Type:	Deconvolution ID		
Quant Method:	Internal Standard	Quant By:	Initial Calibration		
Last ICal File:	\\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D				
Column 1 :	RTX-VMS (40m) (0.18 mm)		Det: MS SCAN		
Process Host:	XAWRK036				

First Level Reviewer: buettnera Date: 21-Feb-2017 08:18:58

Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	9.75	97.49
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	9.56	95.63
$ 68 Toluene-d8 (Surr)	10.0	10.6	105.67
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.2	101.96

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR11JC-021517 | Lab Sample ID: 160-21079-3

Matrix: Water | Lab File ID: LSMP7586.D

Analysis Method: 8260C | Date Collected: 02/15/2017 09:05

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 16:01

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.10
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.13
75-35-4	1,1-Dichloroethene	ND		1.0	0.10
75-34-3	1,1-Dichloroethane	ND		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.41
107-06-2	1,2-Dichloroethane	ND		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	ND		2.0	0.14
78-87-5	1,2-Dichloropropane	ND		1.0	0.10
78-93-3	2-Butanone	ND		5.0	0.47
591-78-6	2-Hexanone	ND		5.0	0.25
108-10-1	4-Methyl-2-pentanone	ND		5.0	0.22
67-64-1	Acetone	ND		2.0	0.55
71-43-2	Benzene	ND		1.0	0.10
75-25-2	Bromoform	ND		1.0	0.17
74-83-9	Methyl bromide	ND		2.0	0.25
75-15-0	Carbon disulfide	ND		1.0	0.10
56-23-5	Carbon tetrachloride	ND		1.0	0.18
108-90-7	Chlorobenzene	ND		1.0	0.11
124-48-1	Chlorodibromomethane	ND		1.0	0.14
75-00-3	Chloroethane	ND		2.0	0.16
67-66-3	Chloroform	ND		1.0	0.10
74-87-3	Chloromethane	ND		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.16
75-27-4	Bromodichloromethane	ND		1.0	0.14
100-41-4	Ethylbenzene	ND		1.0	0.12
106-93-4	1,2-Dibromoethane	ND		1.0	0.13
75-09-2	Methylene Chloride	ND		1.0	0.27
71-36-3	n-Butanol	ND		50	12
100-42-5	Styrene	ND		1.0	0.13
127-18-4	Tetrachloroethene	ND		1.0	0.18
108-88-3	Toluene	ND		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR11JC-021517 | Lab Sample ID: 160-21079-3

Matrix: Water | Lab File ID: LSMP7586.D

Analysis Method: 8260C | Date Collected: 02/15/2017 09:05

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 16:01

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		1.0	0.25
108-05-4	Vinyl acetate	ND		2.0	0.18
75-01-4	Vinyl chloride	ND		2.0	0.19
1330-20-7	Xylenes, Total	ND		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	96		75-129
460-00-4	4-Bromofluorobenzene (Surr)	106		81-130
1868-53-7	Dibromofluoromethane (Surr)	101		81-124
2037-26-5	Toluene-d8 (Surr)	106		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7586.D
Lims ID: 160-21079-A-3
Client ID: GW-BR11JC-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 16:01:30 ALS Bottle#: 15 Worklist Smp#: 17
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-017
Misc. Info.: 160-21079-a-3
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:19:14

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
3 Chloromethane	50		3.346				ND	
4 Vinyl chloride	62		3.499				ND	
6 Bromomethane	94		4.100				ND	
7 Chloroethane	64		4.310				ND	
12 1,1-Dichloroethene	96		5.371				ND	
13 Carbon disulfide	76		5.413				ND	
S 15 1,2-Dichloroethene, Total	96		5.816				ND	
20 Methylene Chloride	84		6.167				ND	
21 Acetone	43		6.237				ND	
22 trans-1,2-Dichloroethene	96		6.377				ND	
30 1,1-Dichloroethane	63		7.103				ND	
33 Vinyl acetate	43		7.340				ND	
34 cis-1,2-Dichloroethene	96		7.675				ND	
38 Chloroform	83		7.941				ND	
40 Carbon tetrachloride	117		8.094				ND	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	94	315428	10.1	
43 1,1,1-Trichloroethane	97		8.164				ND	
45 2-Butanone (MEK)	43		8.248				ND	
48 Benzene	78		8.527				ND	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	295351	9.61	
54 1,2-Dichloroethane	62		8.723				ND	
* 55 Fluorobenzene	96	8.904	8.904	0.000	98	1685810	10.0	
57 Trichloroethene	95		9.058				ND	
59 n-Butanol	56		9.295				ND	
62 1,2-Dichloropropane	63		9.561				ND	
63 Dichlorobromomethane	83		9.589				ND	
67 cis-1,3-Dichloropropene	75		10.161				ND	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	94	1593795	10.6	
69 Toluene	92		10.371				ND	
71 4-Methyl-2-pentanone (MIBK	43		10.692				ND	
72 trans-1,3-Dichloropropene	75		10.734				ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
73 Tetrachloroethene	164		10.734				ND	
75 1,1,2-Trichloroethane	83		10.888				ND	
76 Chlorodibromomethane	129		11.069				ND	
79 Ethylene Dibromide	107		11.321				ND	
80 2-Hexanone	43		11.418				ND	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	87	1118575	10.0	
82 Ethylbenzene	91		11.754				ND	
84 Chlorobenzene	112		11.767				ND	
86 m-Xylene & p-Xylene	106		11.879				ND	
88 o-Xylene	106		12.284				ND	
89 Styrene	104		12.326				ND	
90 Bromoform	173		12.396				ND	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	466790	10.6	
95 1,1,2,2-Tetrachloroethane	83		13.010				ND	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	96	518956	10.0	
115 1,2-Dibromo-3-Chloropropan	157		15.147				ND	
117 1,2,4-Trichlorobenzene	180		15.804				ND	
S 119 Xylenes, Total	106		16.500				ND	

Reagents:

I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

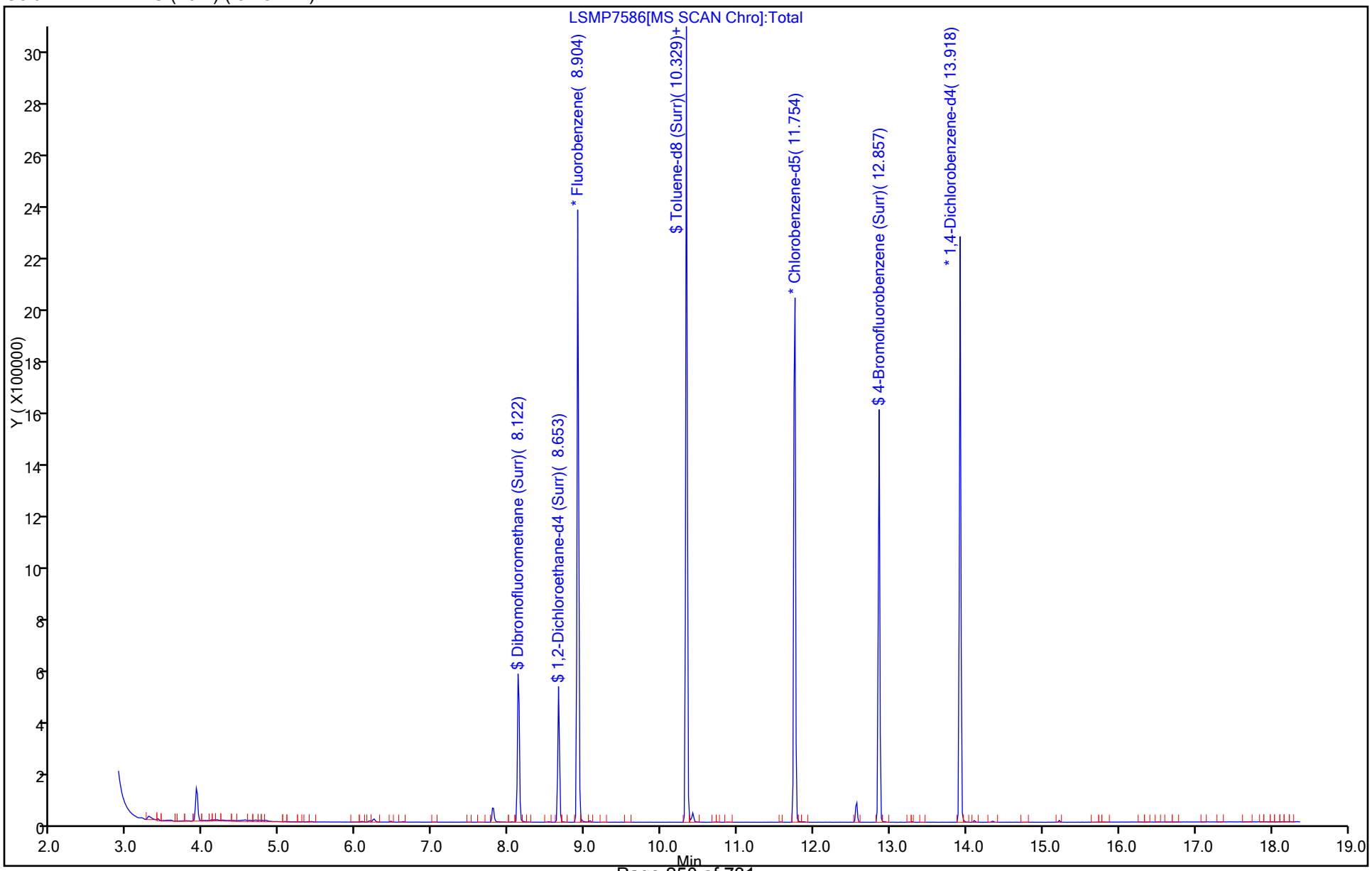
Report Date: 21-Feb-2017 08:25:06 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7586.D

Injection Date:	20-Feb-2017 16:01:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	160-21079-A-3	Lab Sample ID:	160-21079-3	Worklist Smp#:	17
Client ID:	GW-BR11JC-021517				
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	15
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7586.D
Lims ID: 160-21079-A-3
Client ID: GW-BR11JC-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 16:01:30 ALS Bottle#: 15 Worklist Smp#: 17
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-017
Misc. Info.: 160-21079-a-3
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:19:14

Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	10.1	101.13
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	9.61	96.08
$ 68 Toluene-d8 (Surr)	10.0	10.6	105.78
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.6	105.69

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR02JC-021517 | Lab Sample ID: 160-21079-4

Matrix: Water | Lab File ID: LSMP7587.D

Analysis Method: 8260C | Date Collected: 02/15/2017 09:45

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 16:26

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.10
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.13
75-35-4	1,1-Dichloroethene	ND		1.0	0.10
75-34-3	1,1-Dichloroethane	ND		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.41
107-06-2	1,2-Dichloroethane	ND		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	ND		2.0	0.14
78-87-5	1,2-Dichloropropane	ND		1.0	0.10
78-93-3	2-Butanone	ND		5.0	0.47
591-78-6	2-Hexanone	ND		5.0	0.25
108-10-1	4-Methyl-2-pentanone	ND		5.0	0.22
67-64-1	Acetone	ND		2.0	0.55
71-43-2	Benzene	ND		1.0	0.10
75-25-2	Bromoform	ND		1.0	0.17
74-83-9	Methyl bromide	ND		2.0	0.25
75-15-0	Carbon disulfide	ND		1.0	0.10
56-23-5	Carbon tetrachloride	ND		1.0	0.18
108-90-7	Chlorobenzene	ND		1.0	0.11
124-48-1	Chlorodibromomethane	ND		1.0	0.14
75-00-3	Chloroethane	ND		2.0	0.16
67-66-3	Chloroform	ND		1.0	0.10
74-87-3	Chloromethane	ND		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.16
75-27-4	Bromodichloromethane	ND		1.0	0.14
100-41-4	Ethylbenzene	ND		1.0	0.12
106-93-4	1,2-Dibromoethane	ND		1.0	0.13
75-09-2	Methylene Chloride	ND		1.0	0.27
71-36-3	n-Butanol	ND		50	12
100-42-5	Styrene	ND		1.0	0.13
127-18-4	Tetrachloroethene	ND		1.0	0.18
108-88-3	Toluene	ND		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR02JC-021517 | Lab Sample ID: 160-21079-4

Matrix: Water | Lab File ID: LSMP7587.D

Analysis Method: 8260C | Date Collected: 02/15/2017 09:45

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 16:26

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		1.0	0.25
108-05-4	Vinyl acetate	ND		2.0	0.18
75-01-4	Vinyl chloride	ND		2.0	0.19
1330-20-7	Xylenes, Total	ND		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	100		75-129
460-00-4	4-Bromofluorobenzene (Surr)	107		81-130
1868-53-7	Dibromofluoromethane (Surr)	103		81-124
2037-26-5	Toluene-d8 (Surr)	106		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7587.D
Lims ID: 160-21079-A-4
Client ID: GW-BR02JC-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 16:26:30 ALS Bottle#: 16 Worklist Smp#: 18
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-018
Misc. Info.: 160-21079-a-4
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:19:28

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
3 Chloromethane	50		3.346				ND	
4 Vinyl chloride	62		3.499				ND	
6 Bromomethane	94		4.100				ND	
7 Chloroethane	64		4.310				ND	
12 1,1-Dichloroethene	96		5.371				ND	
13 Carbon disulfide	76		5.413				ND	
S 15 1,2-Dichloroethene, Total	96		5.816				ND	
20 Methylene Chloride	84		6.167				ND	
21 Acetone	43		6.237				ND	
22 trans-1,2-Dichloroethene	96		6.377				ND	
30 1,1-Dichloroethane	63		7.103				ND	
33 Vinyl acetate	43		7.340				ND	
34 cis-1,2-Dichloroethene	96		7.675				ND	
38 Chloroform	83		7.941				ND	
40 Carbon tetrachloride	117		8.094				ND	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	93	316441	10.3	
43 1,1,1-Trichloroethane	97		8.164				ND	
45 2-Butanone (MEK)	43		8.248				ND	
48 Benzene	78		8.527				ND	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	93	305301	10.0	
54 1,2-Dichloroethane	62		8.723				ND	
* 55 Fluorobenzene	96	8.904	8.904	0.000	98	1667324	10.0	
57 Trichloroethene	95		9.058				ND	
59 n-Butanol	56		9.295				ND	
62 1,2-Dichloropropane	63		9.561				ND	
63 Dichlorobromomethane	83		9.589				ND	
67 cis-1,3-Dichloropropene	75		10.161				ND	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	94	1581103	10.6	
69 Toluene	92		10.371				ND	
71 4-Methyl-2-pentanone (MIBK	43		10.692				ND	
72 trans-1,3-Dichloropropene	75		10.734				ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
73 Tetrachloroethene	164		10.734				ND	
75 1,1,2-Trichloroethane	83		10.888				ND	
76 Chlorodibromomethane	129		11.069				ND	
79 Ethylene Dibromide	107		11.321				ND	
80 2-Hexanone	43		11.418				ND	
* 83 Chlorobenzene-d5	117	11.753	11.754	-0.001	87	1112415	10.0	
82 Ethylbenzene	91		11.754				ND	
84 Chlorobenzene	112		11.767				ND	
86 m-Xylene & p-Xylene	106		11.879				ND	
88 o-Xylene	106		12.284				ND	
89 Styrene	104		12.326				ND	
90 Bromoform	173		12.396				ND	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	480790	10.7	
95 1,1,2,2-Tetrachloroethane	83		13.010				ND	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	96	530392	10.0	
115 1,2-Dibromo-3-Chloropropan	157		15.147				ND	
117 1,2,4-Trichlorobenzene	180		15.804				ND	
S 119 Xylenes, Total	106		16.500				ND	

Reagents:

I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

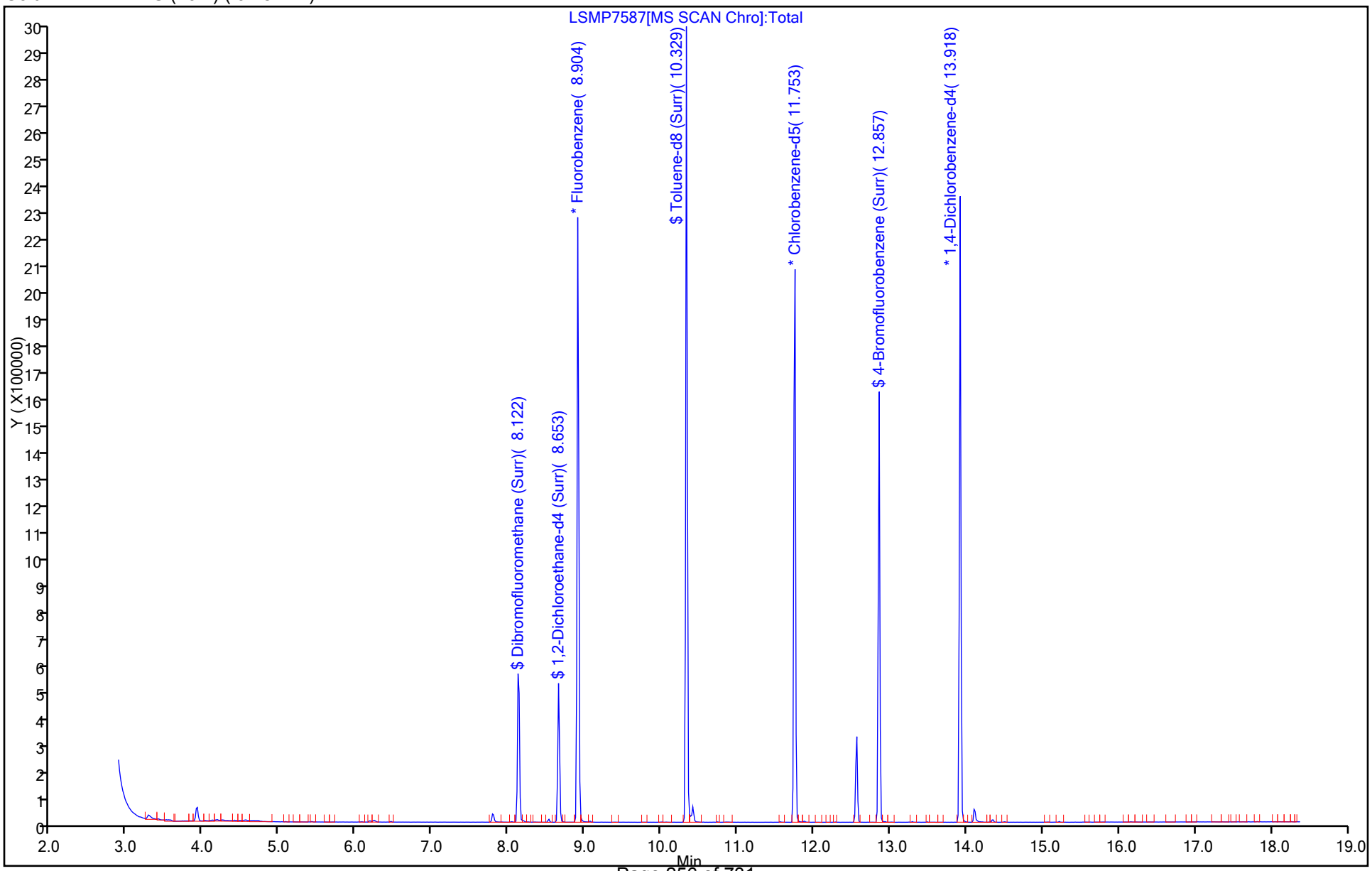
Report Date: 21-Feb-2017 08:25:05 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7587.D

Injection Date:	20-Feb-2017 16:26:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	160-21079-A-4	Lab Sample ID:	160-21079-4	Worklist Smp#:	18
Client ID:	GW-BR02JC-021517				
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	16
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7587.D
Lims ID: 160-21079-A-4
Client ID: GW-BR02JC-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 16:26:30 ALS Bottle#: 16 Worklist Smp#: 18
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-018
Misc. Info.: 160-21079-a-4
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:19:28

Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	10.3	102.58
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	10.0	100.41
$ 68 Toluene-d8 (Surr)	10.0	10.6	105.51
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.7	106.52

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR02RB-021517 | Lab Sample ID: 160-21079-5

Matrix: Water | Lab File ID: LSMP7588.D

Analysis Method: 8260C | Date Collected: 02/15/2017 10:30

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 16:51

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.10
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.13
75-35-4	1,1-Dichloroethene	ND		1.0	0.10
75-34-3	1,1-Dichloroethane	ND		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.41
107-06-2	1,2-Dichloroethane	ND		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	ND		2.0	0.14
78-87-5	1,2-Dichloropropane	ND		1.0	0.10
78-93-3	2-Butanone	ND		5.0	0.47
591-78-6	2-Hexanone	ND		5.0	0.25
108-10-1	4-Methyl-2-pentanone	ND		5.0	0.22
67-64-1	Acetone	ND		2.0	0.55
71-43-2	Benzene	ND		1.0	0.10
75-25-2	Bromoform	ND		1.0	0.17
74-83-9	Methyl bromide	ND		2.0	0.25
75-15-0	Carbon disulfide	ND		1.0	0.10
56-23-5	Carbon tetrachloride	ND		1.0	0.18
108-90-7	Chlorobenzene	ND		1.0	0.11
124-48-1	Chlorodibromomethane	ND		1.0	0.14
75-00-3	Chloroethane	ND		2.0	0.16
67-66-3	Chloroform	ND		1.0	0.10
74-87-3	Chloromethane	ND		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.16
75-27-4	Bromodichloromethane	ND		1.0	0.14
100-41-4	Ethylbenzene	ND		1.0	0.12
106-93-4	1,2-Dibromoethane	ND		1.0	0.13
75-09-2	Methylene Chloride	ND		1.0	0.27
71-36-3	n-Butanol	ND		50	12
100-42-5	Styrene	ND		1.0	0.13
127-18-4	Tetrachloroethene	ND		1.0	0.18
108-88-3	Toluene	ND		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR02RB-021517 | Lab Sample ID: 160-21079-5

Matrix: Water | Lab File ID: LSMP7588.D

Analysis Method: 8260C | Date Collected: 02/15/2017 10:30

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 16:51

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		1.0	0.25
108-05-4	Vinyl acetate	ND		2.0	0.18
75-01-4	Vinyl chloride	ND		2.0	0.19
1330-20-7	Xylenes, Total	ND		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	94		75-129
460-00-4	4-Bromofluorobenzene (Surr)	102		81-130
1868-53-7	Dibromofluoromethane (Surr)	97		81-124
2037-26-5	Toluene-d8 (Surr)	104		87-128

Report Date: 21-Feb-2017 08:25:04 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7588.D
Lims ID: 160-21079-A-5
Client ID: GW-BR02RB-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 16:51:30 ALS Bottle#: 17 Worklist Smp#: 19
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-019
Misc. Info.: 160-21079-a-5
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:19:41

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
3 Chloromethane	50		3.346				ND	
4 Vinyl chloride	62		3.499				ND	
6 Bromomethane	94		4.100				ND	
7 Chloroethane	64		4.310				ND	
12 1,1-Dichloroethene	96		5.371				ND	
13 Carbon disulfide	76		5.413				ND	
S 15 1,2-Dichloroethene, Total	96		5.816				ND	
20 Methylene Chloride	84		6.167				ND	
21 Acetone	43		6.237				ND	
22 trans-1,2-Dichloroethene	96		6.377				ND	
30 1,1-Dichloroethane	63		7.103				ND	
33 Vinyl acetate	43		7.340				ND	
34 cis-1,2-Dichloroethene	96		7.675				ND	
38 Chloroform	83		7.941				ND	
40 Carbon tetrachloride	117		8.094				ND	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	94	303484	9.69	
43 1,1,1-Trichloroethane	97		8.164				ND	
45 2-Butanone (MEK)	43		8.248				ND	
48 Benzene	78		8.527				ND	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	290308	9.40	
54 1,2-Dichloroethane	62		8.723				ND	
* 55 Fluorobenzene	96	8.904	8.904	0.000	98	1692860	10.0	
57 Trichloroethene	95		9.058				ND	
59 n-Butanol	56		9.295				ND	
62 1,2-Dichloropropane	63		9.561				ND	
63 Dichlorobromomethane	83		9.589				ND	
67 cis-1,3-Dichloropropene	75		10.161				ND	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	94	1541543	10.4	
69 Toluene	92		10.371				ND	
71 4-Methyl-2-pentanone (MIBK	43		10.692				ND	
72 trans-1,3-Dichloropropene	75		10.734				ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
73 Tetrachloroethene	164		10.734				ND	
75 1,1,2-Trichloroethane	83		10.888				ND	
76 Chlorodibromomethane	129		11.069				ND	
79 Ethylene Dibromide	107		11.321				ND	
80 2-Hexanone	43		11.418				ND	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	87	1096944	10.0	
82 Ethylbenzene	91		11.754				ND	
84 Chlorobenzene	112		11.767				ND	
86 m-Xylene & p-Xylene	106		11.879				ND	
88 o-Xylene	106		12.284				ND	
89 Styrene	104		12.326				ND	
90 Bromoform	173		12.396				ND	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	438194	10.2	
95 1,1,2,2-Tetrachloroethane	83		13.010				ND	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	96	504058	10.0	
115 1,2-Dibromo-3-Chloropropan	157		15.147				ND	
117 1,2,4-Trichlorobenzene	180		15.804				ND	
S 119 Xylenes, Total	106		16.500				ND	

Reagents:

I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

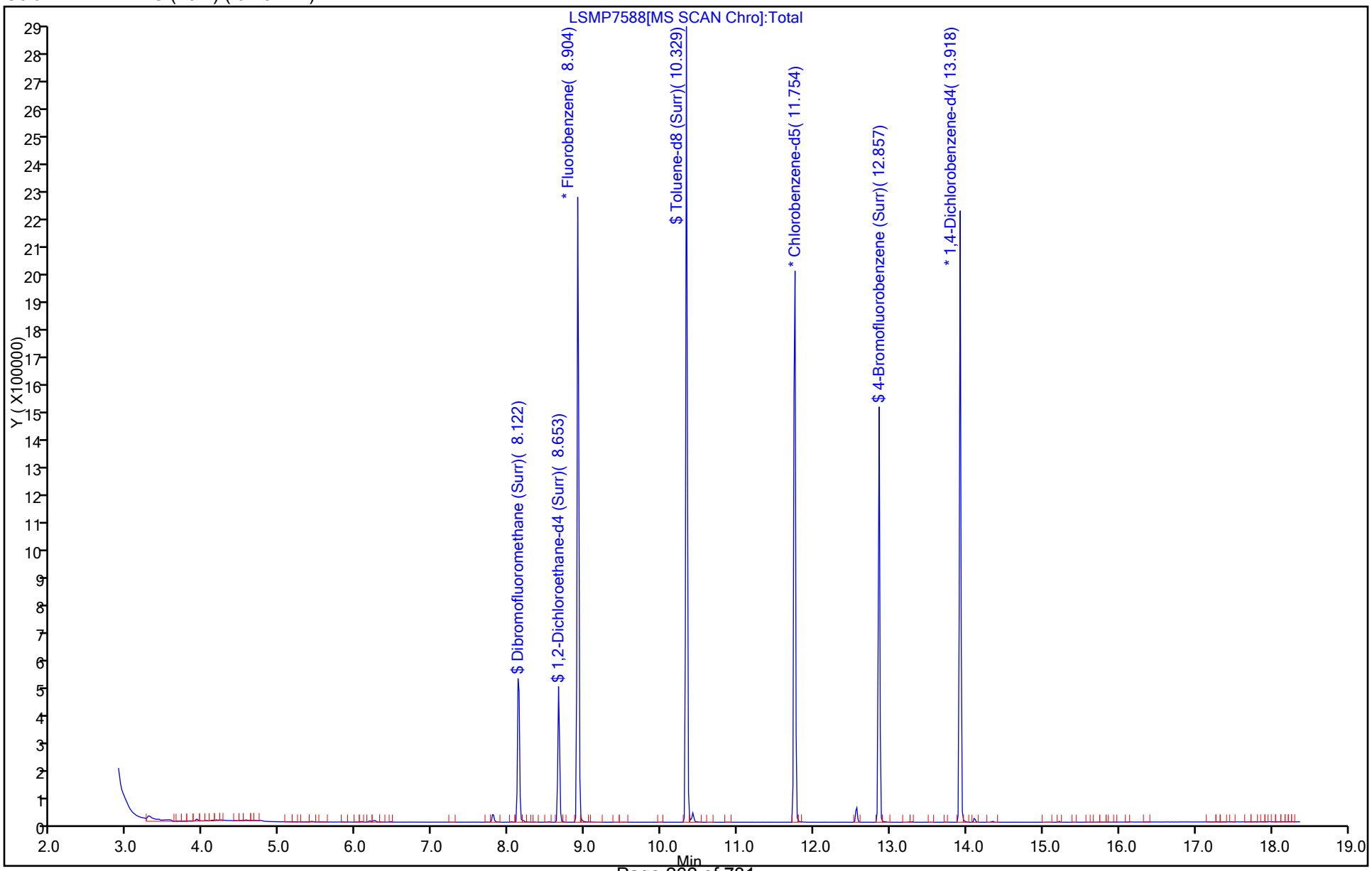
Report Date: 21-Feb-2017 08:25:04 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7588.D

Injection Date:	20-Feb-2017 16:51:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	160-21079-A-5	Lab Sample ID:	160-21079-5	Worklist Smp#:	19
Client ID:	GW-BR02RB-021517				
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	17
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7588.D
Lims ID: 160-21079-A-5
Client ID: GW-BR02RB-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 16:51:30 ALS Bottle#: 17 Worklist Smp#: 19
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-019
Misc. Info.: 160-21079-a-5
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:19:41

Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	9.69	96.89
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	9.40	94.04
$ 68 Toluene-d8 (Surr)	10.0	10.4	104.33
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.2	102.15

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-NB71-021517 | Lab Sample ID: 160-21079-6

Matrix: Water | Lab File ID: LSMP7589.D

Analysis Method: 8260C | Date Collected: 02/15/2017 12:40

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 17:17

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.10
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.13
75-35-4	1,1-Dichloroethene	ND		1.0	0.10
75-34-3	1,1-Dichloroethane	ND		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.41
107-06-2	1,2-Dichloroethane	ND		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	ND		2.0	0.14
78-87-5	1,2-Dichloropropane	ND		1.0	0.10
78-93-3	2-Butanone	ND		5.0	0.47
591-78-6	2-Hexanone	ND		5.0	0.25
108-10-1	4-Methyl-2-pentanone	ND		5.0	0.22
67-64-1	Acetone	ND		2.0	0.55
71-43-2	Benzene	ND		1.0	0.10
75-25-2	Bromoform	ND		1.0	0.17
74-83-9	Methyl bromide	ND		2.0	0.25
75-15-0	Carbon disulfide	ND		1.0	0.10
56-23-5	Carbon tetrachloride	ND		1.0	0.18
108-90-7	Chlorobenzene	ND		1.0	0.11
124-48-1	Chlorodibromomethane	ND		1.0	0.14
75-00-3	Chloroethane	ND		2.0	0.16
67-66-3	Chloroform	ND		1.0	0.10
74-87-3	Chloromethane	ND		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.16
75-27-4	Bromodichloromethane	ND		1.0	0.14
100-41-4	Ethylbenzene	ND		1.0	0.12
106-93-4	1,2-Dibromoethane	ND		1.0	0.13
75-09-2	Methylene Chloride	ND		1.0	0.27
71-36-3	n-Butanol	ND		50	12
100-42-5	Styrene	ND		1.0	0.13
127-18-4	Tetrachloroethene	ND		1.0	0.18
108-88-3	Toluene	ND		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-NB71-021517 | Lab Sample ID: 160-21079-6

Matrix: Water | Lab File ID: LSMP7589.D

Analysis Method: 8260C | Date Collected: 02/15/2017 12:40

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 17:17

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		1.0	0.25
108-05-4	Vinyl acetate	ND		2.0	0.18
75-01-4	Vinyl chloride	ND		2.0	0.19
1330-20-7	Xylenes, Total	ND		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	98		75-129
460-00-4	4-Bromofluorobenzene (Surr)	105		81-130
1868-53-7	Dibromofluoromethane (Surr)	101		81-124
2037-26-5	Toluene-d8 (Surr)	107		87-128

Report Date: 21-Feb-2017 08:25:03 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7589.D
Lims ID: 160-21079-A-6
Client ID: GW-NB71-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 17:17:30 ALS Bottle#: 18 Worklist Smp#: 20
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-020
Misc. Info.: 160-21079-a-6
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:19:52

	Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
	3 Chloromethane	50		3.346				ND	
	4 Vinyl chloride	62		3.499				ND	
	6 Bromomethane	94		4.100				ND	
	7 Chloroethane	64		4.310				ND	
	12 1,1-Dichloroethene	96		5.371				ND	
	13 Carbon disulfide	76		5.413				ND	
S	15 1,2-Dichloroethene, Total	96		5.816				ND	
	20 Methylene Chloride	84		6.167				ND	
	21 Acetone	43		6.237				ND	
	22 trans-1,2-Dichloroethene	96		6.377				ND	
	30 1,1-Dichloroethane	63		7.103				ND	
	33 Vinyl acetate	43		7.340				ND	
	34 cis-1,2-Dichloroethene	96		7.675				ND	
	38 Chloroform	83		7.941				ND	
	40 Carbon tetrachloride	117		8.094				ND	
$	42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	93	301797		10.1
	43 1,1,1-Trichloroethane	97		8.164				ND	
	45 2-Butanone (MEK)	43		8.248				ND	
	48 Benzene	78		8.527				ND	
$	53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	289858		9.84
	54 1,2-Dichloroethane	62		8.723				ND	
*	55 Fluorobenzene	96	8.905	8.904	0.000	98	1615055		10.0
	57 Trichloroethene	95		9.058				ND	
	59 n-Butanol	56		9.295				ND	
	62 1,2-Dichloropropane	63		9.561				ND	
	63 Dichlorobromomethane	83		9.589				ND	
	67 cis-1,3-Dichloropropene	75		10.161				ND	
$	68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	94	1521966		10.7
	69 Toluene	92		10.371				ND	
	71 4-Methyl-2-pentanone (MIBK	43		10.692				ND	
	72 trans-1,3-Dichloropropene	75		10.734				ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
73 Tetrachloroethene	164		10.734				ND	
75 1,1,2-Trichloroethane	83		10.888				ND	
76 Chlorodibromomethane	129		11.069				ND	
79 Ethylene Dibromide	107		11.321				ND	
80 2-Hexanone	43		11.418				ND	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	87	1053007	10.0	
82 Ethylbenzene	91		11.754				ND	
84 Chlorobenzene	112		11.767				ND	
86 m-Xylene & p-Xylene	106		11.879				ND	
88 o-Xylene	106		12.284				ND	
89 Styrene	104		12.326				ND	
90 Bromoform	173		12.396				ND	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	441182	10.5	
95 1,1,2,2-Tetrachloroethane	83		13.010				ND	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	96	493905	10.0	
115 1,2-Dibromo-3-Chloropropan	157		15.147				ND	
117 1,2,4-Trichlorobenzene	180		15.804				ND	
S 119 Xylenes, Total	106		16.500				ND	

Reagents:

I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

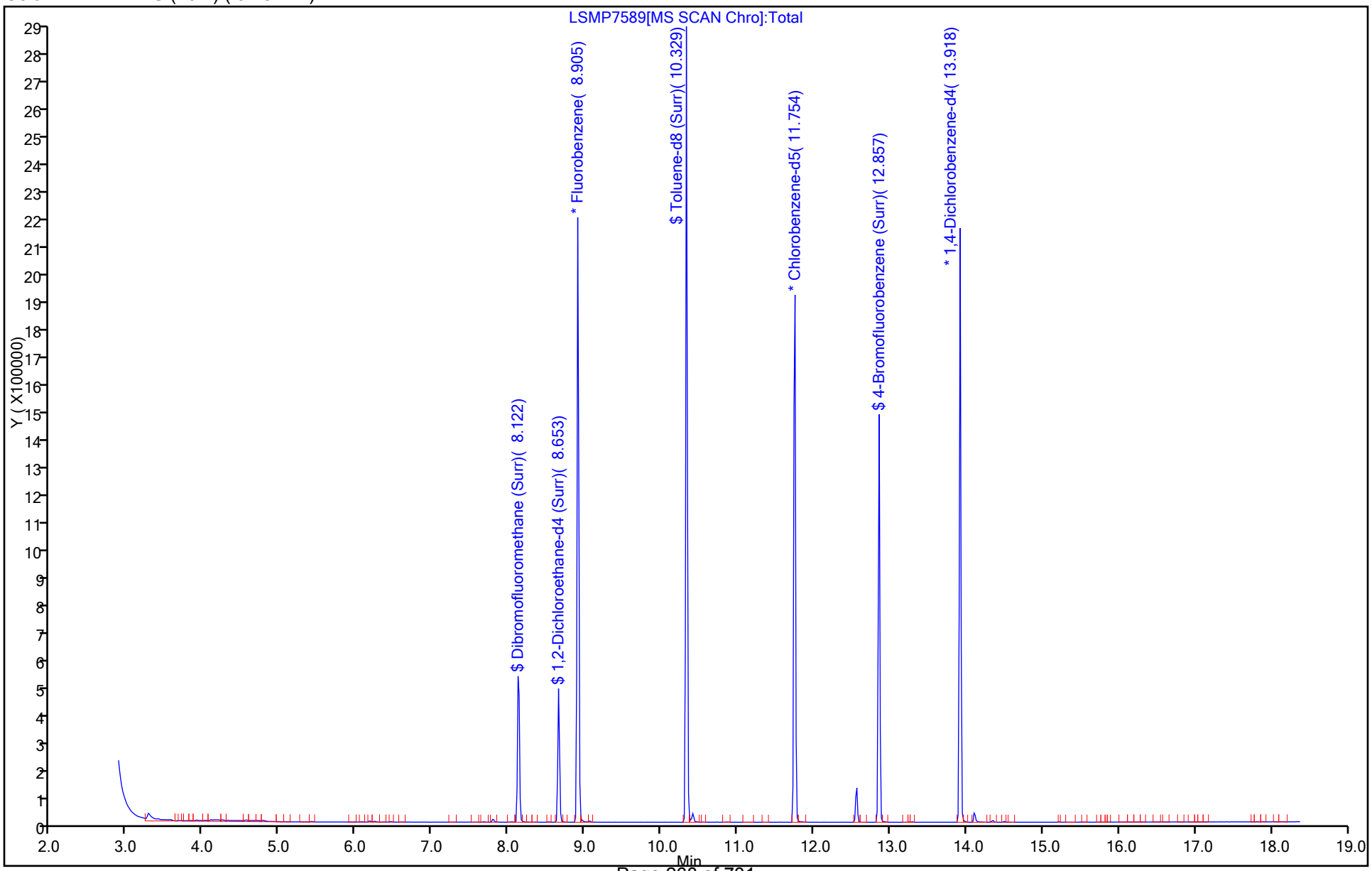
Report Date: 21-Feb-2017 08:25:03 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7589.D

Injection Date:	20-Feb-2017 17:17:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	160-21079-A-6	Lab Sample ID:	160-21079-6	Worklist Smp#:	20
Client ID:	GW-NB71-021517				
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	18
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7589.D
Lims ID: 160-21079-A-6
Client ID: GW-NB71-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 17:17:30 ALS Bottle#: 18 Worklist Smp#: 20
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-020
Misc. Info.: 160-21079-a-6
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:19:52

Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	10.1	101.00
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	9.84	98.42
$ 68 Toluene-d8 (Surr)	10.0	10.7	107.30
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.5	104.96

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR04RB-021517 | Lab Sample ID: 160-21079-7

Matrix: Water | Lab File ID: LSMP7577.D

Analysis Method: 8260C | Date Collected: 02/15/2017 13:45

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 12:13

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.10
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.13
75-35-4	1,1-Dichloroethene	ND		1.0	0.10
75-34-3	1,1-Dichloroethane	ND		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.41
107-06-2	1,2-Dichloroethane	ND		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	ND		2.0	0.14
78-87-5	1,2-Dichloropropane	ND		1.0	0.10
78-93-3	2-Butanone	ND		5.0	0.47
591-78-6	2-Hexanone	ND		5.0	0.25
108-10-1	4-Methyl-2-pentanone	ND		5.0	0.22
67-64-1	Acetone	ND		2.0	0.55
71-43-2	Benzene	ND		1.0	0.10
75-25-2	Bromoform	ND		1.0	0.17
74-83-9	Methyl bromide	ND		2.0	0.25
75-15-0	Carbon disulfide	ND		1.0	0.10
56-23-5	Carbon tetrachloride	ND		1.0	0.18
108-90-7	Chlorobenzene	ND		1.0	0.11
124-48-1	Chlorodibromomethane	ND		1.0	0.14
75-00-3	Chloroethane	ND		2.0	0.16
67-66-3	Chloroform	ND		1.0	0.10
74-87-3	Chloromethane	ND		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.16
75-27-4	Bromodichloromethane	ND		1.0	0.14
100-41-4	Ethylbenzene	ND		1.0	0.12
106-93-4	1,2-Dibromoethane	ND		1.0	0.13
75-09-2	Methylene Chloride	ND		1.0	0.27
71-36-3	n-Butanol	ND		50	12
100-42-5	Styrene	ND		1.0	0.13
127-18-4	Tetrachloroethene	ND		1.0	0.18
108-88-3	Toluene	ND		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR04RB-021517 | Lab Sample ID: 160-21079-7

Matrix: Water | Lab File ID: LSMP7577.D

Analysis Method: 8260C | Date Collected: 02/15/2017 13:45

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 12:13

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		1.0	0.25
108-05-4	Vinyl acetate	ND		2.0	0.18
75-01-4	Vinyl chloride	ND		2.0	0.19
1330-20-7	Xylenes, Total	ND		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	96		75-129
460-00-4	4-Bromofluorobenzene (Surr)	105		81-130
1868-53-7	Dibromofluoromethane (Surr)	95		81-124
2037-26-5	Toluene-d8 (Surr)	105		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7577.D
Lims ID: 160-21079-A-7
Client ID: GW-BR04RB-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 12:13:30 ALS Bottle#: 6 Worklist Smp#: 9
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-009
Misc. Info.: 160-21079-a-7
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:31 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 20-Feb-2017 12:35:44

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85		3.011				ND	
2 1,2-Dichloro-1,1,2,2-tetra	135		3.248				ND	
3 Chloromethane	50		3.346				ND	
4 Vinyl chloride	62		3.499				ND	
5 Butadiene	39		3.527				ND	
6 Bromomethane	94		4.100				ND	
7 Chloroethane	64		4.310				ND	
8 Trichlorofluoromethane	101		4.561				ND	
9 Dichlorofluoromethane	67		4.659				ND	
10 Ethyl ether	74		5.064				ND	
11 Ethanol	45		5.301				ND	
12 1,1-Dichloroethene	96		5.371				ND	
13 Carbon disulfide	76		5.413				ND	
14 1,1,2-Trichloro-1,2,2-trif	151		5.427				ND	
16 Iodomethane	142		5.580				ND	
S 15 1,2-Dichloroethene, Total	96		5.816				ND	
17 Acrolein	56		5.860				ND	
18 3-Chloro-1-propene	39		6.027				ND	
19 Isopropyl alcohol	45	6.069	6.069	0.000	95	4598	7.31	
20 Methylene Chloride	84		6.167				ND	
21 Acetone	43		6.237				ND	
22 trans-1,2-Dichloroethene	96		6.377				ND	
23 Methyl acetate	74		6.377				ND	
24 Hexane	86		6.446				ND	
25 Methyl tert-butyl ether	73		6.502				ND	
26 2-Methyl-2-propanol	59		6.600				ND	
27 Acetonitrile	41		6.809				ND	
28 Isopropyl ether	45		6.921				ND	
29 2-Chloro-1,3-butadiene	53		7.061				ND	
30 1,1-Dichloroethane	63		7.103				ND	
31 Acrylonitrile	53		7.159				ND	

	Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
	32 Tert-butyl ethyl ether	59		7.326				ND	
	33 Vinyl acetate	43		7.340				ND	
	34 cis-1,2-Dichloroethene	96		7.675				ND	
	35 2,2-Dichloropropane	77		7.787				ND	
	37 Chlorobromomethane	128		7.885				ND	
	36 Cyclohexane	84		7.885				ND	
	38 Chloroform	83		7.941				ND	
	39 Ethyl acetate	45		8.038				ND	
	40 Carbon tetrachloride	117		8.094				ND	
	41 Tetrahydrofuran	71		8.122				ND	
$	42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	94	318635		9.51
	43 1,1,1-Trichloroethane	97		8.164				ND	
	45 2-Butanone (MEK)	43		8.248				ND	
	47 1,1-Dichloropropene	75		8.276				ND	
	44 Isooctane	57		8.360				ND	
	46 n-Heptane	43		8.430				ND	
	48 Benzene	78		8.527				ND	
	49 Propionitrile	54		8.541				ND	
	50 Methacrylonitrile	41		8.555				ND	
	51 Tert-amyl methyl ether	73		8.597				ND	
$	53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	315502		9.56
	52 Isobutyl alcohol	42		8.653				ND	
	54 1,2-Dichloroethane	62		8.723				ND	
*	55 Fluorobenzene	96	8.905	8.904	0.001	98	1810431		10.0
	58 Methylcyclohexane	55		9.058				ND	
	57 Trichloroethene	95		9.058				ND	
	56 1,4-Difluorobenzene	114		9.256				ND	
	59 n-Butanol	56		9.295				ND	
	61 Dibromomethane	93		9.477				ND	
	60 Ethyl acrylate	55		9.505				ND	
	62 1,2-Dichloropropane	63		9.561				ND	
	63 Dichlorobromomethane	83		9.589				ND	
	64 Methyl methacrylate	69		9.687				ND	
	65 1,4-Dioxane	88		9.770				ND	
	66 2-Chloroethyl vinyl ether	63		10.064				ND	
	67 cis-1,3-Dichloropropene	75		10.161				ND	
$	68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	93	1699075		10.5
	69 Toluene	92		10.371				ND	
	70 2-Nitropropane	43		10.594				ND	
	71 4-Methyl-2-pentanone (MIBK	43		10.692				ND	
	72 trans-1,3-Dichloropropene	75		10.734				ND	
	73 Tetrachloroethene	164		10.734				ND	
	74 Ethyl methacrylate	69		10.818				ND	
	75 1,1,2-Trichloroethane	83		10.888				ND	
	76 Chlorodibromomethane	129		11.069				ND	
	77 1,3-Dichloropropane	76		11.153				ND	
	78 n-Butyl acetate	43		11.293				ND	
	79 Ethylene Dibromide	107		11.321				ND	
	80 2-Hexanone	43		11.418				ND	
	81 1-Chlorohexane	91		11.684				ND	
*	83 Chlorobenzene-d5	117	11.754	11.754	0.000	87	1205598		10.0
	82 Ethylbenzene	91		11.754				ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
84 Chlorobenzene	112		11.767				ND	
85 1,1,1,2-Tetrachloroethane	131		11.809				ND	
86 m-Xylene & p-Xylene	106		11.879				ND	
88 o-Xylene	106		12.284				ND	
89 Styrene	104		12.326				ND	
90 Bromoform	173		12.396				ND	
91 Isopropylbenzene	105		12.550				ND	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	519754	10.5	
93 N-Propylbenzene	91		12.941				ND	
94 Bromobenzene	156		12.983				ND	
95 1,1,2,2-Tetrachloroethane	83		13.010				ND	
96 1,3,5-Trimethylbenzene	105		13.094				ND	
97 2-Chlorotoluene	91		13.122				ND	
99 1,2,3-Trichloropropane	110		13.164				ND	
98 trans-1,4-Dichloro-2-buten	53		13.178				ND	
100 Cyclohexanone	55		13.248				ND	
101 4-Chlorotoluene	91		13.276				ND	
102 tert-Butylbenzene	119		13.429				ND	
103 1,2,4-Trimethylbenzene	105		13.485				ND	
87 Pentachloroethane	167		13.558				ND	
104 sec-Butylbenzene	105		13.583				ND	
105 4-Isopropyltoluene	119		13.709				ND	
106 1,3-Dichlorobenzene	146		13.848				ND	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	96	582073	10.0	
107 1,2,3-Trimethylbenzene	105		13.918				ND	
109 1,4-Dichlorobenzene	146		13.932				ND	
111 n-Butylbenzene	134		14.128				ND	
110 Benzyl chloride	126		14.156				ND	
112 1,2-Dichlorobenzene	146		14.351				ND	
113 n-Nonyl Aldehyde	57		15.064				ND	
115 1,2-Dibromo-3-Chloropropan	157		15.147				ND	
114 1,3,5-Trichlorobenzene	180		15.161				ND	
116 Hexachlorobutadiene	225		15.748				ND	
117 1,2,4-Trichlorobenzene	180		15.804				ND	
118 Naphthalene	128		16.153				ND	
120 1,2,3-Trichlorobenzene	180		16.348				ND	
S 119 Xylenes, Total	106		16.500				ND	
121 2-Pentanone	1		0.000				ND	
S 130 Trihalomethanes, Total	1		0.000				ND	

Reagents:

I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

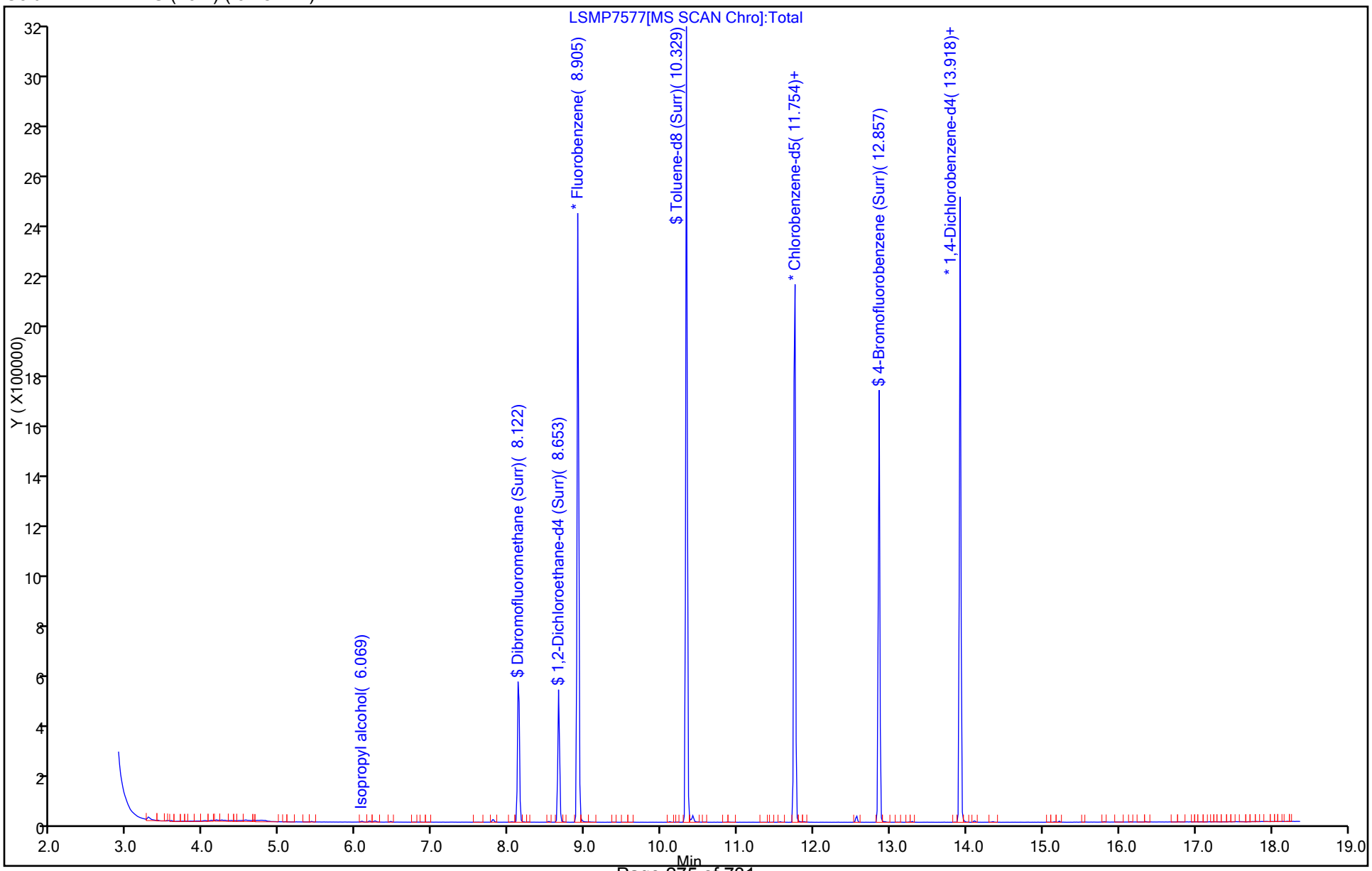
Report Date: 21-Feb-2017 08:24:46 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7577.D

Injection Date:	20-Feb-2017 12:13:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	160-21079-A-7	Lab Sample ID:	160-21079-7	Worklist Smp#:	9
Client ID:	GW-BR04RB-021517				
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	6
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7577.D
Lims ID: 160-21079-A-7
Client ID: GW-BR04RB-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 12:13:30 ALS Bottle#: 6 Worklist Smp#: 9
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-009
Misc. Info.: 160-21079-a-7
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:31 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 20-Feb-2017 12:35:44

Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	9.51	95.12
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	9.56	95.57
$ 68 Toluene-d8 (Surr)	10.0	10.5	104.62
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.5	104.92

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR04RB-021517-FD | Lab Sample ID: 160-21079-8

Matrix: Water | Lab File ID: LSMP7590.D

Analysis Method: 8260C | Date Collected: 02/15/2017 13:45

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 17:42

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.10
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.13
75-35-4	1,1-Dichloroethene	ND		1.0	0.10
75-34-3	1,1-Dichloroethane	ND		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.41
107-06-2	1,2-Dichloroethane	ND		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	ND		2.0	0.14
78-87-5	1,2-Dichloropropane	ND		1.0	0.10
78-93-3	2-Butanone	ND		5.0	0.47
591-78-6	2-Hexanone	ND		5.0	0.25
108-10-1	4-Methyl-2-pentanone	ND		5.0	0.22
67-64-1	Acetone	ND		2.0	0.55
71-43-2	Benzene	ND		1.0	0.10
75-25-2	Bromoform	ND		1.0	0.17
74-83-9	Methyl bromide	ND		2.0	0.25
75-15-0	Carbon disulfide	ND		1.0	0.10
56-23-5	Carbon tetrachloride	ND		1.0	0.18
108-90-7	Chlorobenzene	ND		1.0	0.11
124-48-1	Chlorodibromomethane	ND		1.0	0.14
75-00-3	Chloroethane	ND		2.0	0.16
67-66-3	Chloroform	ND		1.0	0.10
74-87-3	Chloromethane	ND		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.16
75-27-4	Bromodichloromethane	ND		1.0	0.14
100-41-4	Ethylbenzene	ND		1.0	0.12
106-93-4	1,2-Dibromoethane	ND		1.0	0.13
75-09-2	Methylene Chloride	ND		1.0	0.27
71-36-3	n-Butanol	ND		50	12
100-42-5	Styrene	ND		1.0	0.13
127-18-4	Tetrachloroethene	ND		1.0	0.18
108-88-3	Toluene	ND		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR04RB-021517-FD | Lab Sample ID: 160-21079-8

Matrix: Water | Lab File ID: LSMP7590.D

Analysis Method: 8260C | Date Collected: 02/15/2017 13:45

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 17:42

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		1.0	0.25
108-05-4	Vinyl acetate	ND		2.0	0.18
75-01-4	Vinyl chloride	ND		2.0	0.19
1330-20-7	Xylenes, Total	ND		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	96		75-129
460-00-4	4-Bromofluorobenzene (Surr)	105		81-130
1868-53-7	Dibromofluoromethane (Surr)	94		81-124
2037-26-5	Toluene-d8 (Surr)	106		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7590.D
Lims ID: 160-21079-A-8
Client ID: GW-BR04RB-021517-FD
Sample Type: Client
Inject. Date: 20-Feb-2017 17:42:30 ALS Bottle#: 19 Worklist Smp#: 21
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-021
Misc. Info.: 160-21079-a-8
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:20:05

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
3 Chloromethane	50		3.346				ND	
4 Vinyl chloride	62		3.499				ND	
6 Bromomethane	94		4.100				ND	
7 Chloroethane	64		4.310				ND	
12 1,1-Dichloroethene	96		5.371				ND	
13 Carbon disulfide	76		5.413				ND	
S 15 1,2-Dichloroethene, Total	96		5.816				ND	
20 Methylene Chloride	84		6.167				ND	
21 Acetone	43		6.237				ND	
22 trans-1,2-Dichloroethene	96		6.377				ND	
30 1,1-Dichloroethane	63		7.103				ND	
33 Vinyl acetate	43		7.340				ND	
34 cis-1,2-Dichloroethene	96		7.675				ND	
38 Chloroform	83		7.941				ND	
40 Carbon tetrachloride	117		8.094				ND	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	93	281565	9.41	
43 1,1,1-Trichloroethane	97		8.164				ND	
45 2-Butanone (MEK)	43		8.248				ND	
48 Benzene	78		8.527				ND	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	282353	9.57	
54 1,2-Dichloroethane	62		8.723				ND	
* 55 Fluorobenzene	96	8.904	8.904	0.000	98	1617938	10.0	
57 Trichloroethene	95		9.058				ND	
59 n-Butanol	56		9.295				ND	
62 1,2-Dichloropropane	63		9.561				ND	
63 Dichlorobromomethane	83		9.589				ND	
67 cis-1,3-Dichloropropene	75		10.161				ND	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	94	1505674	10.6	
69 Toluene	92		10.371				ND	
71 4-Methyl-2-pentanone (MIBK	43		10.692				ND	
72 trans-1,3-Dichloropropene	75		10.734				ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
73 Tetrachloroethene	164		10.734				ND	
75 1,1,2-Trichloroethane	83		10.888				ND	
76 Chlorodibromomethane	129		11.069				ND	
79 Ethylene Dibromide	107		11.321				ND	
80 2-Hexanone	43		11.418				ND	
* 83 Chlorobenzene-d5	117	11.753	11.754	-0.001	87	1050731	10.0	
82 Ethylbenzene	91		11.754				ND	
84 Chlorobenzene	112		11.767				ND	
86 m-Xylene & p-Xylene	106		11.879				ND	
88 o-Xylene	106		12.284				ND	
89 Styrene	104		12.326				ND	
90 Bromoform	173		12.396				ND	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	431712	10.5	
95 1,1,2,2-Tetrachloroethane	83		13.010				ND	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	96	481324	10.0	
115 1,2-Dibromo-3-Chloropropan	157		15.147				ND	
117 1,2,4-Trichlorobenzene	180		15.804				ND	
S 119 Xylenes, Total	106		16.500				ND	

Reagents:

I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

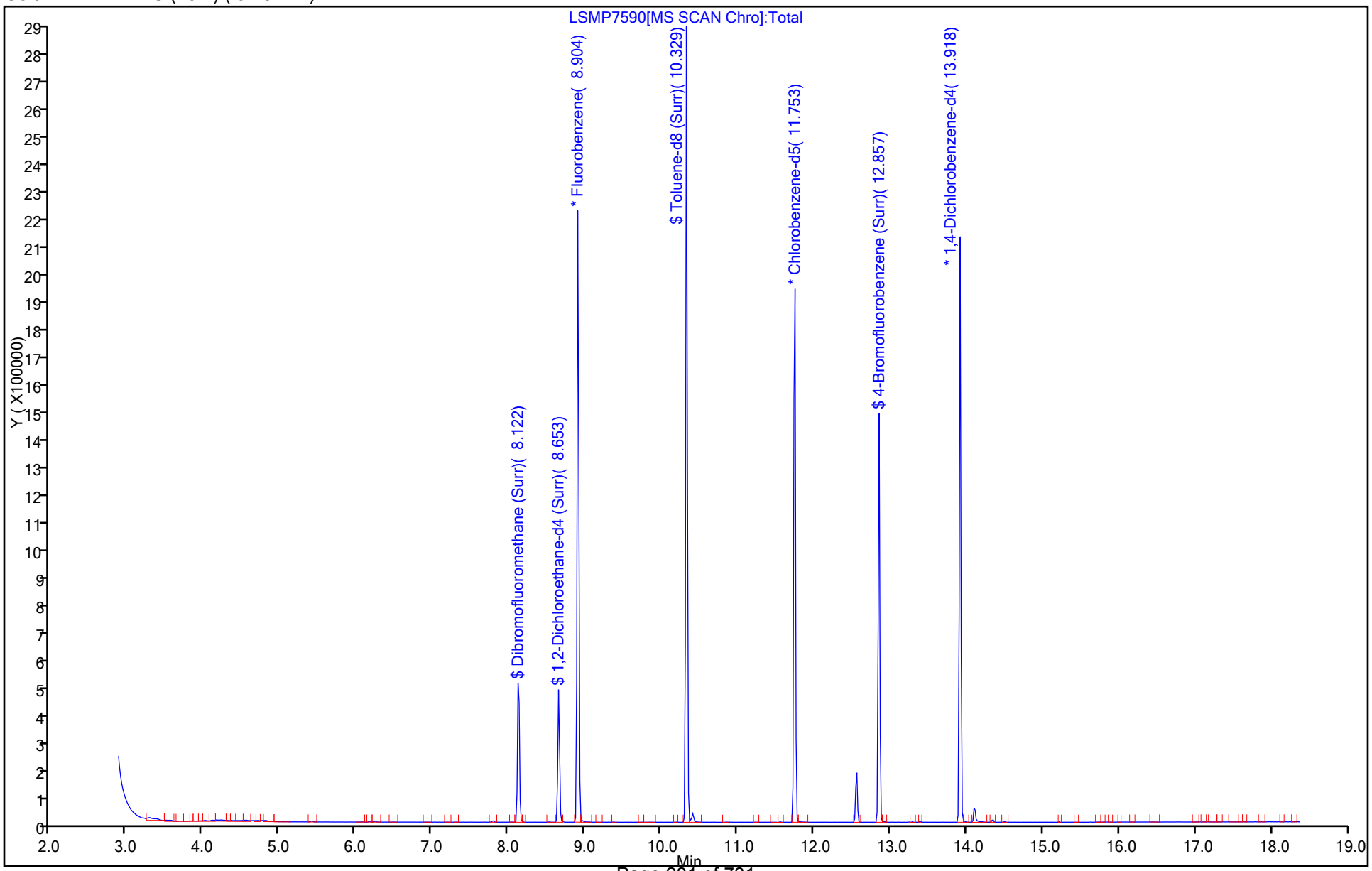
Report Date: 21-Feb-2017 08:25:02 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7590.D

Injection Date:	20-Feb-2017 17:42:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	160-21079-A-8	Lab Sample ID:	160-21079-8	Worklist Smp#:	21
Client ID:	GW-BR04RB-021517-FD				
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	19
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7590.D
Lims ID: 160-21079-A-8
Client ID: GW-BR04RB-021517-FD
Sample Type: Client
Inject. Date: 20-Feb-2017 17:42:30 ALS Bottle#: 19 Worklist Smp#: 21
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-021
Misc. Info.: 160-21079-a-8
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:20:05

Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	9.41	94.06
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	9.57	95.70
$ 68 Toluene-d8 (Surr)	10.0	10.6	106.38
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.5	105.39

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-NB80-021517 | Lab Sample ID: 160-21079-9

Matrix: Water | Lab File ID: LSMP7591.D

Analysis Method: 8260C | Date Collected: 02/15/2017 14:30

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 18:07

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.10
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.13
75-35-4	1,1-Dichloroethene	ND		1.0	0.10
75-34-3	1,1-Dichloroethane	ND		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.41
107-06-2	1,2-Dichloroethane	ND		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	30		2.0	0.14
78-87-5	1,2-Dichloropropane	ND		1.0	0.10
78-93-3	2-Butanone	ND		5.0	0.47
591-78-6	2-Hexanone	ND		5.0	0.25
108-10-1	4-Methyl-2-pentanone	ND		5.0	0.22
67-64-1	Acetone	ND		2.0	0.55
71-43-2	Benzene	ND		1.0	0.10
75-25-2	Bromoform	ND		1.0	0.17
74-83-9	Methyl bromide	ND		2.0	0.25
75-15-0	Carbon disulfide	ND		1.0	0.10
56-23-5	Carbon tetrachloride	ND		1.0	0.18
108-90-7	Chlorobenzene	ND		1.0	0.11
124-48-1	Chlorodibromomethane	ND		1.0	0.14
75-00-3	Chloroethane	ND		2.0	0.16
67-66-3	Chloroform	ND		1.0	0.10
74-87-3	Chloromethane	ND		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	29		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.16
75-27-4	Bromodichloromethane	ND		1.0	0.14
100-41-4	Ethylbenzene	ND		1.0	0.12
106-93-4	1,2-Dibromoethane	ND		1.0	0.13
75-09-2	Methylene Chloride	ND		1.0	0.27
71-36-3	n-Butanol	ND		50	12
100-42-5	Styrene	ND		1.0	0.13
127-18-4	Tetrachloroethene	ND		1.0	0.18
108-88-3	Toluene	ND		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	0.60	J	1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-NB80-021517 | Lab Sample ID: 160-21079-9

Matrix: Water | Lab File ID: LSMP7591.D

Analysis Method: 8260C | Date Collected: 02/15/2017 14:30

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 18:07

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	0.42	J	1.0	0.25
108-05-4	Vinyl acetate	ND		2.0	0.18
75-01-4	Vinyl chloride	3.5		2.0	0.19
1330-20-7	Xylenes, Total	ND		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	98		75-129
460-00-4	4-Bromofluorobenzene (Surr)	105		81-130
1868-53-7	Dibromofluoromethane (Surr)	102		81-124
2037-26-5	Toluene-d8 (Surr)	107		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7591.D
Lims ID: 160-21079-A-9
Client ID: GW-NB80-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 18:07:30 ALS Bottle#: 20 Worklist Smp#: 22
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-022
Misc. Info.: 160-21079-a-9
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:20:21

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
3 Chloromethane	50		3.346				ND	
4 Vinyl chloride	62	3.514	3.499	0.015	99	212310	3.52	
6 Bromomethane	94		4.100				ND	
7 Chloroethane	64		4.310				ND	
12 1,1-Dichloroethene	96		5.371				ND	
13 Carbon disulfide	76		5.413				ND	
S 15 1,2-Dichloroethene, Total	96				0		29.4	
20 Methylene Chloride	84		6.167				ND	
21 Acetone	43		6.237				ND	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.001	98	26192	0.5994	
30 1,1-Dichloroethane	63		7.103				ND	
33 Vinyl acetate	43		7.340				ND	
34 cis-1,2-Dichloroethene	96	7.675	7.675	0.000	83	1189347	28.8	
38 Chloroform	83		7.941				ND	
40 Carbon tetrachloride	117		8.094				ND	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	94	302347	10.2	
43 1,1,1-Trichloroethane	97		8.164				ND	
45 2-Butanone (MEK)	43		8.248				ND	
48 Benzene	78		8.527				ND	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	286271	9.84	
54 1,2-Dichloroethane	62		8.723				ND	
* 55 Fluorobenzene	96	8.905	8.904	0.000	98	1595231	10.0	
57 Trichloroethene	95	9.058	9.058	0.000	97	20084	0.4191	
59 n-Butanol	56		9.295				ND	
62 1,2-Dichloropropane	63		9.561				ND	
63 Dichlorobromomethane	83		9.589				ND	
67 cis-1,3-Dichloropropene	75		10.161				ND	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	94	1494630	10.7	
69 Toluene	92		10.371				ND	
71 4-Methyl-2-pentanone (MIBK	43		10.692				ND	
72 trans-1,3-Dichloropropene	75		10.734				ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
73 Tetrachloroethene	164		10.734				ND	
75 1,1,2-Trichloroethane	83		10.888				ND	
76 Chlorodibromomethane	129		11.069				ND	
79 Ethylene Dibromide	107		11.321				ND	
80 2-Hexanone	43		11.418				ND	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	87	1036660	10.0	
82 Ethylbenzene	91		11.754				ND	
84 Chlorobenzene	112		11.767				ND	
86 m-Xylene & p-Xylene	106		11.879				ND	
88 o-Xylene	106		12.284				ND	
89 Styrene	104		12.326				ND	
90 Bromoform	173		12.396				ND	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	429483	10.5	
95 1,1,2,2-Tetrachloroethane	83		13.010				ND	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	96	482505	10.0	
115 1,2-Dibromo-3-Chloropropan	157		15.147				ND	
117 1,2,4-Trichlorobenzene	180		15.804				ND	
S 119 Xylenes, Total	106		16.500				ND	

Reagents:

I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

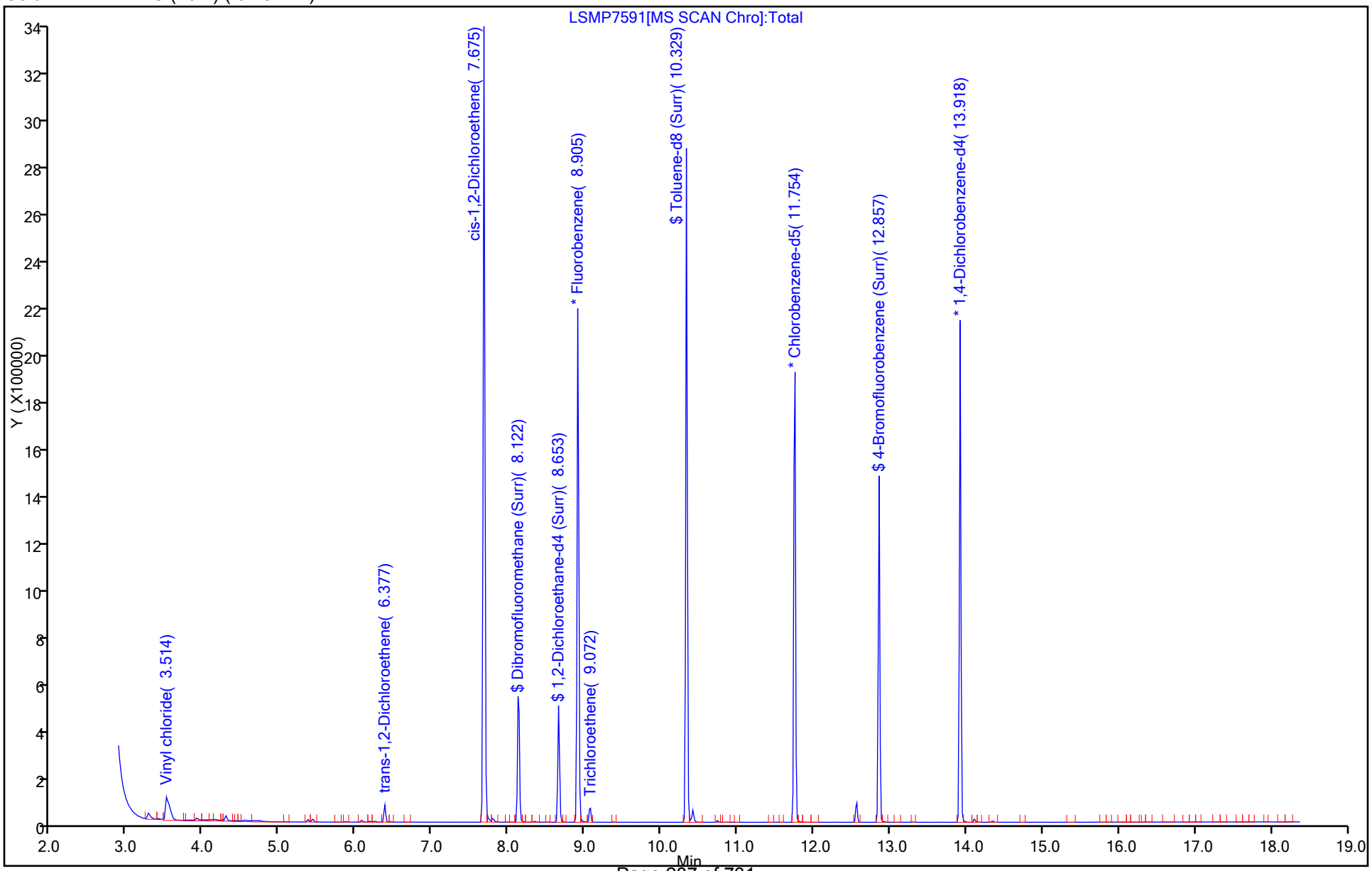
Report Date: 21-Feb-2017 08:25:00 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7591.D

Injection Date:	20-Feb-2017 18:07:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	160-21079-A-9	Lab Sample ID:	160-21079-9	Worklist Smp#:	22
Client ID:	GW-NB80-021517				
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	20
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7591.D
Lims ID: 160-21079-A-9
Client ID: GW-NB80-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 18:07:30 ALS Bottle#: 20 Worklist Smp#: 22
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-022
Misc. Info.: 160-21079-a-9
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:20:21

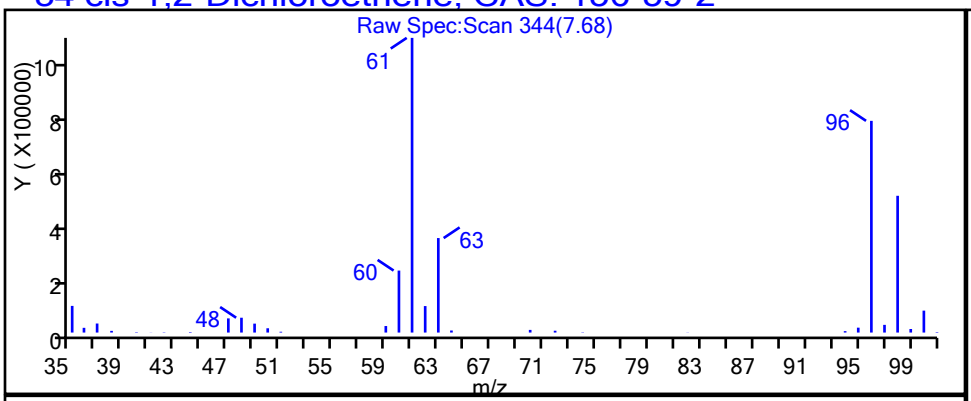
Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	10.2	102.44
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	9.84	98.41
$ 68 Toluene-d8 (Surr)	10.0	10.7	107.03
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.5	104.59

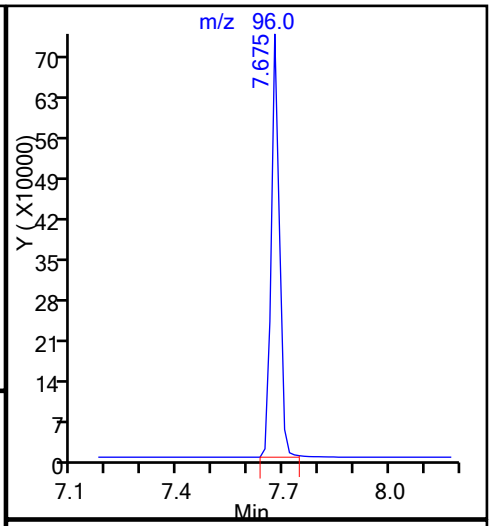
Report Date: 21-Feb-2017 08:25:01 Chrom Revision: 2.2 10-Jan-2017 11:26:10

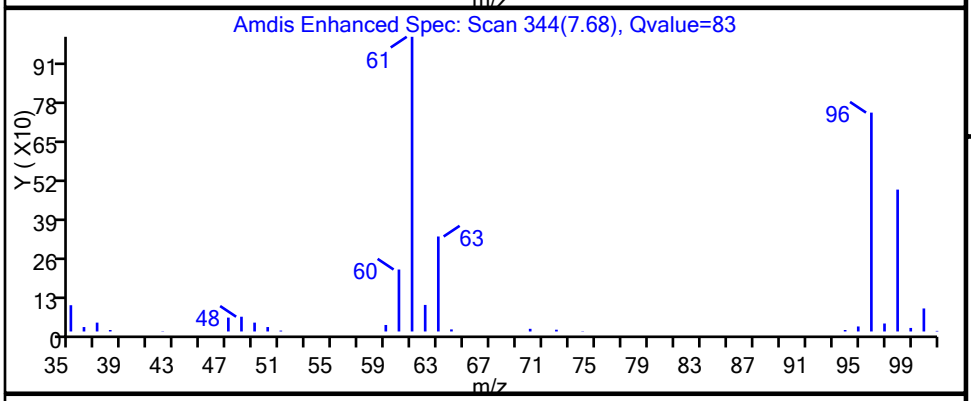
TestAmerica St. Louis

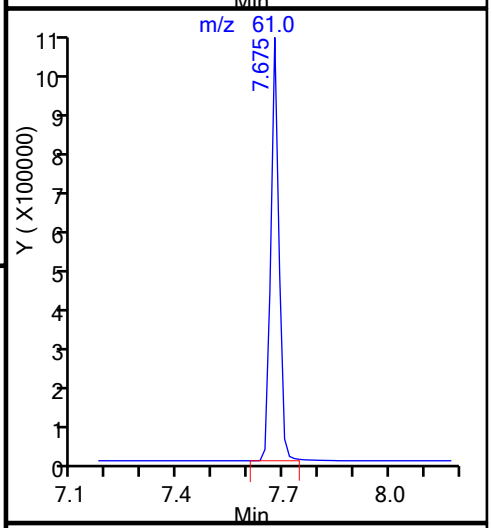
Data File:	\\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7591.D				
Injection Date:	20-Feb-2017 18:07:30	Instrument ID:	VMSL		
Lims ID:	160-21079-A-9	Lab Sample ID:	160-21079-9		
Client ID:	GW-NB80-021517				
Operator ID:	ADB	ALS Bottle#:	20	Worklist Smp#:	22
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		
Column:	RTX-VMS (40m) (0.18 mm)	Detector	MS SCAN		

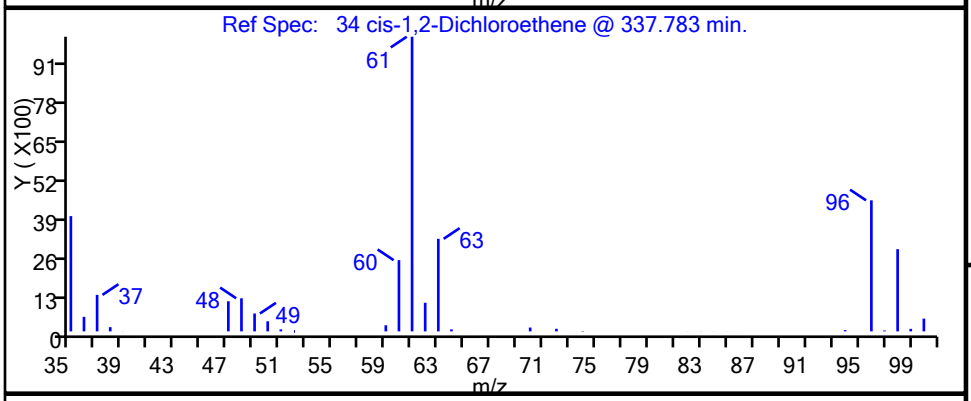
34 cis-1,2-Dichloroethene, CAS: 156-59-2

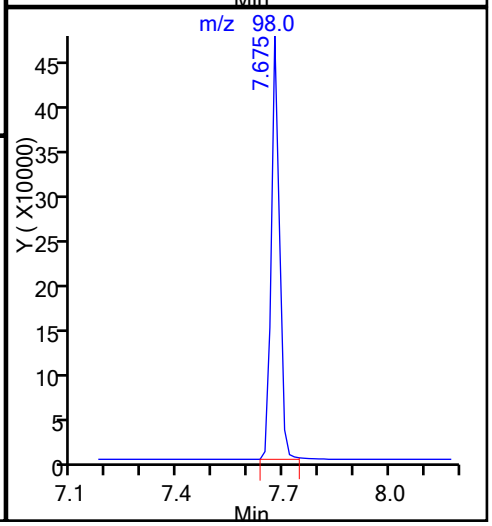


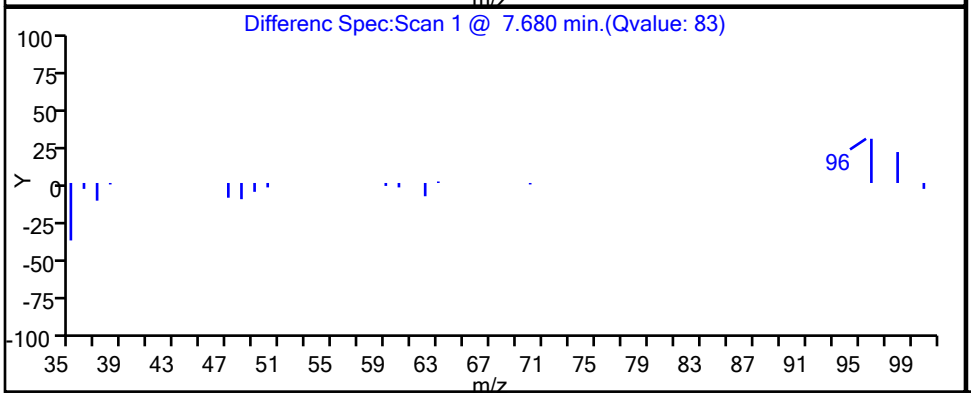












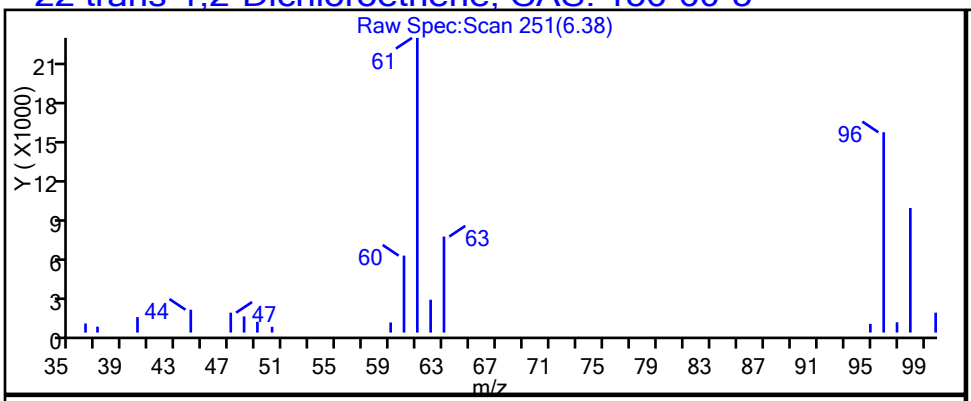
Report Date: 21-Feb-2017 08:25:01 Chrom Revision: 2.2 10-Jan-2017 11:26:10

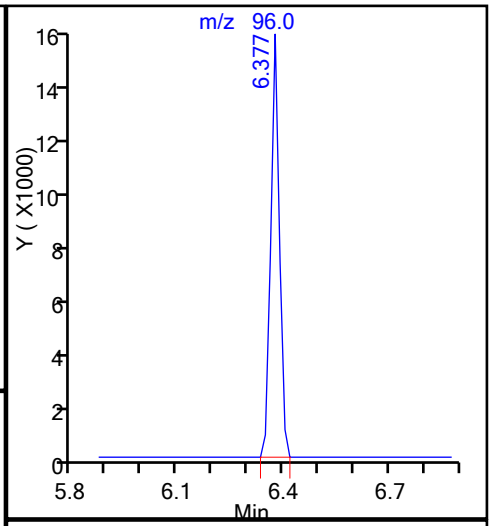
TestAmerica St. Louis

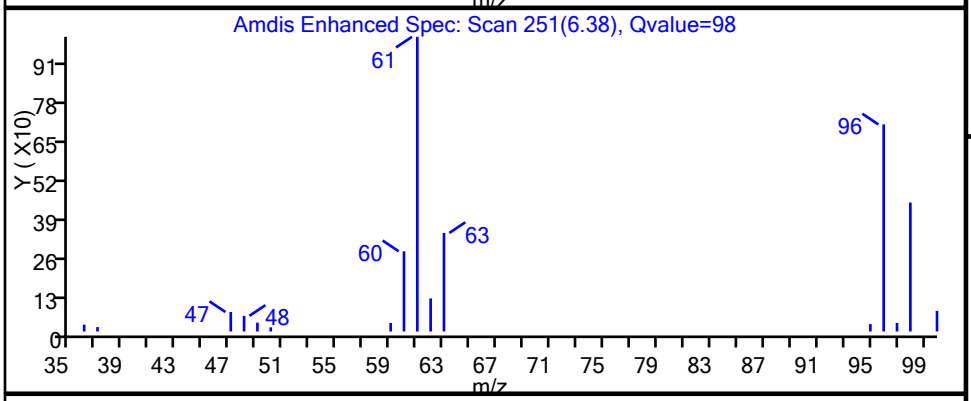
Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7591.D

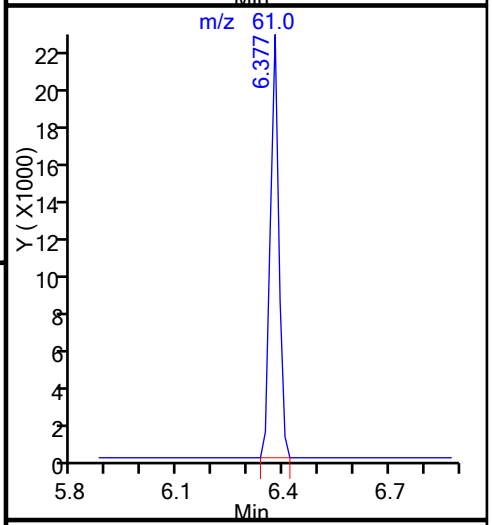
Injection Date:	20-Feb-2017 18:07:30	Instrument ID:	VMSL		
Lims ID:	160-21079-A-9	Lab Sample ID:	160-21079-9		
Client ID:	GW-NB80-021517				
Operator ID:	ADB	ALS Bottle#:	20	Worklist Smp#:	22
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		
Column:	RTX-VMS (40m) (0.18 mm)	Detector	MS SCAN		

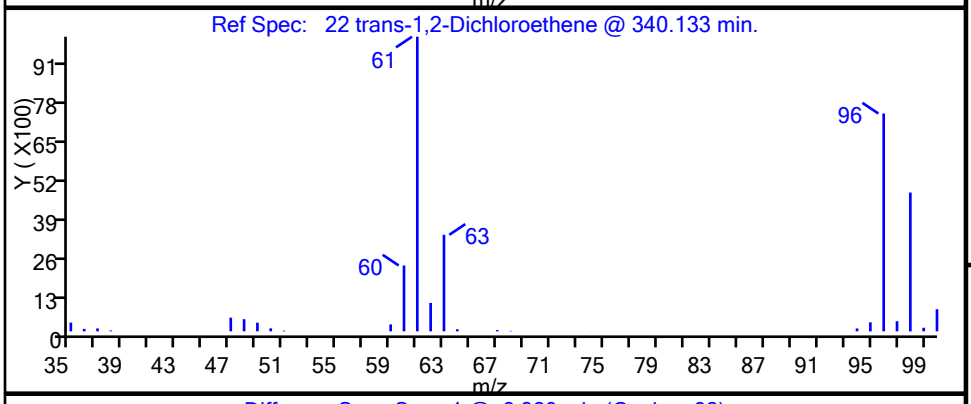
22 trans-1,2-Dichloroethene, CAS: 156-60-5

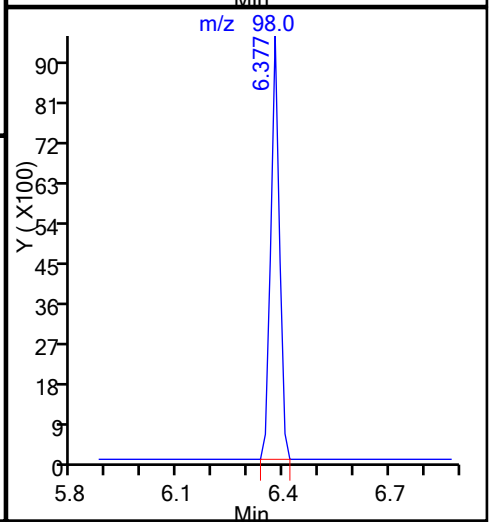


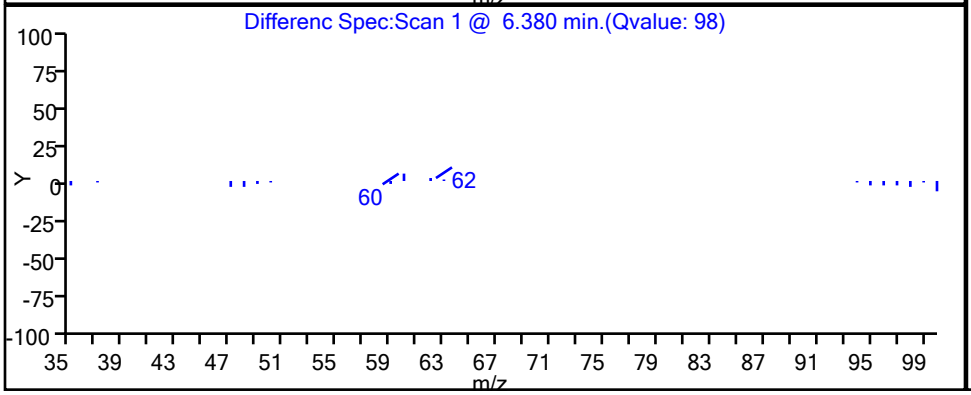










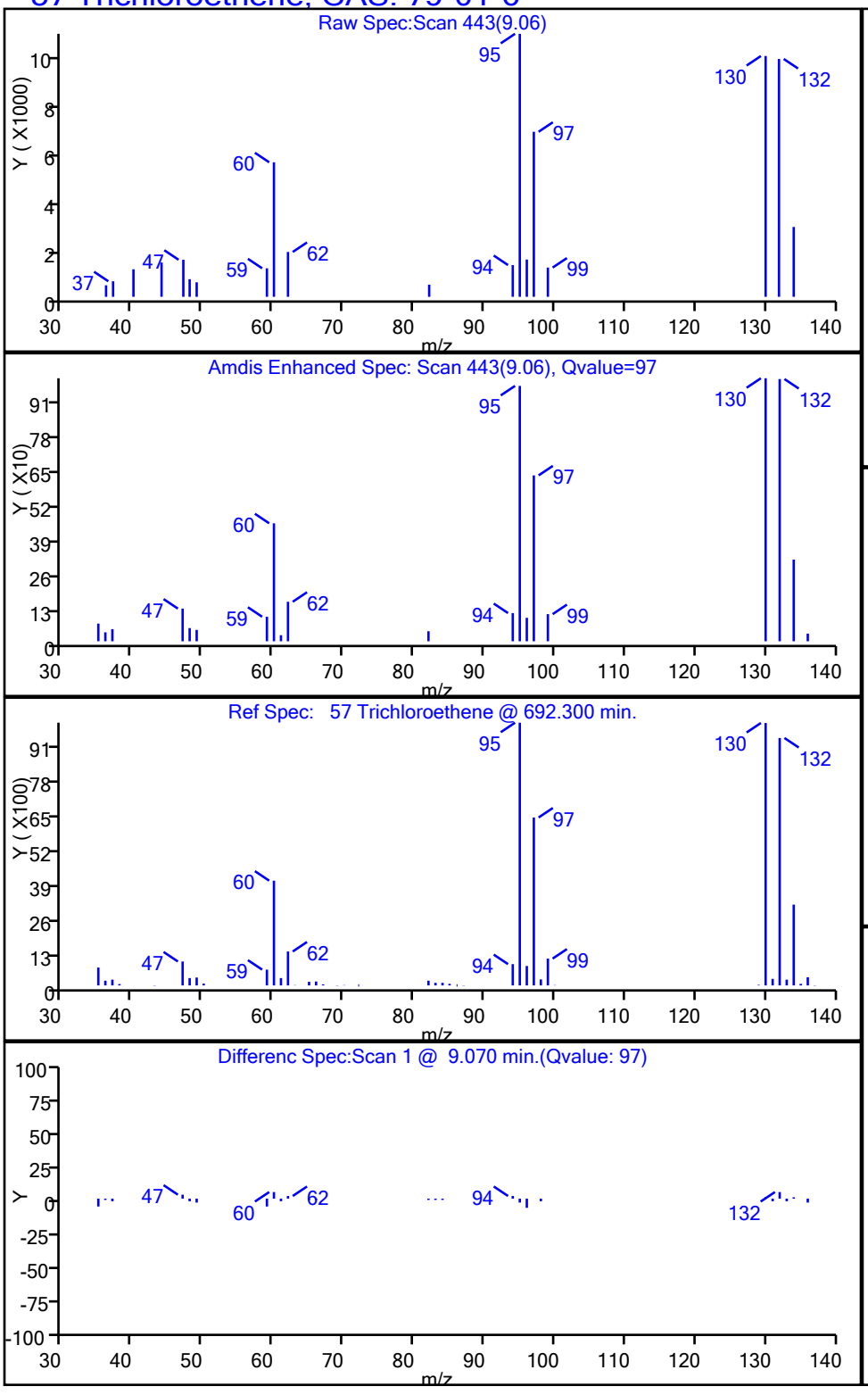


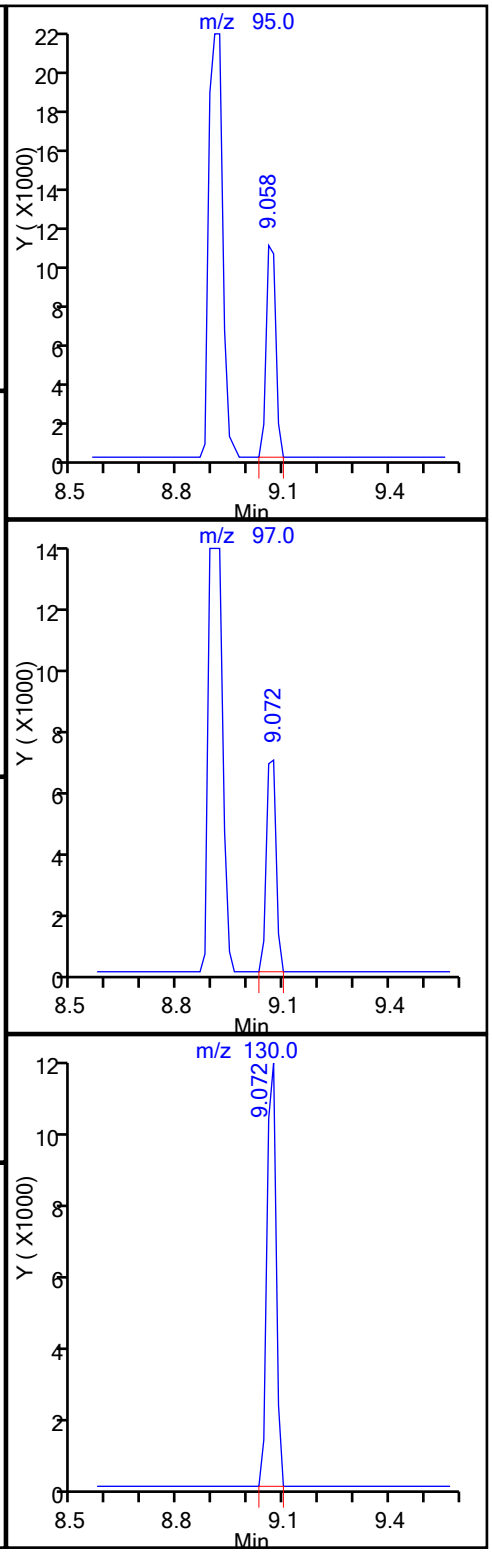
Report Date: 21-Feb-2017 08:25:01 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File:	\\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7591.D				
Injection Date:	20-Feb-2017 18:07:30	Instrument ID:	VMSL		
Lims ID:	160-21079-A-9	Lab Sample ID:	160-21079-9		
Client ID:	GW-NB80-021517				
Operator ID:	ADB	ALS Bottle#:	20	Worklist Smp#:	22
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		
Column:	RTX-VMS (40m) (0.18 mm)	Detector	MS SCAN		

57 Trichloroethene, CAS: 79-01-6



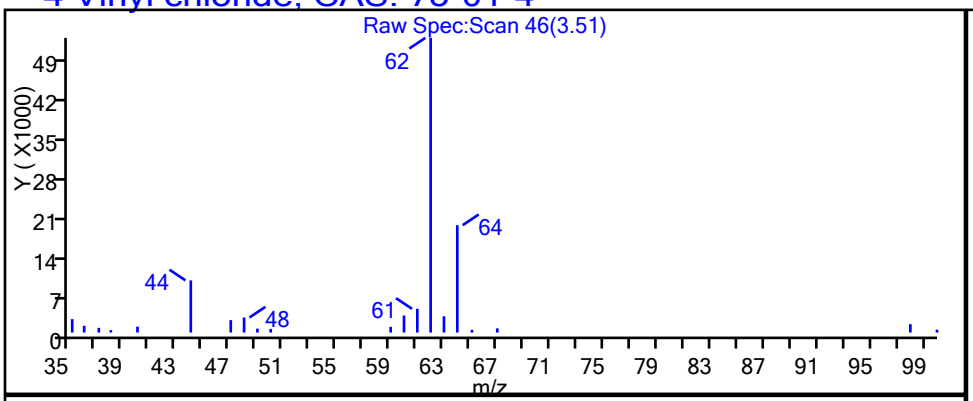


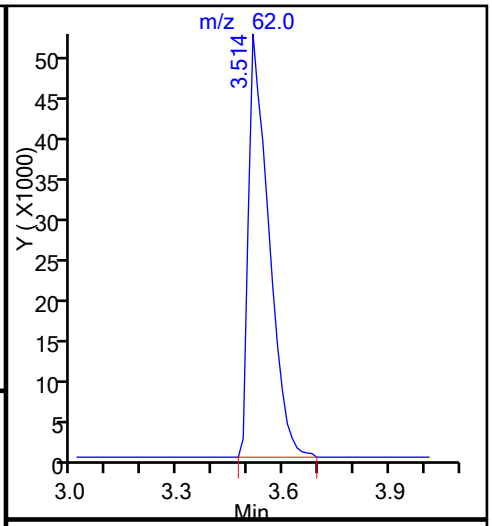
Report Date: 21-Feb-2017 08:25:01 Chrom Revision: 2.2 10-Jan-2017 11:26:10

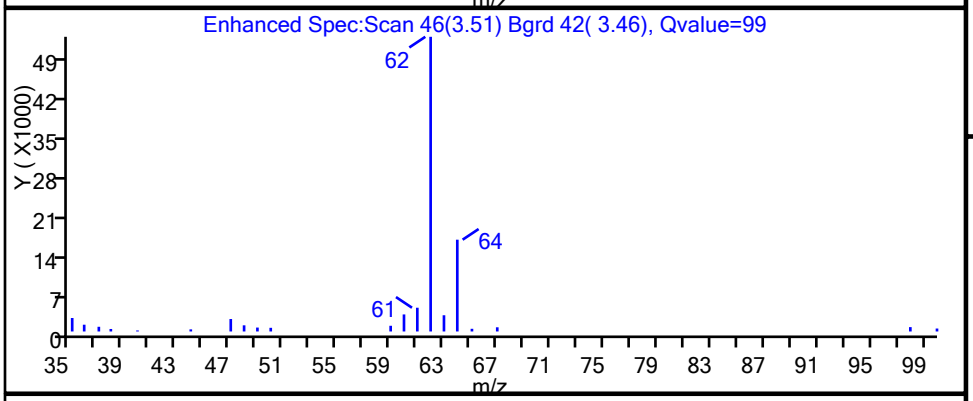
TestAmerica St. Louis

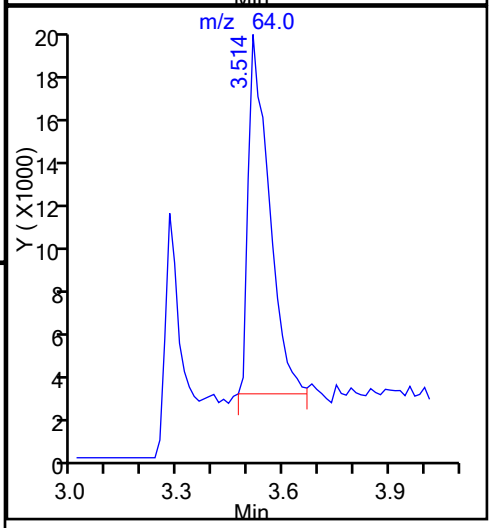
Data File:	\\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7591.D				
Injection Date:	20-Feb-2017 18:07:30	Instrument ID:	VMSL		
Lims ID:	160-21079-A-9	Lab Sample ID:	160-21079-9		
Client ID:	GW-NB80-021517				
Operator ID:	ADB	ALS Bottle#:	20	Worklist Smp#:	22
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		
Column:	RTX-VMS (40m) (0.18 mm)	Detector	MS SCAN		

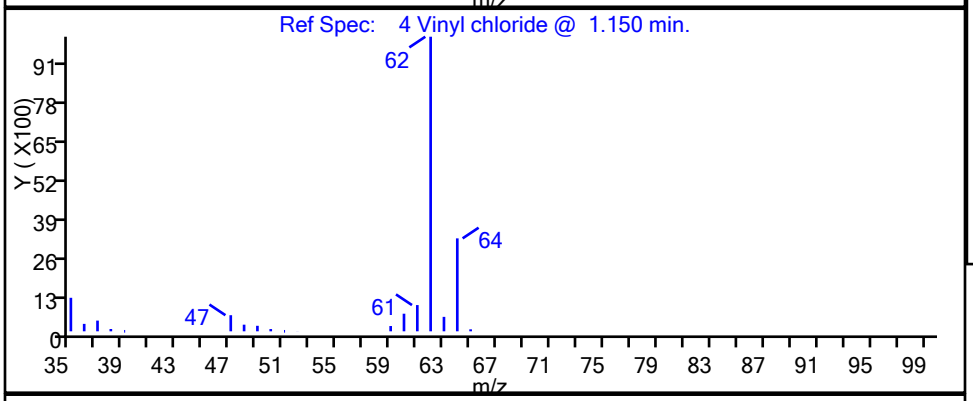
4 Vinyl chloride, CAS: 75-01-4

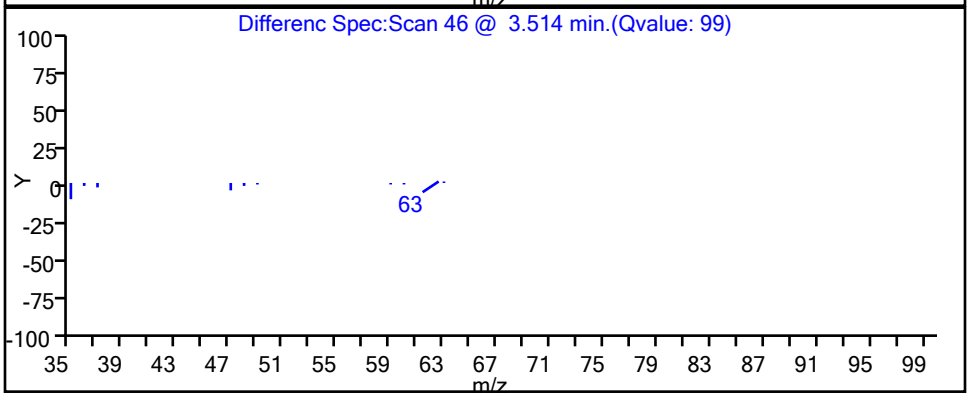












FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-NB50-021517 | Lab Sample ID: 160-21079-10

Matrix: Water | Lab File ID: LSMP7592.D

Analysis Method: 8260C | Date Collected: 02/15/2017 15:10

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 18:32

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.10
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.13
75-35-4	1,1-Dichloroethene	ND		1.0	0.10
75-34-3	1,1-Dichloroethane	ND		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.41
107-06-2	1,2-Dichloroethane	ND		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	ND		2.0	0.14
78-87-5	1,2-Dichloropropane	ND		1.0	0.10
78-93-3	2-Butanone	ND		5.0	0.47
591-78-6	2-Hexanone	ND		5.0	0.25
108-10-1	4-Methyl-2-pentanone	ND		5.0	0.22
67-64-1	Acetone	1.7	J	2.0	0.55
71-43-2	Benzene	ND		1.0	0.10
75-25-2	Bromoform	ND		1.0	0.17
74-83-9	Methyl bromide	ND		2.0	0.25
75-15-0	Carbon disulfide	ND		1.0	0.10
56-23-5	Carbon tetrachloride	ND		1.0	0.18
108-90-7	Chlorobenzene	ND		1.0	0.11
124-48-1	Chlorodibromomethane	ND		1.0	0.14
75-00-3	Chloroethane	ND		2.0	0.16
67-66-3	Chloroform	ND		1.0	0.10
74-87-3	Chloromethane	ND		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.16
75-27-4	Bromodichloromethane	ND		1.0	0.14
100-41-4	Ethylbenzene	ND		1.0	0.12
106-93-4	1,2-Dibromoethane	ND		1.0	0.13
75-09-2	Methylene Chloride	ND		1.0	0.27
71-36-3	n-Butanol	ND		50	12
100-42-5	Styrene	ND		1.0	0.13
127-18-4	Tetrachloroethene	ND		1.0	0.18
108-88-3	Toluene	ND		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-NB50-021517 | Lab Sample ID: 160-21079-10

Matrix: Water | Lab File ID: LSMP7592.D

Analysis Method: 8260C | Date Collected: 02/15/2017 15:10

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 18:32

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		1.0	0.25
108-05-4	Vinyl acetate	ND		2.0	0.18
75-01-4	Vinyl chloride	ND		2.0	0.19
1330-20-7	Xylenes, Total	ND		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	102		75-129
460-00-4	4-Bromofluorobenzene (Surr)	104		81-130
1868-53-7	Dibromofluoromethane (Surr)	99		81-124
2037-26-5	Toluene-d8 (Surr)	105		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7592.D
Lims ID: 160-21079-A-10
Client ID: GW-NB50-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 18:32:30 ALS Bottle#: 21 Worklist Smp#: 23
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-023
Misc. Info.: 160-21079-a-10
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:20:37

	Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
	3 Chloromethane	50		3.346				ND	
	4 Vinyl chloride	62		3.499				ND	
	6 Bromomethane	94		4.100				ND	
	7 Chloroethane	64		4.310				ND	
	12 1,1-Dichloroethene	96		5.371				ND	
	13 Carbon disulfide	76		5.413				ND	
S	15 1,2-Dichloroethene, Total	96		5.816				ND	
	20 Methylene Chloride	84		6.167				ND	
	21 Acetone	43	6.251	6.237	0.014	99	11090	1.71	
	22 trans-1,2-Dichloroethene	96		6.377				ND	
	30 1,1-Dichloroethane	63		7.103				ND	
	33 Vinyl acetate	43		7.340				ND	
	34 cis-1,2-Dichloroethene	96		7.675				ND	
	38 Chloroform	83		7.941				ND	
	40 Carbon tetrachloride	117		8.094				ND	
$	42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	94	296488	9.87	
	43 1,1,1-Trichloroethane	97		8.164				ND	
	45 2-Butanone (MEK)	43		8.248				ND	
	48 Benzene	78		8.527				ND	
$	53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	302099	10.2	
	54 1,2-Dichloroethane	62		8.723				ND	
*	55 Fluorobenzene	96	8.905	8.904	0.001	98	1623407	10.0	
	57 Trichloroethene	95		9.058				ND	
	59 n-Butanol	56		9.295				ND	
	62 1,2-Dichloropropane	63		9.561				ND	
	63 Dichlorobromomethane	83		9.589				ND	
	67 cis-1,3-Dichloropropene	75		10.161				ND	
$	68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	94	1517815	10.5	
	69 Toluene	92		10.371				ND	
	71 4-Methyl-2-pentanone (MIBK	43		10.692				ND	
	72 trans-1,3-Dichloropropene	75		10.734				ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
73 Tetrachloroethene	164		10.734				ND	
75 1,1,2-Trichloroethane	83		10.888				ND	
76 Chlorodibromomethane	129		11.069				ND	
79 Ethylene Dibromide	107		11.321				ND	
80 2-Hexanone	43		11.418				ND	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	87	1076211	10.0	
82 Ethylbenzene	91		11.754				ND	
84 Chlorobenzene	112		11.767				ND	
86 m-Xylene & p-Xylene	106		11.879				ND	
88 o-Xylene	106		12.284				ND	
89 Styrene	104		12.326				ND	
90 Bromoform	173		12.396				ND	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	441235	10.4	
95 1,1,2,2-Tetrachloroethane	83		13.010				ND	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	95	497124	10.0	
115 1,2-Dibromo-3-Chloropropan	157		15.147				ND	
117 1,2,4-Trichlorobenzene	180		15.804				ND	
S 119 Xylenes, Total	106		16.500				ND	

Reagents:

I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

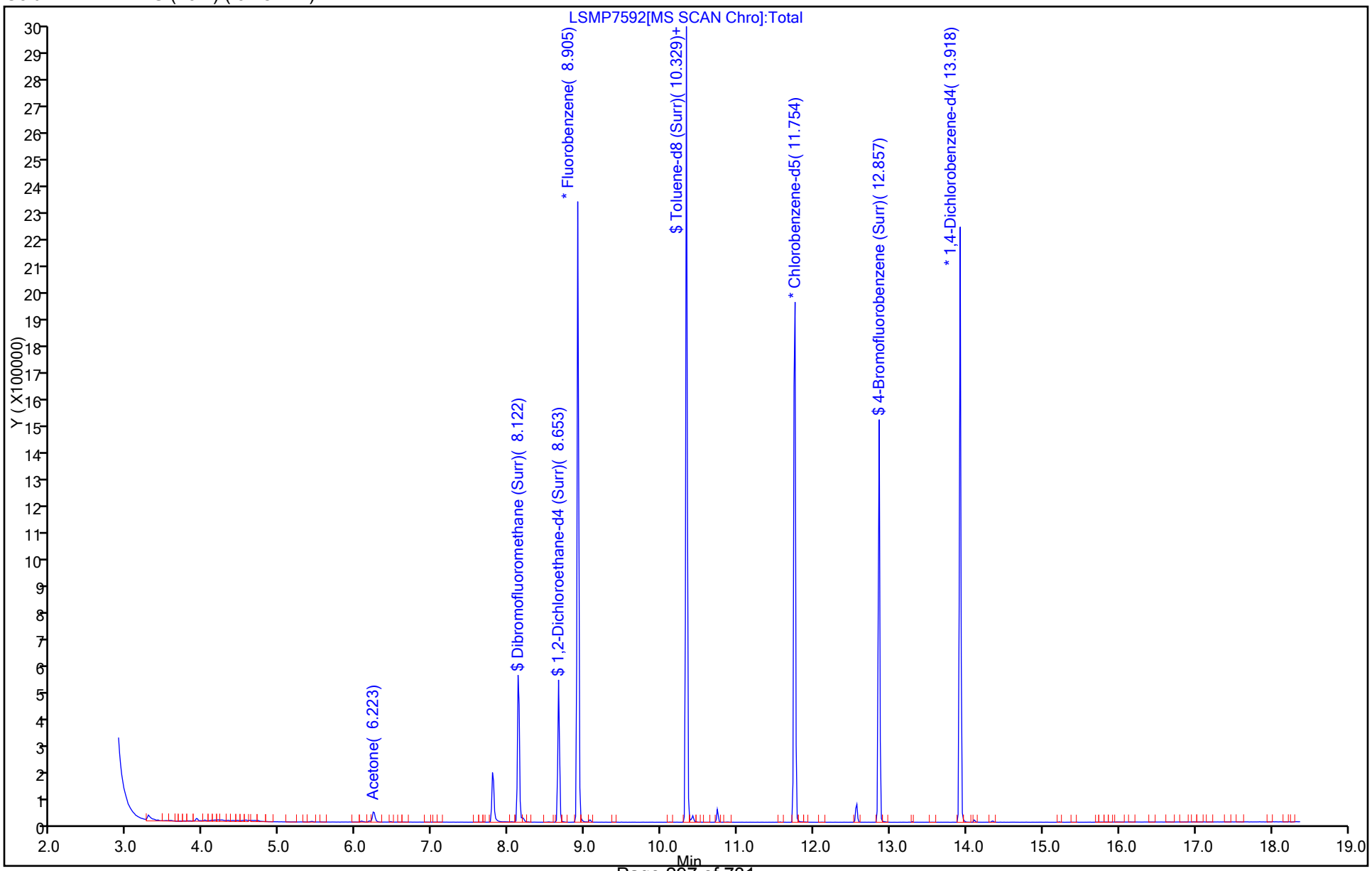
Report Date: 21-Feb-2017 08:25:00 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7592.D

Injection Date:	20-Feb-2017 18:32:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	160-21079-A-10	Lab Sample ID:	160-21079-10	Worklist Smp#:	23
Client ID:	GW-NB50-021517				
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	21
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7592.D
Lims ID: 160-21079-A-10
Client ID: GW-NB50-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 18:32:30 ALS Bottle#: 21 Worklist Smp#: 23
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-023
Misc. Info.: 160-21079-a-10
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:20:37

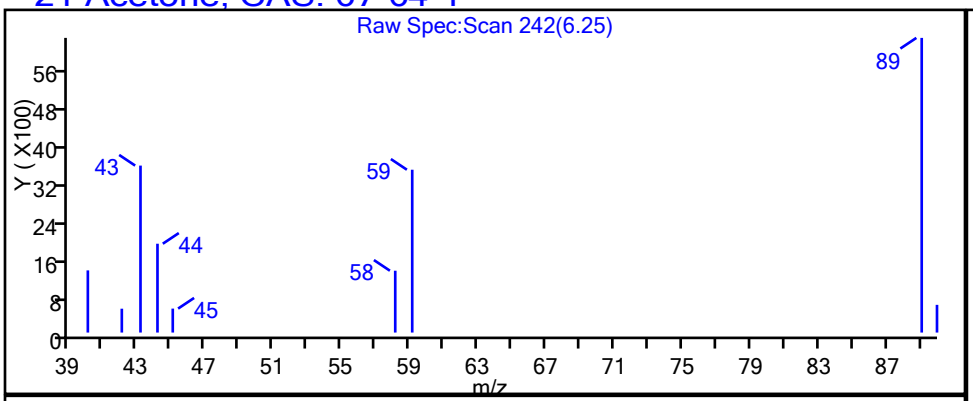
Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	9.87	98.71
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	10.2	102.05
$ 68 Toluene-d8 (Surr)	10.0	10.5	104.70
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.4	104.29

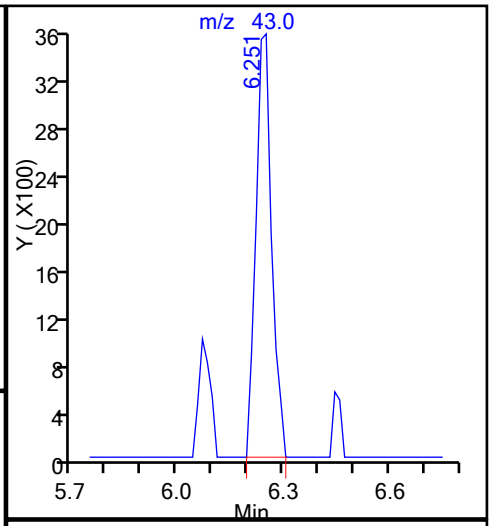
Report Date: 21-Feb-2017 08:25:00 Chrom Revision: 2.2 10-Jan-2017 11:26:10

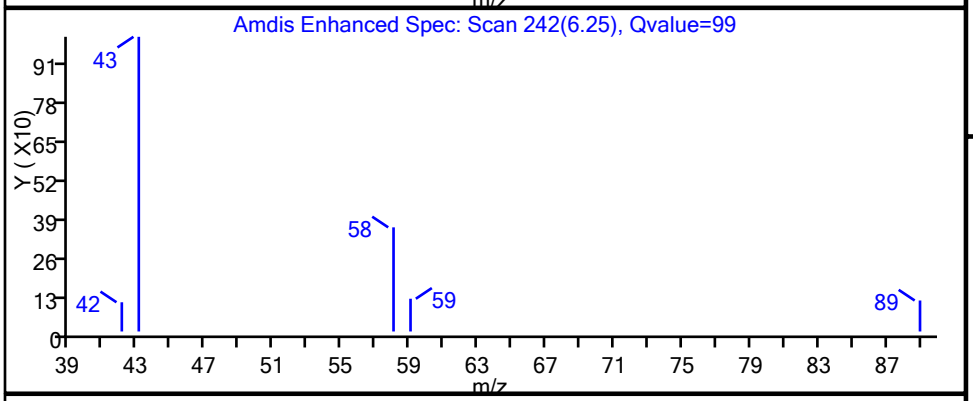
TestAmerica St. Louis

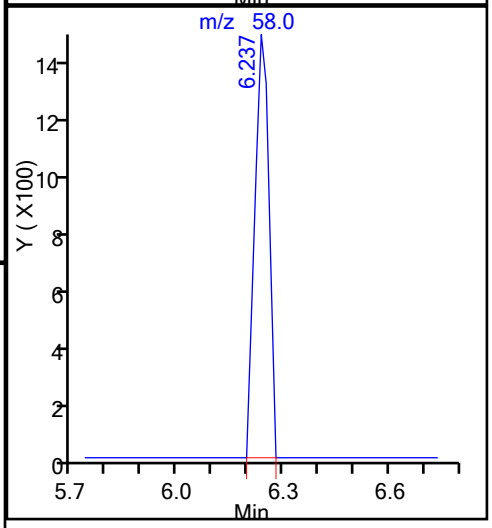
Data File:	\\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7592.D				
Injection Date:	20-Feb-2017 18:32:30	Instrument ID:	VMSL		
Lims ID:	160-21079-A-10	Lab Sample ID:	160-21079-10		
Client ID:	GW-NB50-021517				
Operator ID:	ADB	ALS Bottle#:	21	Worklist Smp#:	23
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		
Column:	RTX-VMS (40m) (0.18 mm)	Detector	MS SCAN		

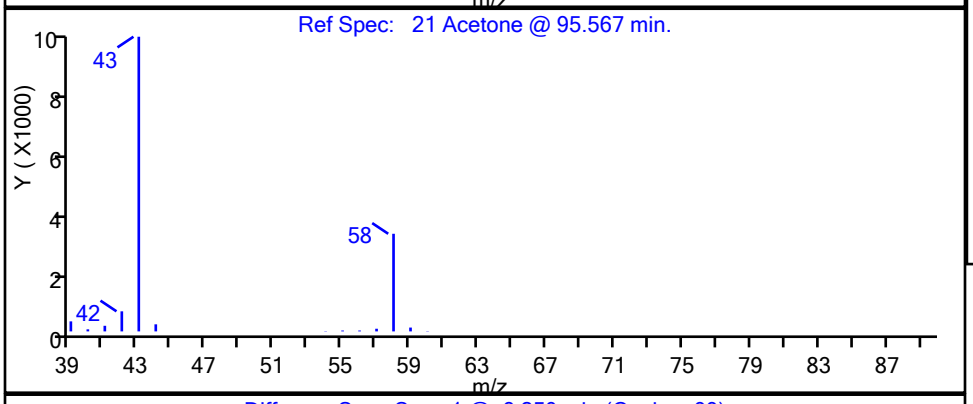
21 Acetone, CAS: 67-64-1

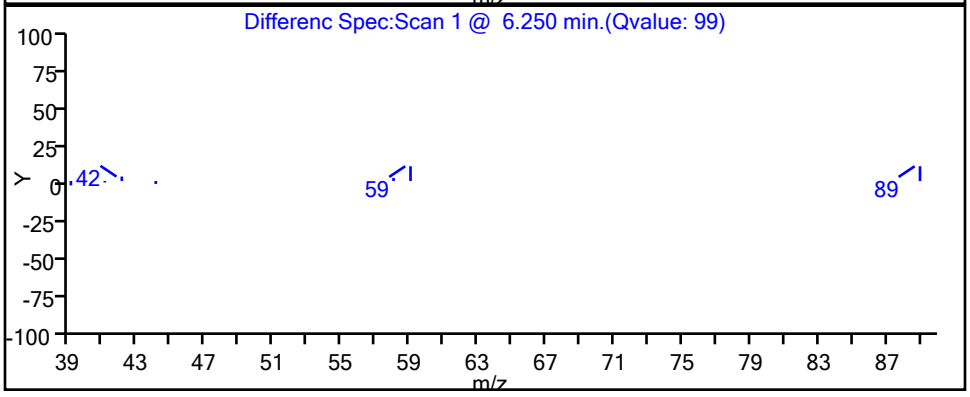












FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-NB57A-021517 | Lab Sample ID: 160-21079-11

Matrix: Water | Lab File ID: LSMP7593.D

Analysis Method: 8260C | Date Collected: 02/15/2017 15:55

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 18:57

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.10
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.13
75-35-4	1,1-Dichloroethene	ND		1.0	0.10
75-34-3	1,1-Dichloroethane	ND		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.41
107-06-2	1,2-Dichloroethane	ND		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	ND		2.0	0.14
78-87-5	1,2-Dichloropropane	ND		1.0	0.10
78-93-3	2-Butanone	ND		5.0	0.47
591-78-6	2-Hexanone	ND		5.0	0.25
108-10-1	4-Methyl-2-pentanone	ND		5.0	0.22
67-64-1	Acetone	0.57	J	2.0	0.55
71-43-2	Benzene	ND		1.0	0.10
75-25-2	Bromoform	ND		1.0	0.17
74-83-9	Methyl bromide	ND		2.0	0.25
75-15-0	Carbon disulfide	ND		1.0	0.10
56-23-5	Carbon tetrachloride	ND		1.0	0.18
108-90-7	Chlorobenzene	ND		1.0	0.11
124-48-1	Chlorodibromomethane	ND		1.0	0.14
75-00-3	Chloroethane	ND		2.0	0.16
67-66-3	Chloroform	ND		1.0	0.10
74-87-3	Chloromethane	ND		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.16
75-27-4	Bromodichloromethane	ND		1.0	0.14
100-41-4	Ethylbenzene	ND		1.0	0.12
106-93-4	1,2-Dibromoethane	ND		1.0	0.13
75-09-2	Methylene Chloride	ND		1.0	0.27
71-36-3	n-Butanol	ND		50	12
100-42-5	Styrene	ND		1.0	0.13
127-18-4	Tetrachloroethene	ND		1.0	0.18
108-88-3	Toluene	ND		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-NB57A-021517 | Lab Sample ID: 160-21079-11

Matrix: Water | Lab File ID: LSMP7593.D

Analysis Method: 8260C | Date Collected: 02/15/2017 15:55

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 18:57

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		1.0	0.25
108-05-4	Vinyl acetate	ND		2.0	0.18
75-01-4	Vinyl chloride	ND		2.0	0.19
1330-20-7	Xylenes, Total	ND		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	102		75-129
460-00-4	4-Bromofluorobenzene (Surr)	105		81-130
1868-53-7	Dibromofluoromethane (Surr)	105		81-124
2037-26-5	Toluene-d8 (Surr)	108		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7593.D
Lims ID: 160-21079-A-11
Client ID: GW-NB57A-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 18:57:30 ALS Bottle#: 22 Worklist Smp#: 24
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-024
Misc. Info.: 160-21079-a-11
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:20:51

	Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
	3 Chloromethane	50		3.346				ND	
	4 Vinyl chloride	62		3.499				ND	
	6 Bromomethane	94		4.100				ND	
	7 Chloroethane	64		4.310				ND	
	12 1,1-Dichloroethene	96		5.371				ND	
	13 Carbon disulfide	76		5.413				ND	
S	15 1,2-Dichloroethene, Total	96		5.816				ND	
	20 Methylene Chloride	84		6.167				ND	
	21 Acetone	43	6.251	6.237	0.014	98	7107	0.5688	
	22 trans-1,2-Dichloroethene	96		6.377				ND	
	30 1,1-Dichloroethane	63		7.103				ND	
	33 Vinyl acetate	43		7.340				ND	
	34 cis-1,2-Dichloroethene	96		7.675				ND	
	38 Chloroform	83		7.941				ND	
	40 Carbon tetrachloride	117		8.094				ND	
$	42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	93	307981	10.5	
	43 1,1,1-Trichloroethane	97		8.164				ND	
	45 2-Butanone (MEK)	43		8.248				ND	
	48 Benzene	78		8.527				ND	
$	53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	293646	10.2	
	54 1,2-Dichloroethane	62		8.723				ND	
*	55 Fluorobenzene	96	8.904	8.904	0.000	98	1581336	10.0	
	57 Trichloroethene	95		9.058				ND	
	59 n-Butanol	56		9.295				ND	
	62 1,2-Dichloropropane	63		9.561				ND	
	63 Dichlorobromomethane	83		9.589				ND	
	67 cis-1,3-Dichloropropene	75		10.161				ND	
$	68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	94	1487854	10.8	
	69 Toluene	92		10.371				ND	
	71 4-Methyl-2-pentanone (MIBK	43		10.692				ND	
	72 trans-1,3-Dichloropropene	75		10.734				ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ug/l	Flags
73 Tetrachloroethene	164		10.734				ND	
75 1,1,2-Trichloroethane	83		10.888				ND	
76 Chlorodibromomethane	129		11.069				ND	
79 Ethylene Dibromide	107		11.321				ND	
80 2-Hexanone	43		11.418				ND	
* 83 Chlorobenzene-d5	117	11.753	11.754	-0.001	87	1024273	10.0	
82 Ethylbenzene	91		11.754				ND	
84 Chlorobenzene	112		11.767				ND	
86 m-Xylene & p-Xylene	106		11.879				ND	
88 o-Xylene	106		12.284				ND	
89 Styrene	104		12.326				ND	
90 Bromoform	173		12.396				ND	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	431513	10.5	
95 1,1,2,2-Tetrachloroethane	83		13.010				ND	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	96	483834	10.0	
115 1,2-Dibromo-3-Chloropropan	157		15.147				ND	
117 1,2,4-Trichlorobenzene	180		15.804				ND	
S 119 Xylenes, Total	106		16.500				ND	

Reagents:

I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

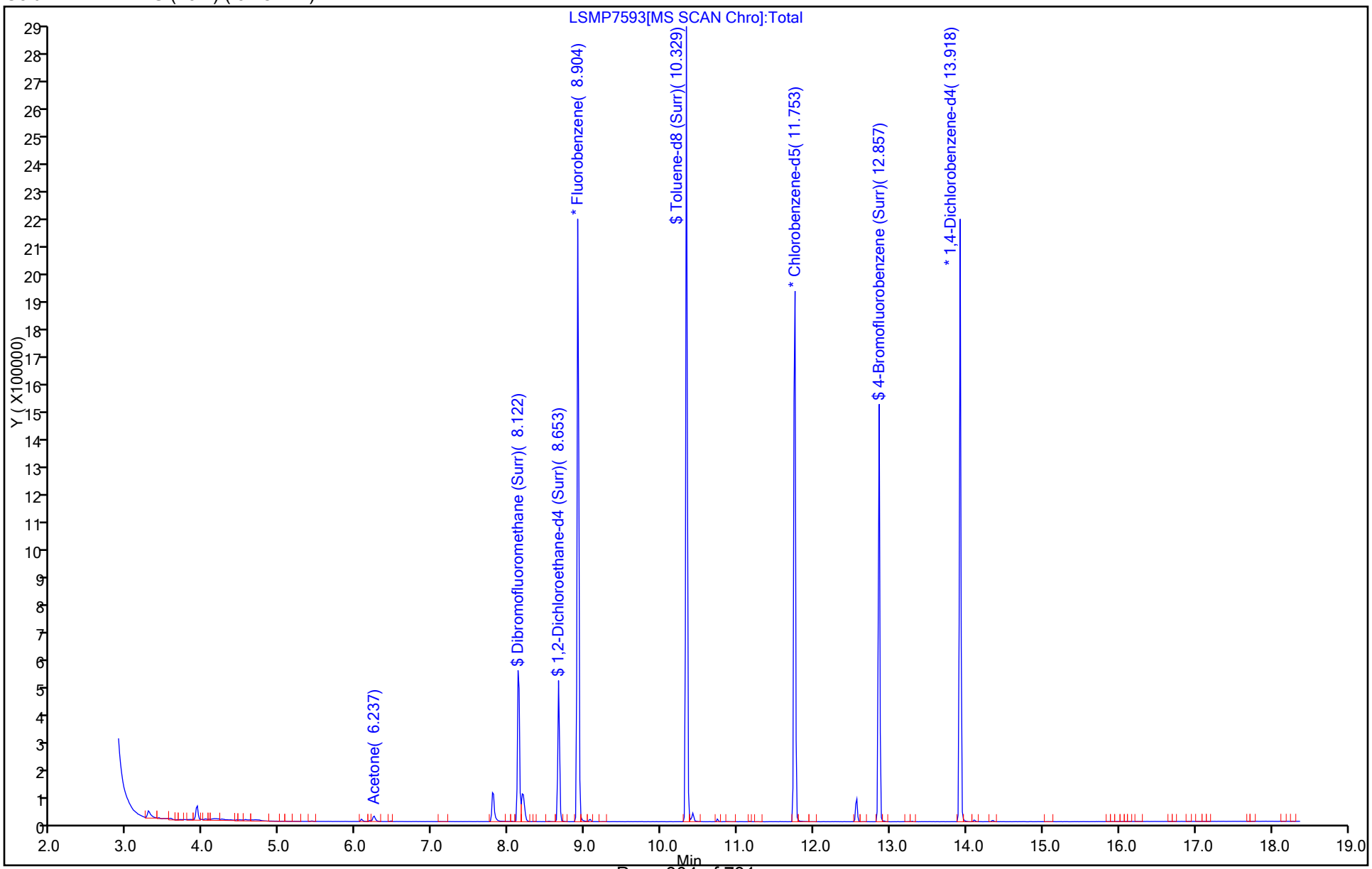
Report Date: 21-Feb-2017 08:24:58 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7593.D

Injection Date:	20-Feb-2017 18:57:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	160-21079-A-11	Lab Sample ID:	160-21079-11	Worklist Smp#:	24
Client ID:	GW-NB57A-021517				
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	22
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7593.D
Lims ID: 160-21079-A-11
Client ID: GW-NB57A-021517
Sample Type: Client
Inject. Date: 20-Feb-2017 18:57:30 ALS Bottle#: 22 Worklist Smp#: 24
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-024
Misc. Info.: 160-21079-a-11
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:20:51

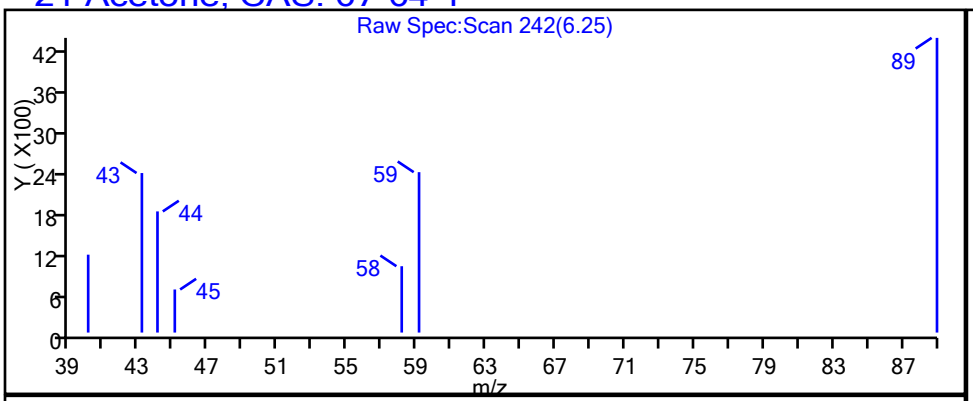
Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	10.5	105.26
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	10.2	101.83
$ 68 Toluene-d8 (Surr)	10.0	10.8	107.84
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.5	104.80

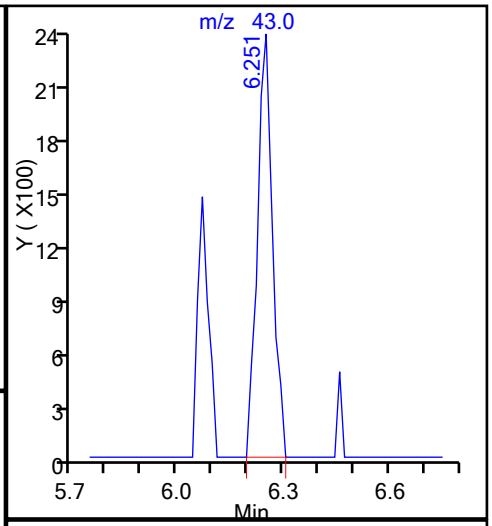
Report Date: 21-Feb-2017 08:24:59 Chrom Revision: 2.2 10-Jan-2017 11:26:10

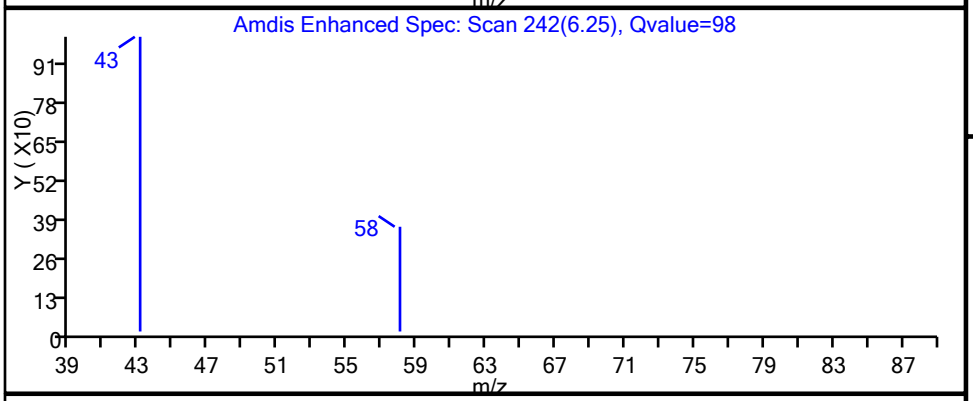
TestAmerica St. Louis

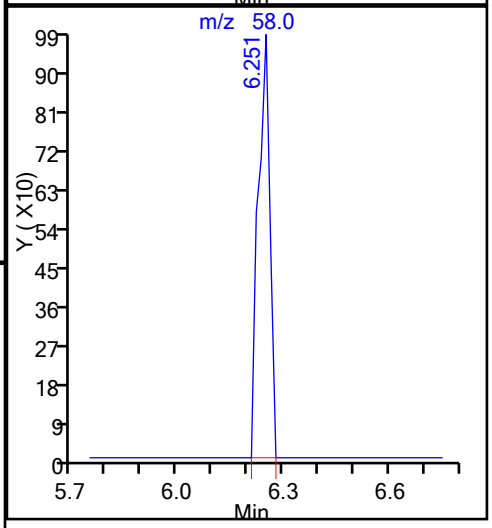
Data File:	\\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7593.D				
Injection Date:	20-Feb-2017 18:57:30	Instrument ID:	VMSL		
Lims ID:	160-21079-A-11	Lab Sample ID:	160-21079-11		
Client ID:	GW-NB57A-021517				
Operator ID:	ADB	ALS Bottle#:	22	Worklist Smp#:	24
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		
Column:	RTX-VMS (40m) (0.18 mm)	Detector	MS SCAN		

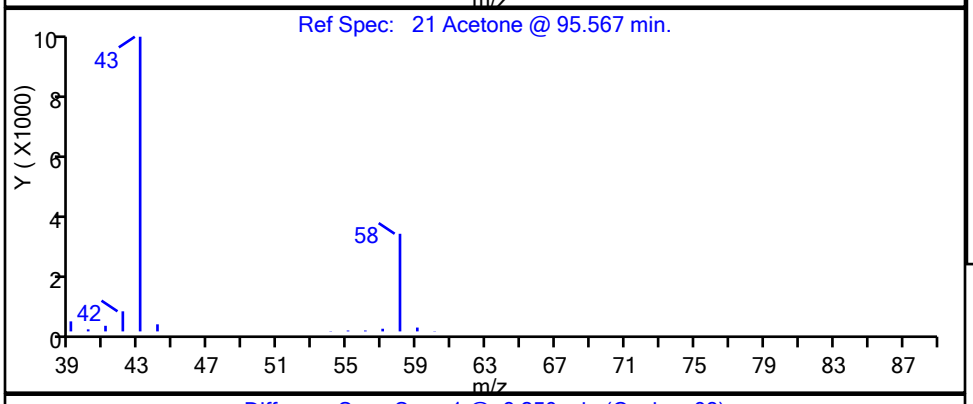
21 Acetone, CAS: 67-64-1

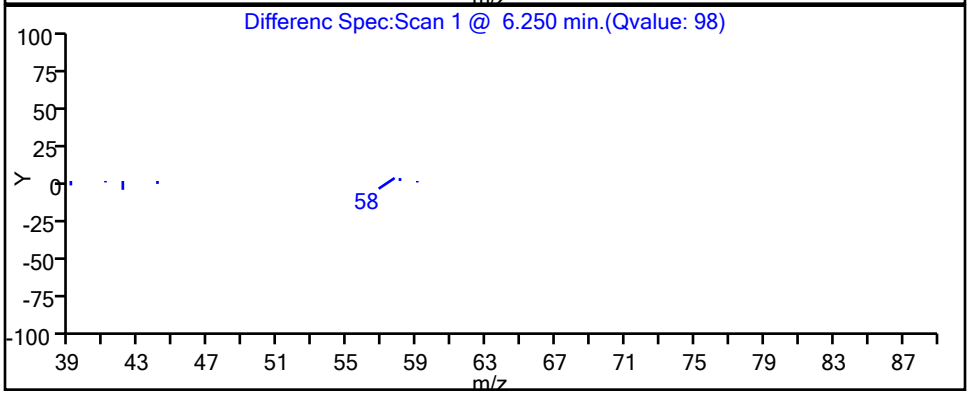












FORM VI
GC/MS VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1 Analy Batch No.: 292232

SDG No.:

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm) Heated Purge: (Y/N) Y

Calibration Start Date: 02/14/2017 12:23 Calibration End Date: 02/14/2017 14:56 Calibration ID: 12338

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 160-292232/6	LICL7558.D
Level 2	IC 160-292232/7	LICL7559.D
Level 3	IC 160-292232/8	LICL7560.D
Level 4	IC 160-292232/9	LICL7561.D
Level 5	ICIS 160-292232/10	LICL7562.D
Level 6	IC 160-292232/11	LICL7563.D
Level 7	IC 160-292232/12	LICL7564.D

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Dichlorodifluoromethane	0.3766 0.3608	0.3591 0.3358	0.3387	0.3536	0.3477	Ave		0.3532			0.1000	4.0		20.0			
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.1791 0.1838	0.1712 0.1743	0.1694	0.1782	0.1781	Ave		0.1763			0.0100	2.8		20.0			
Chloromethane	0.4184 0.3788	0.3897 0.3612	0.3705	0.3683	0.3494	Ave		0.3766			0.1000	5.9		20.0			
Vinyl chloride	0.3964 0.3898	0.3790 0.3687	0.3604	0.3752	0.3753	Ave		0.3778			0.1000	3.2		20.0			
Butadiene	0.4235 0.4153	0.4050 0.3832	0.3987	0.4109	0.4015	Ave		0.4055			0.0100	3.2		20.0			
Methyl bromide	0.1910 0.1594	0.1807 0.1593	0.1808	0.1678	0.1623	Ave		0.1716			0.1000	7.3		20.0			
Chloroethane	0.2480 0.2164	0.2302 0.2022	0.2141	0.2249	0.2136	Ave		0.2214			0.1000	6.7		20.0			
Trichlorofluoromethane	0.5092 0.4534	0.4800 0.4426	0.4475	0.4670	0.4529	Ave		0.4647			0.1000	5.0		20.0			
Dichlorofluoromethane	0.5410 0.4872	0.5116 0.4552	0.4955	0.4975	0.4815	Ave		0.4956			0.0100	5.4		20.0			
Ethyl ether	0.0817 0.0945	0.0737 0.0902	0.0787	0.0821	0.0844	Ave		0.0836			0.0100	8.3		20.0			
Ethanol	0.0010 0.0007	0.0007 0.0007	0.0008	0.0007	0.0007	Ave		0.0008		*	0.0010	12.2		20.0			
1,1-Dichloroethene	0.2688 0.2733	0.2501 0.2700	0.2482	0.2601	0.2661	Ave		0.2624			0.1000	3.8		20.0			
Carbon disulfide	0.9421 0.9486	0.9121 0.9265	0.8857	0.9333	0.9475	Ave		0.9280			0.1000	2.4		20.0			
1,1,2-Trichloro-1,2,2-trifluoroethane	0.2696 0.2567	0.2575 0.2458	0.2461	0.2587	0.2523	Ave		0.2552			0.1000	3.2		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
GC/MS VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1 Analy Batch No.: 292232

SDG No.:

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm) Heated Purge: (Y/N) Y

Calibration Start Date: 02/14/2017 12:23 Calibration End Date: 02/14/2017 14:56 Calibration ID: 12338

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Iodomethane	0.1604 0.2120	0.1327 0.2155	0.1271	0.1436	0.1848	Lin1	-0.075	0.2100			0.0100				0.9920		0.9900
Acrolein	0.0096 0.0124	0.0093 0.0121	0.0100	0.0099	0.0111	Ave		0.0106			0.0010	11.7		20.0			
Allyl chloride	0.2945 0.3304	0.2901 0.3105	0.2846	0.3112	0.3181	Ave		0.3056			0.0100	5.4		20.0			
Isopropyl alcohol	0.0035 0.0040	0.0032 0.0038	0.0031	0.0033	0.0034	Ave		0.0035		*	0.0100	9.3		20.0			
Methylene Chloride	0.2332 0.2170	0.2174 0.2054	0.2247	0.2172	0.2104	Ave		0.2179			0.1000	4.2		20.0			
Acetone	0.0850 0.0232	0.0513 0.0204	0.0384	0.0314	0.0242	Lin1	0.0333	0.0204		*	0.1000				0.9970		0.9900
trans-1,2-Dichloroethene	0.2679 0.2809	0.2711 0.2746	0.2709	0.2738	0.2784	Ave		0.2739			0.1000	1.7		20.0			
Methyl acetate	0.0105 0.0125	0.0096 0.0116	0.0108	0.0112	0.0113	Ave		0.0111		*	0.1000	8.1		20.0			
Hexane	0.0841 0.1034	0.0853 0.1030	0.0849	0.0982	0.1037	Ave		0.0946			0.0100	10.0		20.0			
Methyl tert-butyl ether	0.2705 0.3235	0.2593 0.3158	0.2717	0.2830	0.2852	Ave		0.2870			0.1000	8.4		20.0			
tert-Butyl alcohol	0.0040 0.0046	0.0038 0.0047	0.0038	0.0041	0.0040	Ave		0.0041		*	0.0100	8.5		20.0			
Acetonitrile	0.0117 0.0092	0.0098 0.0085	0.0098	0.0090	0.0085	Ave		0.0095			0.0010	11.6		20.0			
Isopropyl ether	0.5537 0.7370	0.5533 0.6993	0.5881	0.6314	0.6636	Ave		0.6323			0.0100	11.3		20.0			
2-Chloro-1,3-butadiene	0.3973 0.5300	0.4153 0.5223	0.4224	0.4811	0.5130	Ave		0.4688			0.0100	12.0		20.0			
1,1-Dichloroethane	0.5215 0.5043	0.4988 0.4785	0.4963	0.4965	0.4924	Ave		0.4983			0.2000	2.6		20.0			
Acrylonitrile	0.0277 0.0308	0.0275 0.0285	0.0300	0.0292	0.0288	Ave		0.0289			0.0100	4.2		20.0			
Tert-butyl ethyl ether	0.3860 0.5140	0.3610 0.5081	0.3856	0.4170	0.4432	Ave		0.4307			0.0100	14.1		20.0			
Vinyl acetate	0.1726 0.2303	0.1716 0.2262	0.2043	0.1999	0.2088	Ave		0.2020			0.0100	11.5		20.0			
cis-1,2-Dichloroethene	0.2616 0.2726	0.2451 0.2634	0.2506	0.2578	0.2634	Ave		0.2592			0.1000	3.5		20.0			
2,2-Dichloropropane	0.3364 0.3544	0.3278 0.3644	0.3091	0.3320	0.3429	Ave		0.3381			0.0100	5.3		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
GC/MS VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1 Analy Batch No.: 292232

SDG No.:

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm) Heated Purge: (Y/N) Y

Calibration Start Date: 02/14/2017 12:23 Calibration End Date: 02/14/2017 14:56 Calibration ID: 12338

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Bromochloromethane	0.0856 0.0843	0.0829 0.0784	0.0858	0.0835	0.0814	Ave		0.0831			0.0100	3.1		20.0			
Cyclohexane	0.4223 0.5125	0.4407 0.5062	0.4370	0.4930	0.5193	Ave		0.4759			0.1000	8.6		20.0			
Chloroform	0.4539 0.4407	0.4306 0.4185	0.4327	0.4325	0.4322	Ave		0.4344			0.2000	2.5		20.0			
Ethyl acetate	0.0063 0.0113	0.0073 0.0111	0.0078	0.0088	0.0098	Lin1	-0.007	0.0110			0.0100				0.9970		0.9900
Carbon tetrachloride	0.3874 0.3997	0.3862 0.3960	0.3746	0.3949	0.4024	Ave		0.3916			0.1000	2.4		20.0			
Tetrahydrofuran	0.0045 0.0082	0.0054 0.0081	0.0058	0.0060	0.0071	Lin1	-0.006	0.0080			0.0010				0.9960		0.9900
1,1,1-Trichloroethane	0.4471 0.4603	0.4366 0.4498	0.4273	0.4517	0.4572	Ave		0.4471			0.1000	2.6		20.0			
2-Butanone	0.1179 0.0353	0.0703 0.0337	0.0525	0.0422	0.0359	Lin1	0.0405	0.0327		*	0.1000				1.0000		0.9900
1,1-Dichloropropene	0.3619 0.4052	0.3655 0.4007	0.3618	0.3869	0.4110	Ave		0.3847			0.0100	5.6		20.0			
Isooctane	1.1689 1.4376	1.2201 1.3885	1.2377	1.3973	1.4360	Ave		1.3266			0.0100	8.6		20.0			
n-Heptane	0.4934 0.5731	0.5383 0.5693	0.5369	0.5816	0.6110	Ave		0.5576			0.0100	6.8		20.0			
Benzene	1.1494 1.0727	1.1040 1.0250	1.0951	1.0815	1.0777	Ave		1.0865			0.5000	3.4		20.0			
Propionitrile	0.0113 0.0116	0.0106 0.0107	0.0113	0.0110	0.0107	Ave		0.0110			0.0010	3.5		20.0			
Methacrylonitrile	0.0573 0.0638	0.0574 0.0570	0.0613	0.0600	0.0597	Ave		0.0595			0.0100	4.2		20.0			
Tert-amyl methyl ether	0.2521 0.3338	0.2409 0.3358	0.2511	0.2721	0.2858	Ave		0.2817			0.0100	13.9		20.0			
Isobutanol	0.0012 0.0018	0.0013 0.0019	0.0014	0.0015	0.0016	Ave		0.0015			0.0010	16.8		20.0			
1,2-Dichloroethane	0.2274 0.2207	0.2221 0.2043	0.2260	0.2169	0.2130	Ave		0.2186			0.1000	3.7		20.0			
Methylcyclohexane	0.4849 0.4912	0.4861 0.4838	0.4686	0.4991	0.5170	Ave		0.4901			0.1000	3.1		20.0			
Trichloroethene	0.3175 0.2929	0.3061 0.2849	0.2983	0.3014	0.3018	Ave		0.3004			0.2000	3.4		20.0			
n-Butanol	0.0010 0.0018	0.0009 0.0019	0.0011	0.0012	0.0014	Lin	-0.054	0.0019		*	0.0100				0.9970		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
GC/MS VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1 Analy Batch No.: 292232

SDG No.:

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm) Heated Purge: (Y/N) Y

Calibration Start Date: 02/14/2017 12:23 Calibration End Date: 02/14/2017 14:56 Calibration ID: 12338

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Dibromomethane	0.0807 0.0803	0.0773 0.0755	0.0800	0.0766	0.0760	Ave		0.0781			0.0100	2.8		20.0			
Ethyl acrylate	0.0649 0.1123	0.0633 0.1119	0.0694	0.0799	0.0905	Lin1	-0.045	0.1096			0.0100				0.9920		0.9900
1,2-Dichloropropane	0.2233 0.2338	0.2130 0.2239	0.2225	0.2213	0.2244	Ave		0.2232			0.1000	2.7		20.0			
Bromodichloromethane	0.2385 0.2615	0.2339 0.2535	0.2415	0.2407	0.2477	Ave		0.2453			0.2000	3.9		20.0			
Methyl methacrylate	0.0405 0.0685	0.0396 0.0663	0.0433	0.0501	0.0575	Lin1	-0.049	0.0660			0.0100				0.9950		0.9900
1,4-Dioxane	0.0002 0.0008	0.0005 0.0007	0.0005	0.0006	0.0007	Lin1	-0.006	0.0007		*	0.0010				0.9980		0.9900
2-Chloroethyl vinyl ether	0.0246 0.0433	0.0256 0.0419	0.0310	0.0325	0.0393	Lin1	-0.015	0.0422			0.0100				0.9970		0.9900
cis-1,3-Dichloropropene	0.2235 0.3052	0.2206 0.3015	0.2394	0.2576	0.2826	Ave		0.2615			0.2000	13.6		20.0			
Toluene	0.9223 1.0423	0.9397 1.0218	0.9456	1.0209	1.0426	Ave		0.9907			0.4000	5.3		20.0			
2-Nitropropane	0.0215 0.0320	0.0189 0.0336	0.0210	0.0223	0.0247	Lin	-0.070	0.0340			0.0100				0.9970		0.9900
4-Methyl-2-pentanone	0.0637 0.1049	0.0660 0.1092	0.0729	0.0736	0.0840	Lin1	-0.041	0.1049			0.1000				0.9900		0.9900
Tetrachloroethene	0.3976 0.3726	0.3896 0.3710	0.3665	0.3790	0.3944	Ave		0.3815			0.2000	3.2		20.0			
trans-1,3-Dichloropropene	0.2532 0.3562	0.2423 0.3390	0.2552	0.2930	0.3173	Ave		0.2937			0.1000	15.4		20.0			
Ethyl methacrylate	0.0950 0.2171	0.1037 0.2188	0.1068	0.1464	0.1767	Lin1	-0.110	0.2140			0.0100				0.9910		0.9900
1,1,2-Trichloroethane	0.1515 0.1551	0.1450 0.1450	0.1456	0.1469	0.1447	Ave		0.1477			0.1000	2.7		20.0			
Chlorodibromomethane	0.1853 0.2262	0.1771 0.2211	0.1872	0.1965	0.2039	Ave		0.1996			0.1000	9.3		20.0			
1,3-Dichloropropane	0.3260 0.3415	0.3066 0.3214	0.3039	0.3187	0.3158	Ave		0.3191			0.0100	3.9		20.0			
n-Butyl acetate	0.1055 0.2020	0.1055 0.2116	0.1087	0.1238	0.1507	Qua	-0.145	0.1813	0.0008714		0.0100				0.9980		0.9900
1,2-Dibromoethane	0.1473 0.1656	0.1384 0.1578	0.1422	0.1481	0.1511	Ave		0.1501			0.1000	6.1		20.0			
2-Hexanone	0.0497 0.0816	0.0486 0.0789	0.0547	0.0655	0.0717	Lin1	-0.026	0.0792		*	0.1000				0.9970		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
GC/MS VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1 Analy Batch No.: 292232

SDG No.:

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm) Heated Purge: (Y/N) Y

Calibration Start Date: 02/14/2017 12:23 Calibration End Date: 02/14/2017 14:56 Calibration ID: 12338

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Ethylbenzene	1.9946 1.9139	2.0112 1.8454	1.9175	1.9523	2.0380	Ave		1.9533			0.1000	3.4		20.0			
Chlorobenzene	1.1058 0.9945	1.0410 0.9710	1.0166	1.0092	1.0112	Ave		1.0213			0.5000	4.2		20.0			
1,1,1,2-Tetrachloroethane	0.3090 0.3269	0.2873 0.3222	0.2895	0.3072	0.3129	Ave		0.3079			0.0100	4.9		20.0			
m-Xylene & p-Xylene	0.6621 0.7542	0.6855 0.7741	0.6868	0.7337	0.7950	Ave		0.7273			0.1000	6.9		20.0			
o-Xylene	0.4971 0.6894	0.5396 0.7059	0.5611	0.6334	0.6932	Ave		0.6171			0.3000	13.7		20.0			
Styrene	0.7106 1.0469	0.7693 1.0621	0.8422	0.9454	1.0419	Ave		0.9169			0.3000	15.7		20.0			
Bromoform	0.2007 0.2419	0.1781 0.2343	0.1832	0.1983	0.1996	Ave		0.2052			0.1000	11.8		20.0			
Isopropylbenzene	3.2522 4.0882	3.5263 4.0520	3.5303	3.9401	4.2615	Ave		3.8072			0.1000	9.7		20.0			
N-Propylbenzene	3.5942 4.5835	4.1031 4.4044	4.1343	4.5162	4.9238	Ave		4.3228			0.0100	9.9		20.0			
Bromobenzene	0.7801 0.7981	0.7582 0.7809	0.7427	0.7756	0.7708	Ave		0.7723			0.0100	2.3		20.0			
1,1,2,2-Tetrachloroethane	0.3601 0.3681	0.3295 0.3367	0.3260	0.3380	0.3253	Ave		0.3405			0.3000	5.0		20.0			
1,3,5-Trimethylbenzene	2.2920 3.2413	2.6489 3.2416	2.7272	3.0541	3.3586	Ave		2.9377			0.0100	13.3		20.0			
2-Chlorotoluene	2.7177 2.9574	2.9311 2.9237	2.8598	2.9759	3.0354	Ave		2.9144			0.0100	3.5		20.0			
1,2,3-Trichloropropane	0.1320 0.1218	0.1067 0.1089	0.1058	0.1118	0.1071	Ave		0.1134			0.0100	8.7		20.0			
trans-1,4-Dichloro-2-butene	0.1015 0.1157	0.0928 0.1063	0.0886	0.1034	0.0968	Ave		0.1007			0.0100	9.0		20.0			
Cyclohexanone	0.0106 0.0069	0.0058 0.0072	0.0048	0.0049	0.0054	Lin	-0.061	0.0073			0.0010				0.9960		0.9900
4-Chlorotoluene	2.2270 2.6132	2.3480 2.6157	2.3621	2.5374	2.6751	Ave		2.4826			0.0100	6.8		20.0			
tert-Butylbenzene	2.3116 2.9114	2.5712 2.9910	2.6177	2.8548	3.1118	Ave		2.7671			0.0100	10.1		20.0			
1,2,4-Trimethylbenzene	2.4529 3.2089	2.8187 3.2010	2.9038	3.1370	3.3178	Ave		3.0057			0.0100	10.0		20.0			
sec-Butylbenzene	3.7404 4.4564	4.2692 4.4299	4.2354	4.4413	4.8751	Ave		4.3497			0.0100	7.8		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
GC/MS VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1 Analy Batch No.: 292232

SDG No.:

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm) Heated Purge: (Y/N) Y

Calibration Start Date: 02/14/2017 12:23 Calibration End Date: 02/14/2017 14:56 Calibration ID: 12338

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
4-Isopropyltoluene	2.7240 3.6714	3.2437 3.6819	3.3453	3.5999	3.9900	Ave		3.4652			0.0100	11.8		20.0			
1,3-Dichlorobenzene	1.7112 1.6313	1.6401 1.6372	1.5940	1.6161	1.6441	Ave		1.6391			0.6000	2.2		20.0			
1,2,3-Trimethylbenzene	2.6958 2.9983	2.7746 2.9472	2.7171	2.8809	2.9732	Ave		2.8553			0.0100	4.4		20.0			
1,4-Dichlorobenzene	1.8089 1.5982	1.6726 1.5562	1.6085	1.6394	1.6078	Ave		1.6417			0.5000	5.0		20.0			
n-Butylbenzene	0.7507 0.9639	0.8454 1.0112	0.8667	0.9214	1.0441	Ave		0.9148			0.0100	11.2		20.0			
Benzyl chloride	0.0851 0.1216	0.0760 0.1279	0.0736	0.0851	0.1000	Lin	-0.127	0.1296			0.0100				0.9980		0.9900
1,2-Dichlorobenzene	1.3319 1.3346	1.2906 1.3117	1.2520	1.2878	1.3054	Ave		1.3020			0.4000	2.2		20.0			
Nonanal	0.0812 0.2714	0.0659 0.3269	0.0575	0.0903	0.1522	Qua	-0.271	0.1928	0.0035677		0.0100				0.9960		0.9900
1,2-Dibromo-3-Chloropropane	0.0525 0.0681	0.0420 0.0648	0.0454	0.0520	0.0551	Ave		0.0543			0.0500	17.5		20.0			
1,3,5-Trichlorobenzene	1.2500 1.3246	1.2593 1.3287	1.2344	1.2970	1.3334	Ave		1.2896			0.0100	3.2		20.0			
Hexachlorobutadiene	0.8008 0.7325	0.8157 0.7898	0.7716	0.7500	0.8106	Ave		0.7815			0.0100	4.0		20.0			
1,2,4-Trichlorobenzene	0.9307 1.0174	0.8770 1.0163	0.8742	0.9338	0.9771	Ave		0.9466			0.2000	6.3		20.0			
Naphthalene	0.8167 1.2337	0.7215 1.2059	0.7620	0.9364	1.0493	Lin1	-0.421	1.1967			0.0100				0.9950		0.9900
1,2,3-Trichlorobenzene	0.7550 0.8023	0.7040 0.7957	0.7155	0.7454	0.7625	Ave		0.7544			0.0100	4.9		20.0			
Dibromofluoromethane (Surr)	0.1827 0.1841	0.1869 0.2017	0.1794	0.1780	0.1824	Ave		0.1850			0.0100	4.3		20.0			
1,2-Dichloroethane-d4 (Surr)	0.1934 0.1721	0.1933 0.1832	0.1877	0.1755	0.1713	Ave		0.1824			0.0100	5.2		20.0			
Toluene-d8 (Surr)	1.2437 1.3606	1.3166 1.5126	1.2477	1.3487	1.3994	Ave		1.3470			0.0100	6.9		20.0			
4-Bromofluorobenzene (Surr)	0.7898 0.8802	0.8095 1.0122	0.7761	0.8259	0.8636	Ave		0.8510			0.0100	9.4		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
GC/MS VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1 Analy Batch No.: 292232

SDG No.:

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm) Heated Purge: (Y/N) Y

Calibration Start Date: 02/14/2017 12:23 Calibration End Date: 02/14/2017 14:56 Calibration ID: 12338

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 160-292232/6	LICL7558.D
Level 2	IC 160-292232/7	LICL7559.D
Level 3	IC 160-292232/8	LICL7560.D
Level 4	IC 160-292232/9	LICL7561.D
Level 5	ICIS 160-292232/10	LICL7562.D
Level 6	IC 160-292232/11	LICL7563.D
Level 7	IC 160-292232/12	LICL7564.D

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (UG/L)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Dichlorodifluoromethane	FB	Ave	32317 1256427	62965 2636692	94786	251708	634852	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,2-Dichloro-1,1,2,2-tetrafluoroethane	FB	Ave	15370 639957	30017 1368515	47424	126813	325126	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Chloromethane	FB	Ave	35904 1318934	68333 2836166	103698	262120	637841	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Vinyl chloride	FB	Ave	34020 1357335	66452 2894691	100871	267048	685127	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Butadiene	FB	Ave	36342 1446021	71008 3009031	111598	292450	733049	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Methyl bromide	FB	Ave	16388 555055	31686 1250968	50603	119430	296249	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Chloroethane	FB	Ave	21278 753649	40368 1587780	59909	160105	389941	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Trichlorofluoromethane	FB	Ave	43698 1578822	84155 3474861	125236	332352	826896	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Dichlorofluoromethane	FB	Ave	46428 1696388	89693 3574242	138674	354094	879082	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Ethyl ether	FB	Ave	7007 329022	12925 708611	22026	58409	154033	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Ethanol	FB	Ave	3265 102897	5143 225956	8956	20248	48991	20.0 800	40.0 1600	80.0	160	400
1,1-Dichloroethene	FB	Ave	23067 951766	43846 2119756	69478	185093	485900	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Carbon disulfide	FB	Ave	80844 3302911	159923 7274693	247896	664241	1729860	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,1,2-Trichloro-1,2,2-trifluoroethane	FB	Ave	23136 893873	45151 1929989	68871	184159	460534	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Iodomethane	FB	Lin1	13767 738223	23270 1692176	35578	102207	337296	0.500 20.0	1.00 40.0	2.00	4.00	10.0

FORM VI
GC/MS VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1 Analy Batch No.: 292232

SDG No.:

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm) Heated Purge: (Y/N) Y

Calibration Start Date: 02/14/2017 12:23 Calibration End Date: 02/14/2017 14:56 Calibration ID: 12338

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (UG/L)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Acrolein	FB	Ave	4127 216721	8152 474485	14001	35197	100915	2.50 100	5.00 200	10.0	20.0	50.0
Allyl chloride	FB	Ave	25271 1150529	50856 2437693	79649	221460	580706	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Isopropyl alcohol	FB	Ave	3020 137823	5659 302224	8671	23172	62222	5.00 200	10.0 400	20.0	40.0	100
Methylene Chloride	FB	Ave	20015 755598	38117 1612750	62888	154556	384047	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Acetone	FB	Lin1	7297 80703	8994 160101	10735	22339	44176	0.500 20.0	1.00 40.0	2.00	4.00	10.0
trans-1,2-Dichloroethene	FB	Ave	22988 978176	47530 2156075	75819	194844	508224	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Methyl acetate	FB	Ave	4493 217091	8455 455488	15092	39770	103417	2.50 100	5.00 200	10.0	20.0	50.0
Hexane	FB	Ave	7213 360150	14950 808431	23768	69908	189282	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Methyl tert-butyl ether	FB	Ave	23212 1126507	45467 2479651	76044	201413	520732	0.500 20.0	1.00 40.0	2.00	4.00	10.0
tert-Butyl alcohol	FB	Ave	3392 160322	6655 365472	10695	29002	73903	5.00 200	10.0 400	20.0	40.0	100
Acetonitrile	FB	Ave	10011 320302	17254 664114	27352	64145	155641	5.00 200	10.0 400	20.0	40.0	100
Isopropyl ether	FB	Ave	47515 2566082	97005 5490596	164592	449409	1211476	0.500 20.0	1.00 40.0	2.00	4.00	10.0
2-Chloro-1,3-butadiene	FB	Ave	34093 1845351	72819 4101400	118219	342420	936515	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,1-Dichloroethane	FB	Ave	44748 1756056	87461 3757018	138900	353362	898980	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Acrylonitrile	FB	Ave	23742 1073527	48173 2237698	84073	208110	526284	5.00 200	10.0 400	20.0	40.0	100
Tert-butyl ethyl ether	FB	Ave	33120 1789705	63297 3989127	107921	296816	809225	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Vinyl acetate	FB	Ave	14813 801797	30088 1775934	57193	142286	381135	0.500 20.0	1.00 40.0	2.00	4.00	10.0
cis-1,2-Dichloroethene	FB	Ave	22445 949313	42976 2068435	70138	183466	480896	0.500 20.0	1.00 40.0	2.00	4.00	10.0
2,2-Dichloropropane	FB	Ave	28867 1233952	57472 2860984	86524	236272	625960	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Bromochloromethane	FB	Ave	7343 293577	14532 615280	24000	59405	148543	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Cyclohexane	FB	Ave	36239 1784571	77268 3974985	122294	350857	948070	0.500 20.0	1.00 40.0	2.00	4.00	10.0

FORM VI
GC/MS VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1 Analy Batch No.: 292232

SDG No.:

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm) Heated Purge: (Y/N) Y

Calibration Start Date: 02/14/2017 12:23 Calibration End Date: 02/14/2017 14:56 Calibration ID: 12338

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (UG/L)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Chloroform	FB	Ave	38953 1534405	75489 3286289	121095	307859	789087	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Ethyl acetate	FB	Lin1	1086 78629	2556 173553	4384	12522	35763	1.00 40.0	2.00 80.0	4.00	8.00	20.0
Carbon tetrachloride	FB	Ave	33247 1391641	67711 3109164	104850	281071	734608	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Tetrahydrofuran	FB	Lin1	778 56935	1878 126688	3246	8609	25802	1.00 40.0	2.00 80.0	4.00	8.00	20.0
1,1,1-Trichloroethane	FB	Ave	38368 1602853	76552 3531719	119587	321490	834642	0.500 20.0	1.00 40.0	2.00	4.00	10.0
2-Butanone	FB	Lin1	10117 123054	12327 264324	14693	30021	65567	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,1-Dichloropropene	FB	Ave	31059 1410741	64090 3146503	101267	275394	750406	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Isooctane	FB	Ave	100302 5005583	213924 10902381	346406	994490	2621621	0.500 20.0	1.00 40.0	2.00	4.00	10.0
n-Heptane	FB	Ave	42342 1995284	94376 4469957	150266	413938	1115473	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Benzene	FB	Ave	98628 3735154	193558 8047817	306491	769748	1967570	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Propionitrile	FB	Ave	9664 404254	18650 838323	31748	78442	195483	5.00 200	10.0 400	20.0	40.0	100
Methacrylonitrile	FB	Ave	49134 2220679	100688 4476859	171441	427045	1090316	5.00 200	10.0 400	20.0	40.0	100
Tert-amyl methyl ether	FB	Ave	21636 1162260	42236 2636896	70287	193645	521833	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Isobutanol	FB	Ave	2487 156359	5703 365507	9832	26365	71036	12.5 500	25.0 1000	50.0	100	250
1,2-Dichloroethane	FB	Ave	19514 768531	38947 1603847	63265	154389	388949	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Methylcyclohexane	FB	Ave	41606 1710274	85220 3798739	131162	355259	943803	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Trichloroethene	FB	Ave	27241 1019746	53667 2236904	83494	214501	551055	0.500 20.0	1.00 40.0	2.00	4.00	10.0
n-Butanol	FB	Lin	2165 152940	3978 370033	7463	20579	64867	12.5 500	25.0 1000	50.0	100	250
Dibromomethane	FB	Ave	6929 279672	13554 593144	22385	54513	138772	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Ethyl acrylate	FB	Lin1	5569 390858	11095 878884	19435	56902	165140	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,2-Dichloropropane	FB	Ave	19161 813917	37349 1757801	62263	157474	409754	0.500 20.0	1.00 40.0	2.00	4.00	10.0

FORM VI
GC/MS VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1 Analy Batch No.: 292232

SDG No.:

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm) Heated Purge: (Y/N) Y

Calibration Start Date: 02/14/2017 12:23 Calibration End Date: 02/14/2017 14:56 Calibration ID: 12338

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (UG/L)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Bromodichloromethane	FB	Ave	20467 910493	41012 1990323	67584	171312	452220	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Methyl methacrylate	FB	Lin1	6949 477155	13895 1041364	24221	71341	209912	1.00 40.0	2.00 80.0	4.00	8.00	20.0
1,4-Dioxane	FB	Lin1	385 52672	1673 115692	2910	8490	25179	10.0 400	20.0 800	40.0	80.0	200
2-Chloroethyl vinyl ether	FB	Lin1	2111 150856	4488 329263	8671	23130	71667	0.500 20.0	1.00 40.0	2.00	4.00	10.0
cis-1,3-Dichloropropene	FB	Ave	19181 1062639	38685 2367621	66998	183326	515898	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Toluene	CBNZ d5	Ave	50973 2351671	110695 5242977	181421	477515	1272234	0.500 20.0	1.00 40.0	2.00	4.00	10.0
2-Nitropropane	CBNZ d5	Lin	2381 144356	4451 344381	8040	20833	60307	1.00 40.0	2.00 80.0	4.00	8.00	20.0
4-Methyl-2-pentanone	CBNZ d5	Lin1	3522 236579	7780 560481	13989	34405	102481	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Tetrachloroethene	CBNZ d5	Ave	21973 840730	45895 1903799	70322	177263	481253	0.500 20.0	1.00 40.0	2.00	4.00	10.0
trans-1,3-Dichloropropene	CBNZ d5	Ave	13992 803753	28538 1739577	48964	137047	387135	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Ethyl methacrylate	CBNZ d5	Lin1	5251 489901	12210 1122615	20484	68461	215566	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,1,2-Trichloroethane	CBNZ d5	Ave	8375 349969	17086 743923	27931	68699	176545	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Chlorodibromomethane	CBNZ d5	Ave	10242 510489	20866 1134461	35923	91923	248800	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,3-Dichloropropane	CBNZ d5	Ave	18014 770605	36119 1649148	58317	149063	385361	0.500 20.0	1.00 40.0	2.00	4.00	10.0
n-Butyl acetate	CBNZ d5	Qua	5833 455679	12423 1085856	20849	57900	183885	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,2-Dibromoethane	CBNZ d5	Ave	8142 373536	16303 809705	27278	69274	184418	0.500 20.0	1.00 40.0	2.00	4.00	10.0
2-Hexanone	CBNZ d5	Lin1	2749 184016	5726 405071	10489	30653	87490	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Ethylbenzene	CBNZ d5	Ave	110234 4318403	236921 9469134	367902	913138	2486865	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Chlorobenzene	CBNZ d5	Ave	61114 2243827	122627 4982702	195059	472052	1233906	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,1,1,2-Tetrachloroethane	CBNZ d5	Ave	17078 737681	33841 1653307	55546	143690	381864	0.500 20.0	1.00 40.0	2.00	4.00	10.0
m-Xylene & p-Xylene	CBNZ d5	Ave	36589 1701756	80746 3971961	131779	343185	970153	0.500 20.0	1.00 40.0	2.00	4.00	10.0

FORM VI
GC/MS VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1 Analy Batch No.: 292232

SDG No.:

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm) Heated Purge: (Y/N) Y

Calibration Start Date: 02/14/2017 12:23 Calibration End Date: 02/14/2017 14:56 Calibration ID: 12338

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (UG/L)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
o-Xylene	CBNZ d5	Ave	27473 1555500	63565 3621957	107660	296261	845841	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Styrene	CBNZ d5	Ave	39272 2362178	90624 5449977	161592	442182	1271324	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Bromoform	DCBd 4	Ave	5169 258142	10162 581518	17245	44391	120062	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Isopropylbenzene	DCBd 4	Ave	83777 4361986	201198 10055299	332264	881821	2562749	0.500 20.0	1.00 40.0	2.00	4.00	10.0
N-Propylbenzene	DCBd 4	Ave	92586 4890506	234106 10929700	389117	1010750	2961062	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Bromobenzene	DCBd 4	Ave	20095 851566	43258 1937781	69900	173592	463522	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,1,2,2-Tetrachloroethane	DCBd 4	Ave	9275 392709	18801 835618	30682	75638	195643	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,3,5-Trimethylbenzene	DCBd 4	Ave	59041 3458399	151136 8044316	256684	683531	2019769	0.500 20.0	1.00 40.0	2.00	4.00	10.0
2-Chlorotoluene	DCBd 4	Ave	70008 3155446	167238 7255220	269160	666024	1825409	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,2,3-Trichloropropane	DCBd 4	Ave	3401 129986	6087 270304	9955	25017	64386	0.500 20.0	1.00 40.0	2.00	4.00	10.0
trans-1,4-Dichloro-2-butene	DCBd 4	Ave	2615 123446	5294 263721	8335	23138	58231	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Cyclohexanone	DCBd 4	Lin	2727 74111	3312 179553	4529	11067	32256	5.00 200	10.0 400	20.0	40.0	100
4-Chlorotoluene	DCBd 4	Ave	57367 2788252	133966 6490968	222316	567876	1608761	0.500 20.0	1.00 40.0	2.00	4.00	10.0
tert-Butylbenzene	DCBd 4	Ave	59546 3106458	146703 7422275	246377	638927	1871331	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,2,4-Trimethylbenzene	DCBd 4	Ave	63188 3423809	160823 7943513	273297	702078	1995253	0.500 20.0	1.00 40.0	2.00	4.00	10.0
sec-Butylbenzene	DCBd 4	Ave	96353 4754921	243586 10993079	398627	993992	2931782	0.500 20.0	1.00 40.0	2.00	4.00	10.0
4-Isopropyltoluene	DCBd 4	Ave	70171 3917287	185074 9136770	314853	805672	2399495	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,3-Dichlorobenzene	DCBd 4	Ave	44081 1740580	93578 4062756	150022	361693	988692	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,2,3-Trimethylbenzene	DCBd 4	Ave	69443 3199086	158309 7313522	255734	644762	1787977	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,4-Dichlorobenzene	DCBd 4	Ave	46597 1705248	95431 3861852	151387	366901	966912	0.500 20.0	1.00 40.0	2.00	4.00	10.0
n-Butylbenzene	DCBd 4	Ave	19339 1028489	48236 2509452	81572	206207	627877	0.500 20.0	1.00 40.0	2.00	4.00	10.0

FORM VI
GC/MS VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1 Analy Batch No.: 292232

SDG No.:

Instrument ID: VMSL GC Column: RTX-VMS40 ID: 0.18(mm) Heated Purge: (Y/N) Y

Calibration Start Date: 02/14/2017 12:23 Calibration End Date: 02/14/2017 14:56 Calibration ID: 12338

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (UG/L)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Benzyl chloride	DCBd 4	Lin	2191 129712	4337 317429	6923	19040	60145	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,2-Dichlorobenzene	DCBd 4	Ave	34309 1424008	73638 3255106	117835	288210	785043	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Nonanal	DCBd 4	Qua	2092 289588	3759 811232	5409	20217	91559	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,2-Dibromo-3-Chloropropane	DCBd 4	Ave	1352 72609	2395 160919	4269	11637	33140	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,3,5-Trichlorobenzene	DCBd 4	Ave	32201 1413327	71852 3297207	116179	290282	801900	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Hexachlorobutadiene	DCBd 4	Ave	20628 781531	46540 1959840	72618	167863	487449	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,2,4-Trichlorobenzene	DCBd 4	Ave	23974 1085567	50039 2522059	82275	208981	587581	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Naphthalene	DCBd 4	Lin1	21039 1316312	41165 2992441	71721	209562	631041	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,2,3-Trichlorobenzene	DCBd 4	Ave	19450 856069	40169 1974560	67346	166827	458528	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Dibromofluoromethane (Surr)	FB	Ave	15675 641092	32765 1583491	50208	126704	332989	0.500 20.0	1.00 40.0	2.00	4.00	10.0
1,2-Dichloroethane-d4 (Surr)	FB	Ave	16596 599365	33889 1438479	52534	124885	312683	0.500 20.0	1.00 40.0	2.00	4.00	10.0
Toluene-d8 (Surr)	CBNZ d5	Ave	68731 3070026	155095 7761722	239384	630833	1707588	0.500 20.0	1.00 40.0	2.00	4.00	10.0
4-Bromofluorobenzene (Surr)	DCBd 4	Ave	20345 939146	46185 2511754	73047	184835	519332	0.500 20.0	1.00 40.0	2.00	4.00	10.0

Curve Type Legend:

Ave = Average ISTD
Lin = Linear ISTD
Lin1 = Linear 1/conc ISTD
Qua = Quadratic ISTD

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7558.D
Lims ID: ic
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 14-Feb-2017 12:23:30 ALS Bottle#: 2 Worklist Smp#: 6
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: IC
Misc. Info.: 0.5
Operator ID: SMCR Instrument ID: VMSL
Sublist: chrom-25mL-8260-MSL*sub17

Method: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 15-Feb-2017 11:40:48 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK023

First Level Reviewer: rhoadess Date: 15-Feb-2017 10:50:05

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85	3.011	3.011	0.000	99	32317	0.5000	0.5331	
2 1,2-Dichloro-1,1,2,2-tetra	135	3.248	3.248	0.000	98	15370	0.5000	0.5080	M
3 Chloromethane	50	3.346	3.346	0.000	99	35904	0.5000	0.5555	
4 Vinyl chloride	62	3.500	3.500	0.000	98	34020	0.5000	0.5246	
5 Butadiene	39	3.528	3.528	0.000	92	36342	0.5000	0.5223	
6 Bromomethane	94	4.086	4.100	-0.014	90	16388	0.5000	0.5564	
7 Chloroethane	64	4.324	4.324	0.000	99	21278	0.5000	0.5601	
8 Trichlorofluoromethane	101	4.561	4.561	0.000	97	43698	0.5000	0.5480	
9 Dichlorofluoromethane	67	4.659	4.659	0.000	97	46428	0.5000	0.5458	
10 Ethyl ether	74	5.078	5.064	0.014	92	7007	0.5000	0.4883	
11 Ethanol	45	5.301	5.315	-0.014	85	3265	20.0	25.0	
12 1,1-Dichloroethene	96	5.371	5.371	0.000	95	23067	0.5000	0.5123	
13 Carbon disulfide	76	5.413	5.413	0.000	100	80844	0.5000	0.5076	
14 1,1,2-Trichloro-1,2,2-trif	151	5.427	5.427	0.000	90	23136	0.5000	0.5281	
16 Iodomethane	142	5.581	5.581	0.000	98	13767	0.5000	0.7384	
S 15 1,2-Dichloroethene, Total	96				0			0.99	
17 Acrolein	56	5.860	5.860	0.000	97	4127	2.50	2.26	
18 3-Chloro-1-propene	39	6.028	6.028	0.000	90	25271	0.5000	0.4818	
19 Isopropyl alcohol	45	6.069	6.069	0.000	95	3020	5.00	5.07	
20 Methylene Chloride	84	6.167	6.167	0.000	95	20015	0.5000	0.5352	
21 Acetone	43	6.251	6.251	0.000	99	7297	0.5000	0.4501	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.000	96	22988	0.5000	0.4890	
23 Methyl acetate	74	6.391	6.391	0.000	98	4493	2.50	2.37	
24 Hexane	86	6.447	6.447	-0.001	93	7213	0.5000	0.4440	
25 Methyl tert-butyl ether	73	6.502	6.502	0.000	91	23212	0.5000	0.4712	
26 2-Methyl-2-propanol	59	6.614	6.614	0.000	83	3392	5.00	4.78	
27 Acetonitrile	41	6.810	6.810	0.000	99	10011	5.00	6.14	
28 Isopropyl ether	45	6.921	6.921	0.000	90	47515	0.5000	0.4378	
29 2-Chloro-1,3-butadiene	53	7.061	7.061	0.000	93	34093	0.5000	0.4238	
30 1,1-Dichloroethane	63	7.089	7.103	-0.014	97	44748	0.5000	0.5232	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
31 Acrylonitrile	53	7.159	7.159	0.000	97	23742	5.00	4.78	
32 Tert-butyl ethyl ether	59	7.326	7.326	0.000	93	33120	0.5000	0.4481	
33 Vinyl acetate	43	7.340	7.340	0.000	98	14813	0.5000	0.4274	
34 cis-1,2-Dichloroethene	96	7.676	7.676	0.000	80	22445	0.5000	0.5045	
35 2,2-Dichloropropane	77	7.787	7.787	0.000	89	28867	0.5000	0.4974	
37 Chlorobromomethane	128	7.885	7.885	0.000	56	7343	0.5000	0.5149	
36 Cyclohexane	84	7.885	7.885	0.000	92	36239	0.5000	0.4437	
38 Chloroform	83	7.941	7.941	0.000	95	38953	0.5000	0.5224	
39 Ethyl acetate	45	8.039	8.039	0.000	80	1086	1.00	1.25	
40 Carbon tetrachloride	117	8.095	8.095	0.000	98	33247	0.5000	0.4947	
41 Tetrahydrofuran	71	8.122	8.123	-0.001	44	778	1.00	1.26	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.123	-0.001	95	15675	0.5000	0.4936	
43 1,1,1-Trichloroethane	97	8.164	8.164	0.000	97	38368	0.5000	0.5000	
45 2-Butanone (MEK)	43	8.248	8.248	0.000	99	10117	0.5000	0.5634	
47 1,1-Dichloropropene	75	8.276	8.276	0.000	95	31059	0.5000	0.4704	
44 Isooctane	57	8.360	8.360	0.000	96	100302	0.5000	0.4406	
46 n-Heptane	43	8.430	8.430	0.000	91	42342	0.5000	0.4424	
48 Benzene	78	8.527	8.528	-0.001	95	98628	0.5000	0.5289	
49 Propionitrile	54	8.555	8.555	0.000	39	9664	5.00	5.10	
50 Methacrylonitrile	41	8.569	8.555	0.014	93	49134	5.00	4.81	
51 Tert-amyl methyl ether	73	8.597	8.597	0.000	86	21636	0.5000	0.4476	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	91	16596	0.5000	0.5303	
52 Isobutyl alcohol	42	8.667	8.667	0.000	86	2487	12.5	9.60	
54 1,2-Dichloroethane	62	8.723	8.723	0.000	97	19514	0.5000	0.5200	
* 55 Fluorobenzene	96	8.905	8.905	0.000	99	1716236	10.0	10.0	
58 Methylcyclohexane	55	9.058	9.058	0.000	93	41606	0.5000	0.4947	
57 Trichloroethene	95	9.058	9.058	0.000	69	27241	0.5000	0.5284	
59 n-Butanol	56	9.310	9.296	0.014	82	2165	12.5	34.9	
61 Dibromomethane	93	9.477	9.477	0.000	93	6929	0.5000	0.5171	
60 Ethyl acrylate	55	9.505	9.505	0.000	13	5569	0.5000	0.7028	
62 1,2-Dichloropropane	63	9.561	9.561	0.000	90	19161	0.5000	0.5003	
63 Dichlorobromomethane	83	9.589	9.603	-0.014	98	20467	0.5000	0.4861	
64 Methyl methacrylate	69	9.687	9.687	0.000	94	6949	1.00	1.36	
65 1,4-Dioxane	88	9.784	9.785	0.000	1	385	10.0	11.3	M
66 2-Chloroethyl vinyl ether	63	10.064	10.078	-0.014	12	2111	0.5000	0.6360	M
67 cis-1,3-Dichloropropene	75	10.162	10.162	0.000	93	19181	0.5000	0.4274	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	94	68731	0.5000	0.4616	
69 Toluene	92	10.371	10.371	0.000	98	50973	0.5000	0.4655	
70 2-Nitropropane	43	10.594	10.595	-0.001	93	2381	1.00	2.70	
71 4-Methyl-2-pentanone (MIBK	43	10.692	10.692	0.000	91	3522	0.5000	0.6923	
72 trans-1,3-Dichloropropene	75	10.734	10.734	0.000	68	13992	0.5000	0.4310	
73 Tetrachloroethene	164	10.734	10.734	0.000	97	21973	0.5000	0.5210	
74 Ethyl methacrylate	69	10.818	10.818	0.000	40	5251	0.5000	0.7382	
75 1,1,2-Trichloroethane	83	10.888	10.888	0.000	94	8375	0.5000	0.5131	
76 Chlorodibromomethane	129	11.069	11.069	0.000	89	10242	0.5000	0.4642	
77 1,3-Dichloropropane	76	11.153	11.153	0.000	95	18014	0.5000	0.5107	
78 n-Butyl acetate	43	11.293	11.307	-0.014	92	5833	0.5000	1.09	
79 Ethylene Dibromide	107	11.321	11.321	0.000	98	8142	0.5000	0.4909	
80 2-Hexanone	43	11.432	11.433	-0.001	38	2749	0.5000	0.6469	
81 1-Chlorohexane	91	11.684	11.684	0.000	89	23479	0.5000	0.3900	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	87	1105305	10.0	10.0	
82 Ethylbenzene	91	11.754	11.754	0.000	68	110234	0.5000	0.5106	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
84 Chlorobenzene	112	11.768	11.768	0.000	94	61114	0.5000	0.5414	
85 1,1,1,2-Tetrachloroethane	131	11.810	11.810	0.000	93	17078	0.5000	0.5019	
86 m-Xylene & p-Xylene	106	11.879	11.879	0.000	98	36589	0.5000	0.4551	
88 o-Xylene	106	12.284	12.284	0.000	95	27473	0.5000	0.4028	
89 Styrene	104	12.326	12.326	0.000	94	39272	0.5000	0.3875	
90 Bromoform	173	12.396	12.396	0.000	94	5169	0.5000	0.4890	
91 Isopropylbenzene	105	12.550	12.550	0.000	97	83777	0.5000	0.4271	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	94	20345	0.5000	0.4640	
93 N-Propylbenzene	91	12.941	12.941	0.000	98	92586	0.5000	0.4157	
94 Bromobenzene	156	12.983	12.983	0.000	94	20095	0.5000	0.5050	
95 1,1,2,2-Tetrachloroethane	83	13.011	13.011	0.000	95	9275	0.5000	0.5287	
96 1,3,5-Trimethylbenzene	105	13.094	13.108	-0.014	94	59041	0.5000	0.3901	
97 2-Chlorotoluene	91	13.122	13.122	0.000	96	70008	0.5000	0.4662	
99 1,2,3-Trichloropropane	110	13.164	13.164	0.000	88	3401	0.5000	0.5819	
98 trans-1,4-Dichloro-2-buten	53	13.178	13.178	0.000	70	2615	0.5000	0.5039	
100 Cyclohexanone	55	13.248	13.248	0.000	87	2727	5.00	15.6	
101 4-Chlorotoluene	91	13.276	13.276	0.000	98	57367	0.5000	0.4485	
102 tert-Butylbenzene	119	13.430	13.430	0.000	94	59546	0.5000	0.4177	
103 1,2,4-Trimethylbenzene	105	13.485	13.486	-0.001	97	63188	0.5000	0.4080	
104 sec-Butylbenzene	105	13.597	13.597	0.000	94	96353	0.5000	0.4300	
105 4-Isopropyltoluene	119	13.709	13.709	0.000	97	70171	0.5000	0.3931	
106 1,3-Dichlorobenzene	146	13.849	13.849	0.000	98	44081	0.5000	0.5220	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.919	0.000	95	515202	10.0	10.0	
107 1,2,3-Trimethylbenzene	105	13.918	13.919	0.000	52	69443	0.5000	0.4721	
109 1,4-Dichlorobenzene	146	13.932	13.932	0.000	94	46597	0.5000	0.5509	
111 n-Butylbenzene	134	14.128	14.128	0.000	97	19339	0.5000	0.4103	
110 Benzyl chloride	126	14.156	14.156	0.000	77	2191	0.5000	1.31	
112 1,2-Dichlorobenzene	146	14.351	14.351	0.000	96	34309	0.5000	0.5115	
113 n-Nonyl Aldehyde	57	15.064	15.078	-0.014	28	2092	0.5000	1.57	
115 1,2-Dibromo-3-Chloropropan	157	15.147	15.148	-0.001	1	1352	0.5000	0.4836	M
114 1,3,5-Trichlorobenzene	180	15.161	15.162	-0.001	96	32201	0.5000	0.4846	
116 Hexachlorobutadiene	225	15.734	15.748	-0.014	98	20628	0.5000	0.5123	
117 1,2,4-Trichlorobenzene	180	15.804	15.804	0.000	94	23974	0.5000	0.4916	
118 Naphthalene	128	16.153	16.153	0.000	96	21039	0.5000	0.6929	
120 1,2,3-Trichlorobenzene	180	16.349	16.349	0.000	96	19450	0.5000	0.5005	
S 119 Xylenes, Total	106				0			0.8579	
S 130 Trihalomethanes, Total	1				0			1.96	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

8260 Surr 25_00071	Amount Added: 0.50	Units: uL	
8260 NewWkMix_00206	Amount Added: 0.50	Units: uL	
I.S. Working_00143	Amount Added: 10.00	Units: uL	Run Reagent

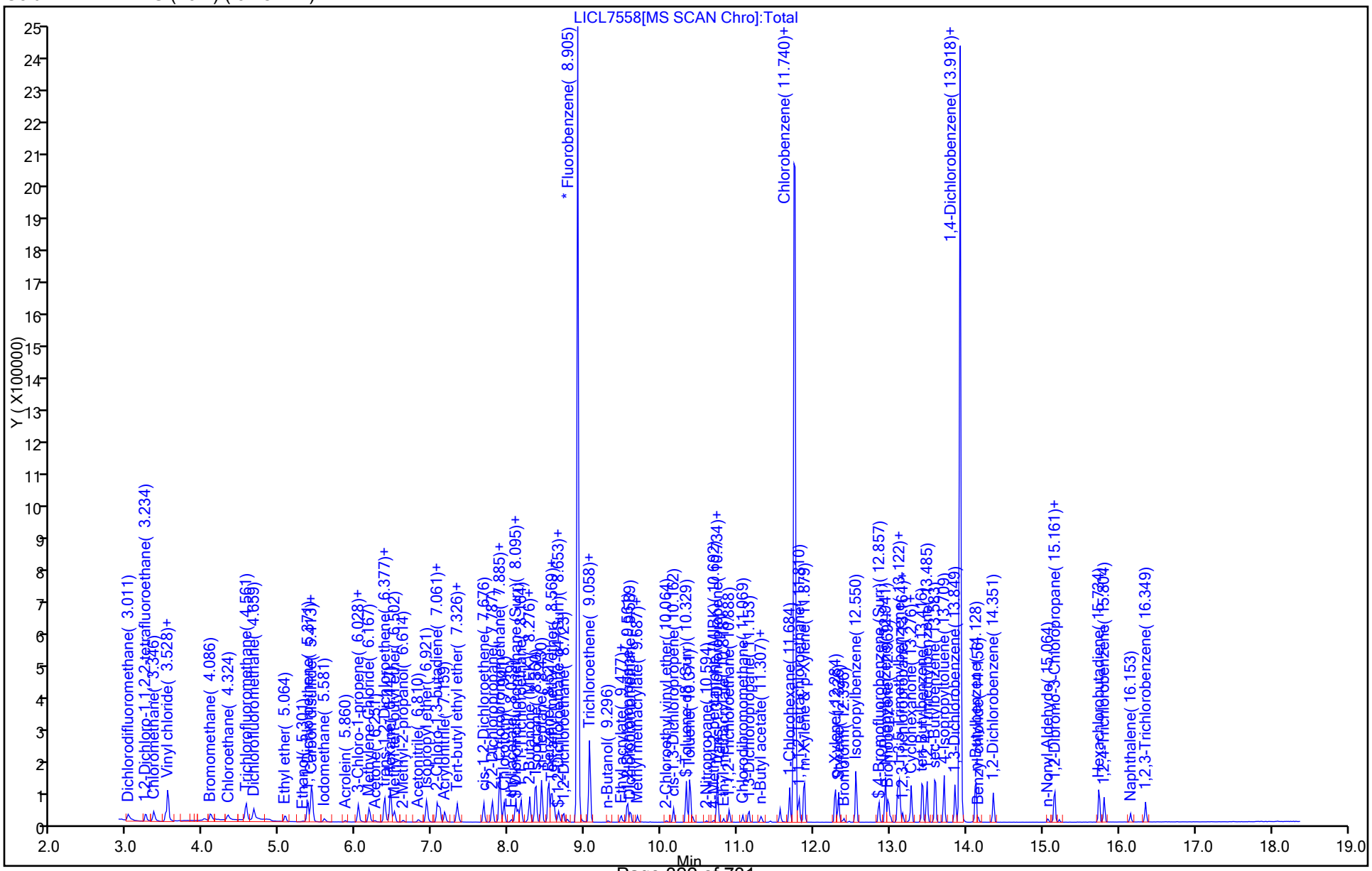
Report Date: 15-Feb-2017 11:40:48 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7558.D

Injection Date:	14-Feb-2017 12:23:30	Instrument ID:	VMSL	Operator ID:	SMCR
Lims ID:	ic			Worklist Smp#:	6
Client ID:					
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	2
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis

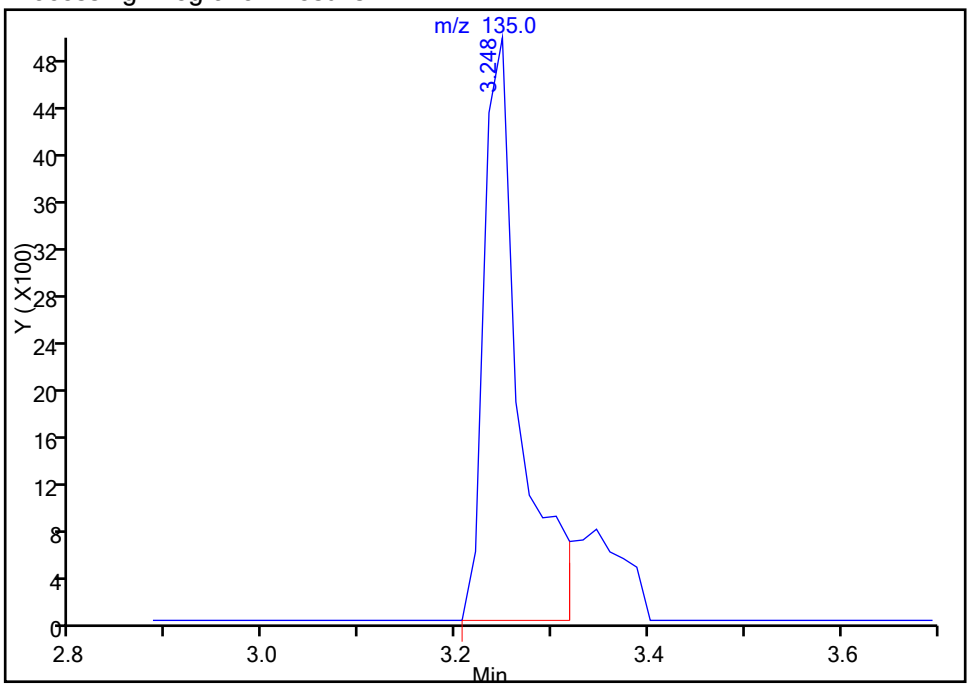
Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7558.D
Injection Date: 14-Feb-2017 12:23:30 Instrument ID: VMSL
Lims ID: ic
Client ID:
Operator ID: SMCR ALS Bottle#: 2 Worklist Smp#: 6
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Method: 25mL-8260-MSL Limit Group: MSV-8260
Column: RTX-VMS (40m) (0.18 mm) Detector MS SCAN

2 1,2-Dichloro-1,1,2,2-tetrafluoroethane, CAS: 76-14-2

Signal: 1

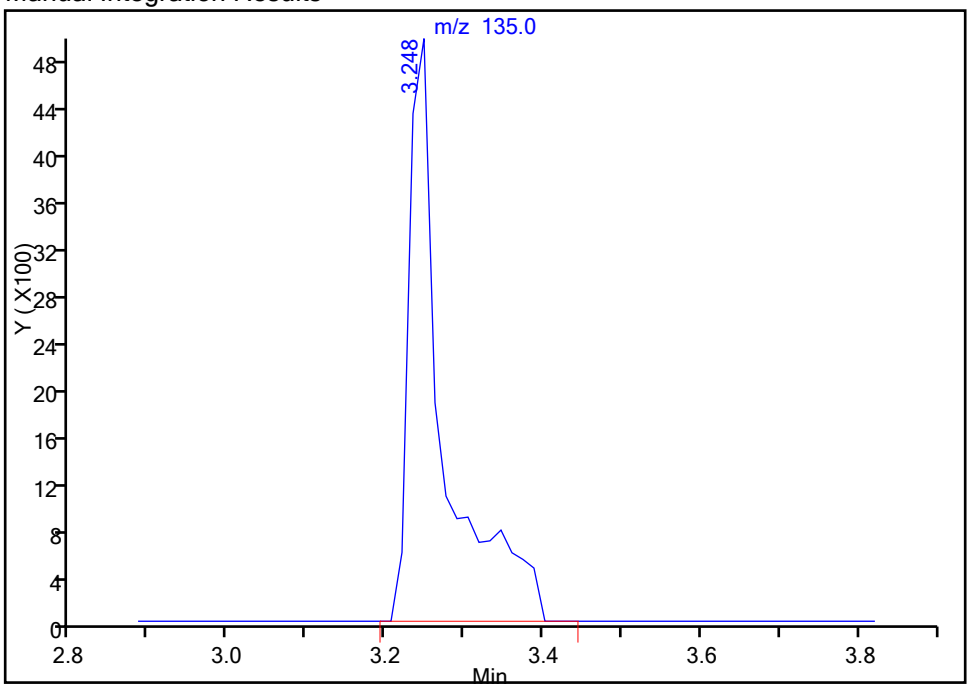
Processing Integration Results

RT: 3.25
Area: 12825
Amount: 0.467627
Amount Units: ug/l



Manual Integration Results

RT: 3.25
Area: 15370
Amount: 0.507975
Amount Units: ug/l



Reviewer: rhoadess, 15-Feb-2017 10:50:05
Audit Action: Manually Integrated Audit Reason: Peak Tail

Manual Integration/User Assign Peak Report

TestAmerica St. Louis

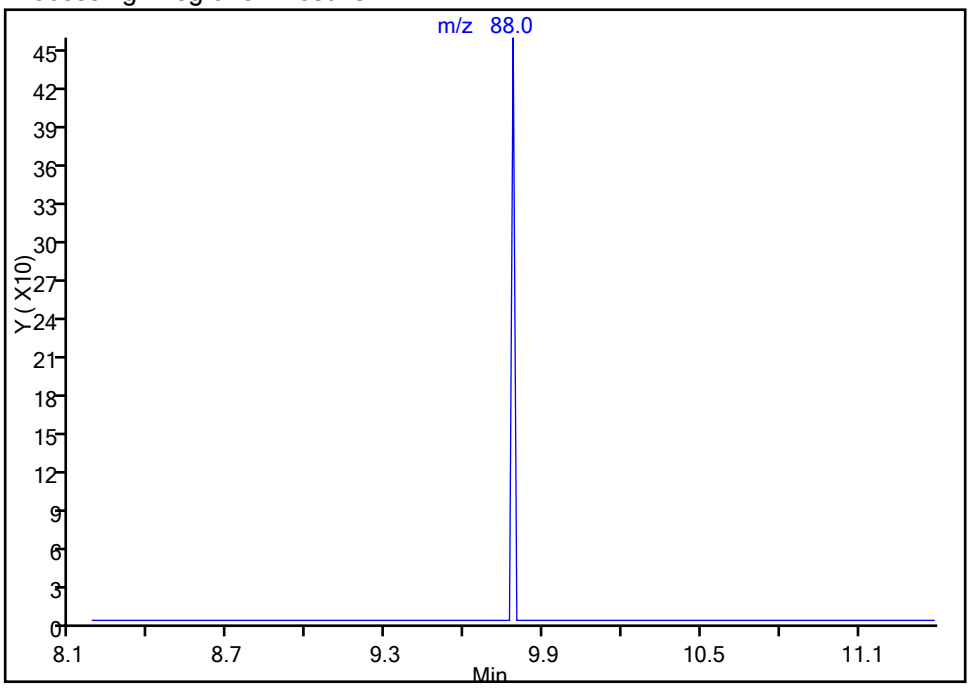
Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7558.D
Injection Date: 14-Feb-2017 12:23:30 Instrument ID: VMSL
Lims ID: ic
Client ID:
Operator ID: SMCR ALS Bottle#: 2 Worklist Smp#: 6
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Method: 25mL-8260-MSL Limit Group: MSV-8260
Column: RTX-VMS (40m) (0.18 mm) Detector MS SCAN

65 1,4-Dioxane, CAS: 123-91-1

Signal: 1

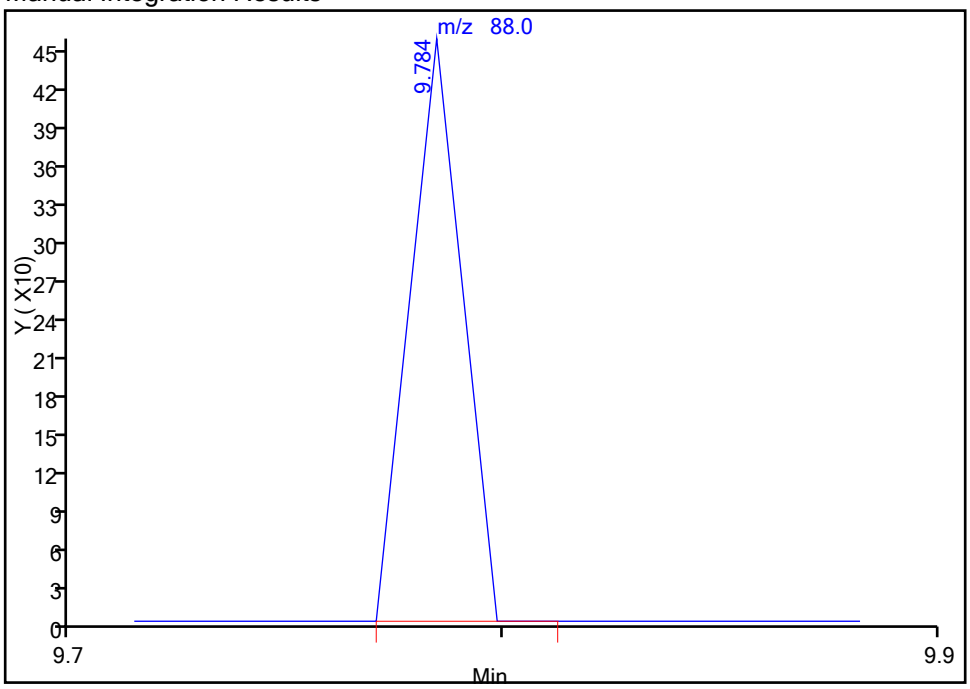
Not Detected
Expected RT: 9.78

Processing Integration Results



Manual Integration Results

RT: 9.78
Area: 385
Amount: 11.286136
Amount Units: ug/l



Reviewer: rhoadess, 15-Feb-2017 10:50:05
Audit Action: Manually Integrated Audit Reason: Peak Tail

Manual Integration/User Assign Peak Report

TestAmerica St. Louis

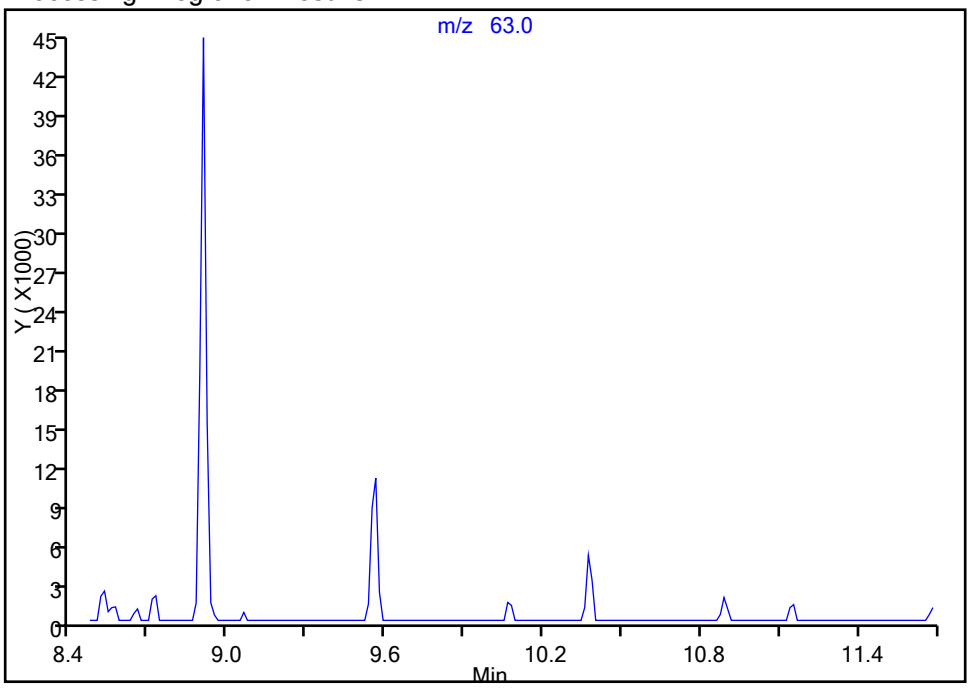
Data File:	\\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7558.D				
Injection Date:	14-Feb-2017 12:23:30	Instrument ID:	VMSL		
Lims ID:	ic				
Client ID:					
Operator ID:	SMCR	ALS Bottle#:	2	Worklist Smp#:	6
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		
Column:	RTX-VMS (40m) (0.18 mm)	Detector	MS SCAN		

66 2-Chloroethyl vinyl ether, CAS: 110-75-8

Signal: 1

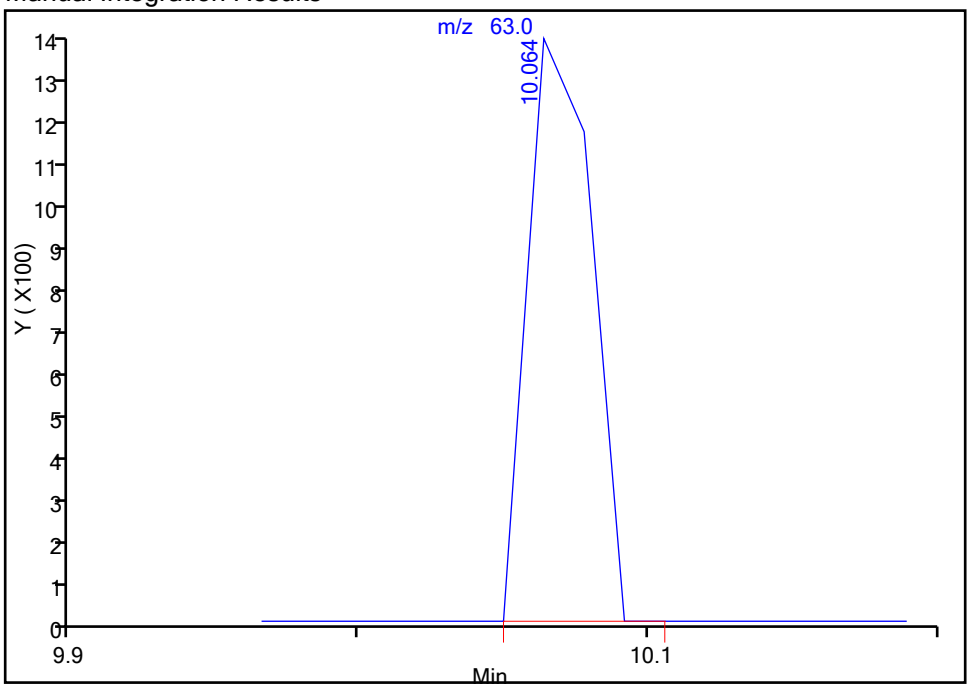
Not Detected
Expected RT: 10.08

Processing Integration Results



Manual Integration Results

RT: 10.06
Area: 2111
Amount: 0.635951
Amount Units: ug/l



Reviewer: rhoadess, 15-Feb-2017 10:50:05
Audit Action: Manually Integrated Audit Reason: Peak Tail

Manual Integration/User Assign Peak Report

TestAmerica St. Louis

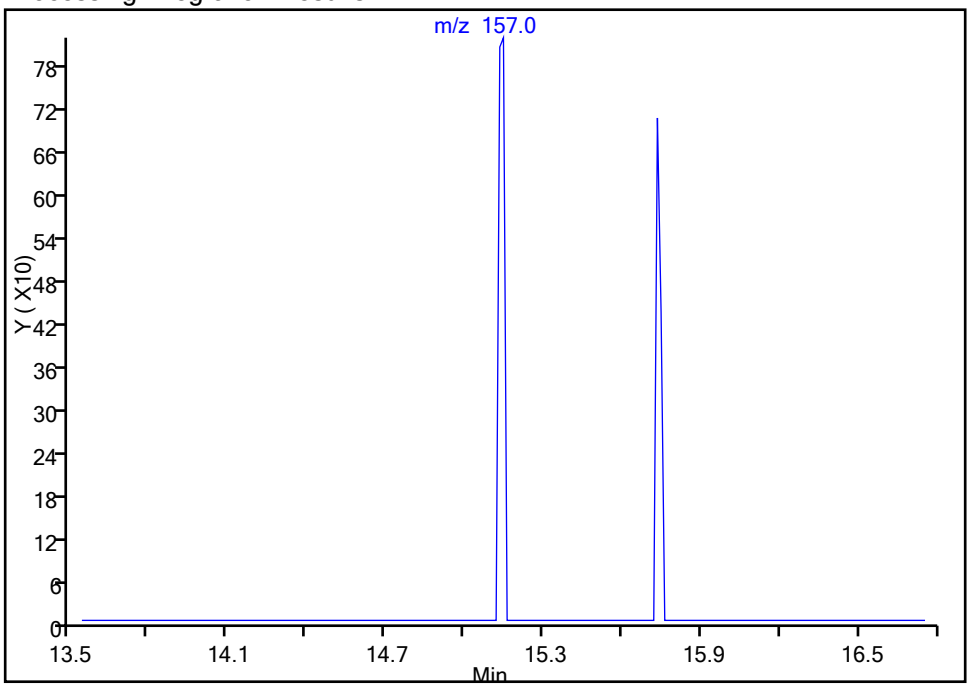
Data File:	\\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7558.D				
Injection Date:	14-Feb-2017 12:23:30	Instrument ID:	VMSL		
Lims ID:	ic				
Client ID:					
Operator ID:	SMCR	ALS Bottle#:	2	Worklist Smp#:	6
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		
Column:	RTX-VMS (40m) (0.18 mm)	Detector	MS SCAN		

115 1,2-Dibromo-3-Chloropropane, CAS: 96-12-8

Signal: 1

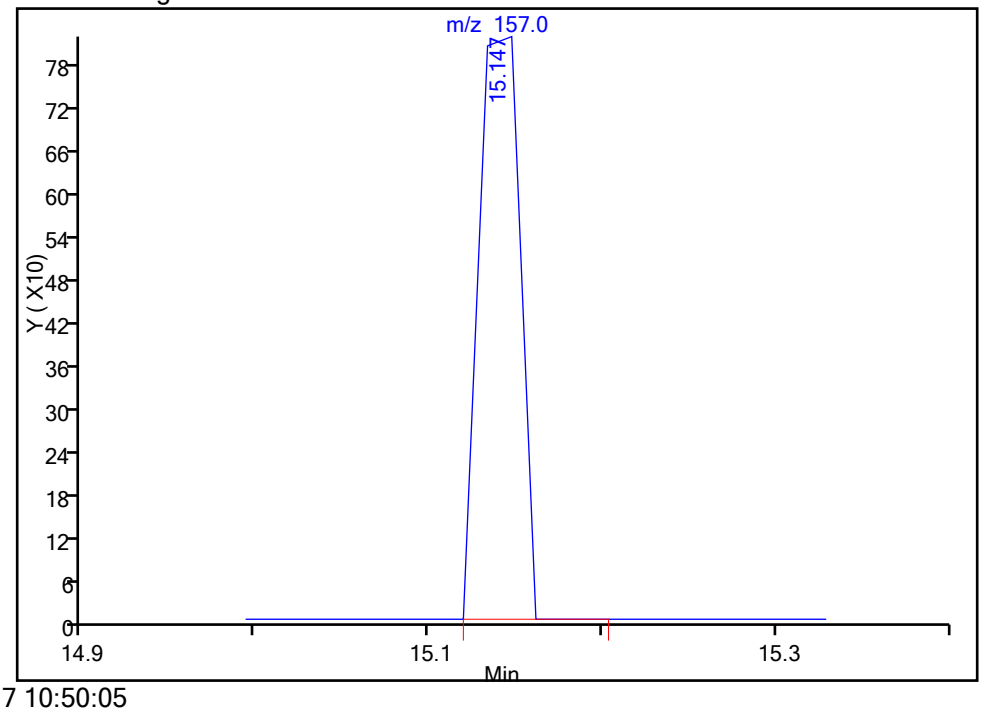
Not Detected
Expected RT: 15.15

Processing Integration Results



Manual Integration Results

RT: 15.15
Area: 1352
Amount: 0.483639
Amount Units: ug/l



Reviewer: rhoadess, 15-Feb-2017 10:50:05
Audit Action: Assigned Compound ID Audit Reason: Peak Tail

Manual Integration/User Assign Peak Report

TestAmerica St. Louis

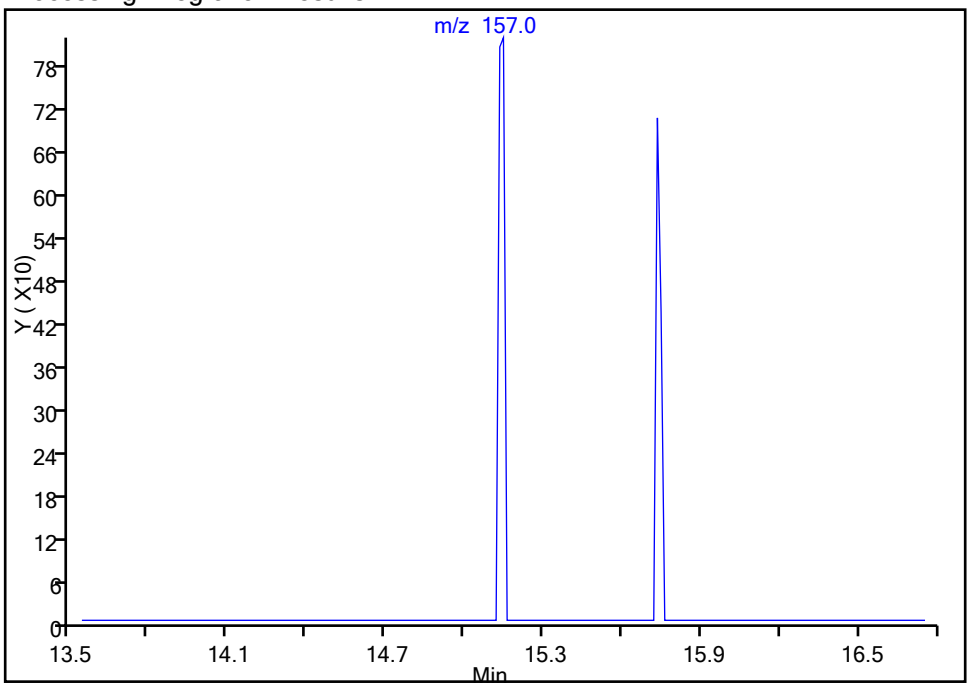
Data File:	\\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7558.D				
Injection Date:	14-Feb-2017 12:23:30	Instrument ID:	VMSL		
Lims ID:	ic				
Client ID:					
Operator ID:	SMCR	ALS Bottle#:	2	Worklist Smp#:	6
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		
Column:	RTX-VMS (40m) (0.18 mm)	Detector	MS SCAN		

115 1,2-Dibromo-3-Chloropropane, CAS: 96-12-8

Signal: 1

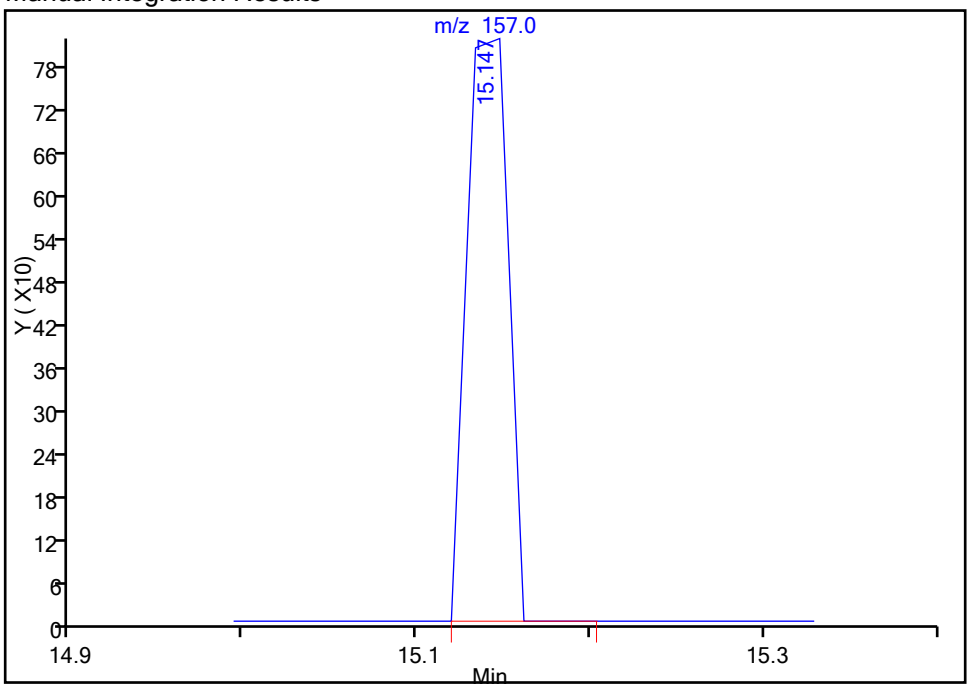
Not Detected
Expected RT: 15.15

Processing Integration Results



Manual Integration Results

RT: 15.15
Area: 1352
Amount: 0.483639
Amount Units: ug/l



Reviewer: rhoadess, 15-Feb-2017 10:50:05
Audit Action: Manually Integrated Audit Reason: Peak Tail

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7559.D
Lims ID: ic
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 14-Feb-2017 12:49:30 ALS Bottle#: 3 Worklist Smp#: 7
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: IC
Operator ID: SMCR Instrument ID: VMSL
Sublist: chrom-25mL-8260-MSL*sub17

Method: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 15-Feb-2017 11:40:49 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK023

First Level Reviewer: rhoadess Date: 15-Feb-2017 10:51:32

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85	3.011	3.011	0.000	99	62965	1.00	1.02	
2 1,2-Dichloro-1,1,2,2-tetra	135	3.248	3.248	0.000	98	30017	1.00	0.9711	M
3 Chloromethane	50	3.346	3.346	0.000	99	68333	1.00	1.03	
4 Vinyl chloride	62	3.500	3.500	0.000	98	66452	1.00	1.00	
5 Butadiene	39	3.528	3.528	0.000	91	71008	1.00	1.00	
6 Bromomethane	94	4.100	4.100	0.000	91	31686	1.00	1.05	
7 Chloroethane	64	4.324	4.324	0.000	100	40368	1.00	1.04	
8 Trichlorofluoromethane	101	4.561	4.561	0.000	98	84155	1.00	1.03	
9 Dichlorofluoromethane	67	4.659	4.659	0.000	98	89693	1.00	1.03	
10 Ethyl ether	74	5.078	5.064	0.014	92	12925	1.00	0.8817	
11 Ethanol	45	5.315	5.315	0.000	97	5143	40.0	38.6	
12 1,1-Dichloroethene	96	5.371	5.371	0.000	95	43846	1.00	0.9531	
13 Carbon disulfide	76	5.413	5.413	0.000	100	159923	1.00	0.9829	
14 1,1,2-Trichloro-1,2,2-trif	151	5.427	5.427	0.000	92	45151	1.00	1.01	
16 Iodomethane	142	5.581	5.581	0.000	99	23270	1.00	0.9884	
S 15 1,2-Dichloroethene, Total	96				0			1.94	
17 Acrolein	56	5.860	5.860	0.000	97	8152	5.00	4.37	
18 3-Chloro-1-propene	39	6.028	6.028	0.000	90	50856	1.00	0.9491	
19 Isopropyl alcohol	45	6.069	6.069	0.000	96	5659	10.0	9.29	
20 Methylene Chloride	84	6.167	6.167	0.000	97	38117	1.00	1.00	
21 Acetone	43	6.251	6.251	0.000	98	8994	1.00	0.8797	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.000	97	47530	1.00	0.9896	
23 Methyl acetate	74	6.391	6.391	0.000	98	8455	5.00	4.36	
24 Hexane	86	6.461	6.447	0.014	94	14950	1.00	0.9009	
25 Methyl tert-butyl ether	73	6.502	6.502	0.000	92	45467	1.00	0.9035	
26 2-Methyl-2-propanol	59	6.614	6.614	0.000	81	6655	10.0	9.18	
27 Acetonitrile	41	6.810	6.810	0.000	99	17254	10.0	10.4	
28 Isopropyl ether	45	6.921	6.921	0.000	91	97005	1.00	0.8750	
29 2-Chloro-1,3-butadiene	53	7.061	7.061	0.000	94	72819	1.00	0.8860	
30 1,1-Dichloroethane	63	7.103	7.103	0.000	96	87461	1.00	1.00	
31 Acrylonitrile	53	7.159	7.159	0.000	98	48173	10.0	9.49	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
32 Tert-butyl ethyl ether	59	7.326	7.326	0.000	93	63297	1.00	0.8382	
33 Vinyl acetate	43	7.340	7.340	0.000	97	30088	1.00	0.8497	
34 cis-1,2-Dichloroethene	96	7.676	7.676	0.000	82	42976	1.00	0.9456	
35 2,2-Dichloropropane	77	7.787	7.787	0.000	88	57472	1.00	0.9694	
36 Cyclohexane	84	7.885	7.885	0.000	92	77268	1.00	0.9261	
37 Chlorobromomethane	128	7.885	7.885	0.000	54	14532	1.00	1.00	
38 Chloroform	83	7.941	7.941	0.000	95	75489	1.00	0.99	
39 Ethyl acetate	45	8.039	8.039	0.000	99	2556	2.00	2.00	
40 Carbon tetrachloride	117	8.095	8.095	0.000	98	67711	1.00	0.9862	
$ 42 Dibromofluoromethane (Surr	113	8.123	8.123	0.000	94	32765	1.00	1.01	
41 Tetrahydrofuran	71	8.123	8.123	0.000	43	1878	2.00	2.04	
43 1,1,1-Trichloroethane	97	8.164	8.164	0.000	97	76552	1.00	0.9765	
45 2-Butanone (MEK)	43	8.248	8.248	0.000	98	12327	1.00	0.9111	
47 1,1-Dichloropropene	75	8.276	8.276	0.000	95	64090	1.00	0.9501	
44 Isooctane	57	8.360	8.360	0.000	96	213924	1.00	0.9198	
46 n-Heptane	43	8.430	8.430	0.000	91	94376	1.00	0.9653	
48 Benzene	78	8.528	8.528	0.000	97	193558	1.00	1.02	
50 Methacrylonitrile	41	8.569	8.555	0.014	93	100688	10.0	9.65	
49 Propionitrile	54	8.555	8.555	0.000	42	18650	10.0	9.64	
51 Tert-amyl methyl ether	73	8.597	8.597	0.000	85	42236	1.00	0.8552	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	91	33889	1.00	1.06	
52 Isobutyl alcohol	42	8.667	8.667	0.000	87	5703	25.0	21.6	
54 1,2-Dichloroethane	62	8.723	8.723	0.000	97	38947	1.00	1.02	
* 55 Fluorobenzene	96	8.905	8.905	0.000	99	1753300	10.0	10.0	
57 Trichloroethene	95	9.058	9.058	0.000	67	53667	1.00	1.02	
58 Methylcyclohexane	55	9.058	9.058	0.000	94	85220	1.00	0.99	
59 n-Butanol	56	9.296	9.296	0.000	88	3978	25.0	40.2	
61 Dibromomethane	93	9.477	9.477	0.000	95	13554	1.00	0.99	
60 Ethyl acrylate	55	9.505	9.505	0.000	53	11095	1.00	0.9841	
62 1,2-Dichloropropane	63	9.561	9.561	0.000	90	37349	1.00	0.9546	
63 Dichlorobromomethane	83	9.603	9.603	0.000	99	41012	1.00	0.9535	
64 Methyl methacrylate	69	9.687	9.687	0.000	93	13895	2.00	1.94	
65 1,4-Dioxane	88	9.798	9.785	0.014	81	1673	20.0	21.1	
66 2-Chloroethyl vinyl ether	63	10.064	10.078	-0.014	1	4488	1.00	0.9513	M
67 cis-1,3-Dichloropropene	75	10.162	10.162	0.000	93	38685	1.00	0.8438	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	93	155095	1.00	0.9774	
69 Toluene	92	10.371	10.371	0.000	98	110695	1.00	0.9485	
70 2-Nitropropane	43	10.595	10.595	0.000	93	4451	2.00	3.18	
71 4-Methyl-2-pentanone (MIBK	43	10.692	10.692	0.000	97	7780	1.00	1.02	
73 Tetrachloroethene	164	10.734	10.734	0.000	97	45895	1.00	1.02	
72 trans-1,3-Dichloropropene	75	10.734	10.734	0.000	67	28538	1.00	0.8248	
74 Ethyl methacrylate	69	10.818	10.818	0.000	89	12210	1.00	1.00	
75 1,1,2-Trichloroethane	83	10.888	10.888	0.000	93	17086	1.00	0.9821	
76 Chlorodibromomethane	129	11.069	11.069	0.000	90	20866	1.00	0.8873	
77 1,3-Dichloropropane	76	11.153	11.153	0.000	94	36119	1.00	0.9608	
78 n-Butyl acetate	43	11.307	11.307	0.000	93	12423	1.00	1.37	
79 Ethylene Dibromide	107	11.321	11.321	0.000	99	16303	1.00	0.9222	
80 2-Hexanone	43	11.433	11.433	-0.001	91	5726	1.00	0.9468	
81 1-Chlorohexane	91	11.684	11.684	0.000	90	57056	1.00	0.8893	
82 Ethylbenzene	91	11.754	11.754	0.000	95	236921	1.00	1.03	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	86	1177993	10.0	10.0	
84 Chlorobenzene	112	11.768	11.768	0.000	97	122627	1.00	1.02	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
85 1,1,1,2-Tetrachloroethane	131	11.810	11.810	0.000	94	33841	1.00	0.9331	
86 m-Xylene & p-Xylene	106	11.879	11.879	0.000	98	80746	1.00	0.9424	
88 o-Xylene	106	12.284	12.284	0.000	96	63565	1.00	0.8744	
89 Styrene	104	12.326	12.326	0.000	93	90624	1.00	0.8390	
90 Bromoform	173	12.396	12.396	0.000	96	10162	1.00	0.8680	
91 Isopropylbenzene	105	12.550	12.550	0.000	97	201198	1.00	0.9262	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	46185	1.00	0.9512	
93 N-Propylbenzene	91	12.941	12.941	0.000	98	234106	1.00	0.9492	
94 Bromobenzene	156	12.983	12.983	0.000	89	43258	1.00	0.9817	
95 1,1,2,2-Tetrachloroethane	83	13.011	13.011	0.000	96	18801	1.00	0.9677	
96 1,3,5-Trimethylbenzene	105	13.108	13.108	0.000	93	151136	1.00	0.9017	
97 2-Chlorotoluene	91	13.122	13.122	0.000	95	167238	1.00	1.01	
99 1,2,3-Trichloropropane	110	13.164	13.164	0.000	89	6087	1.00	0.9404	
98 trans-1,4-Dichloro-2-buten	53	13.178	13.178	0.000	73	5294	1.00	0.9212	
100 Cyclohexanone	55	13.248	13.248	0.000	84	3312	10.0	16.3	
101 4-Chlorotoluene	91	13.276	13.276	0.000	99	133966	1.00	0.9458	
102 tert-Butylbenzene	119	13.430	13.430	0.000	94	146703	1.00	0.9292	
103 1,2,4-Trimethylbenzene	105	13.486	13.486	0.000	98	160823	1.00	0.9378	
104 sec-Butylbenzene	105	13.597	13.597	0.000	94	243586	1.00	0.9815	
105 4-Isopropyltoluene	119	13.709	13.709	0.000	97	185074	1.00	0.9361	
106 1,3-Dichlorobenzene	146	13.849	13.849	0.000	98	93578	1.00	1.00	
107 1,2,3-Trimethylbenzene	105	13.918	13.919	0.000	74	158309	1.00	0.9717	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.919	0.000	95	570564	10.0	10.0	
109 1,4-Dichlorobenzene	146	13.932	13.932	0.000	95	95431	1.00	1.02	
111 n-Butylbenzene	134	14.128	14.128	0.000	97	48236	1.00	0.9242	
110 Benzyl chloride	126	14.156	14.156	0.000	87	4337	1.00	1.57	
112 1,2-Dichlorobenzene	146	14.351	14.351	0.000	97	73638	1.00	0.99	
113 n-Nonyl Aldehyde	57	15.064	15.078	-0.014	81	3759	1.00	1.69	
115 1,2-Dibromo-3-Chloropropan	157	15.148	15.148	0.000	1	2395	1.00	0.7736	M
114 1,3,5-Trichlorobenzene	180	15.161	15.162	-0.001	98	71852	1.00	0.9765	
116 Hexachlorobutadiene	225	15.748	15.748	0.000	98	46540	1.00	1.04	
117 1,2,4-Trichlorobenzene	180	15.804	15.804	0.000	94	50039	1.00	0.9265	
118 Naphthalene	128	16.153	16.153	0.000	97	41165	1.00	0.9545	
120 1,2,3-Trichlorobenzene	180	16.349	16.349	0.000	95	40169	1.00	0.9333	
S 119 Xylenes, Total	106				0			1.82	
S 130 Trihalomethanes, Total	1				0			3.70	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

8260 Surr 25_00071	Amount Added: 1.00	Units: uL	
8260 NewWkMix_00206	Amount Added: 1.00	Units: uL	
I.S. Working_00143	Amount Added: 10.00	Units: uL	Run Reagent

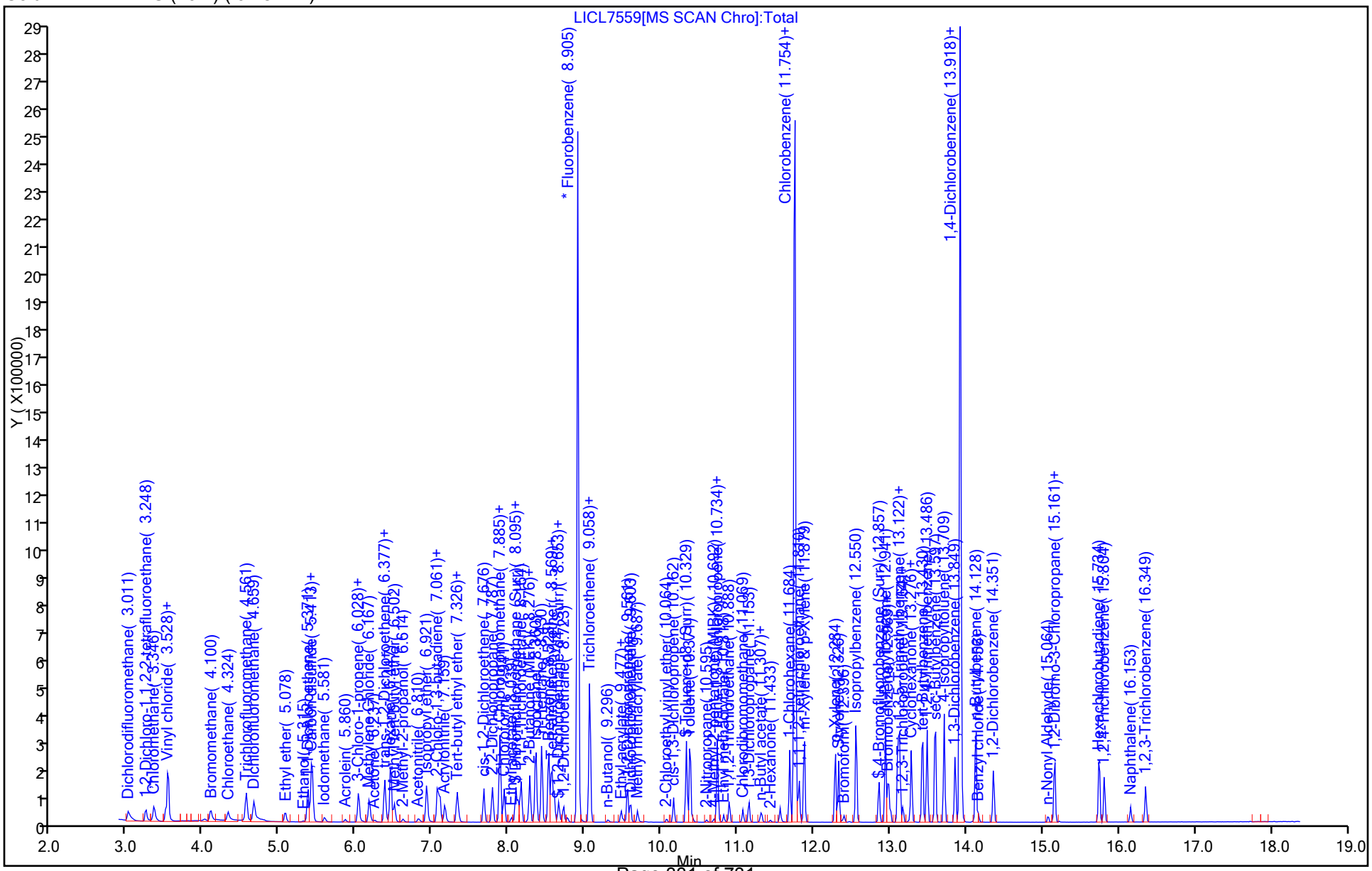
Report Date: 15-Feb-2017 11:40:50 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7559.D

Injection Date:	14-Feb-2017 12:49:30	Instrument ID:	VMSL	Operator ID:	SMCR
Lims ID:	ic			Worklist Smp#:	7
Client ID:					
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	3
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



Manual Integration/User Assign Peak Report

TestAmerica St. Louis

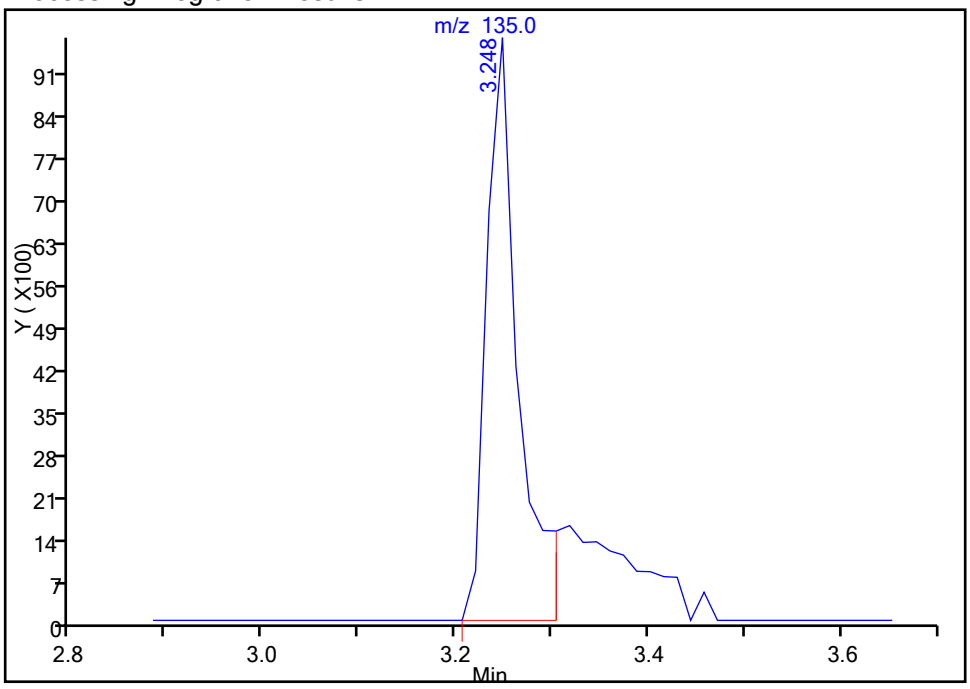
Data File:	\\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7559.D				
Injection Date:	14-Feb-2017 12:49:30	Instrument ID:	VMSL		
Lims ID:	ic				
Client ID:					
Operator ID:	SMCR	ALS Bottle#:	3	Worklist Smp#:	7
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		
Column:	RTX-VMS (40m) (0.18 mm)	Detector	MS SCAN		

2 1,2-Dichloro-1,1,2,2-tetrafluoroethane, CAS: 76-14-2

Signal: 1

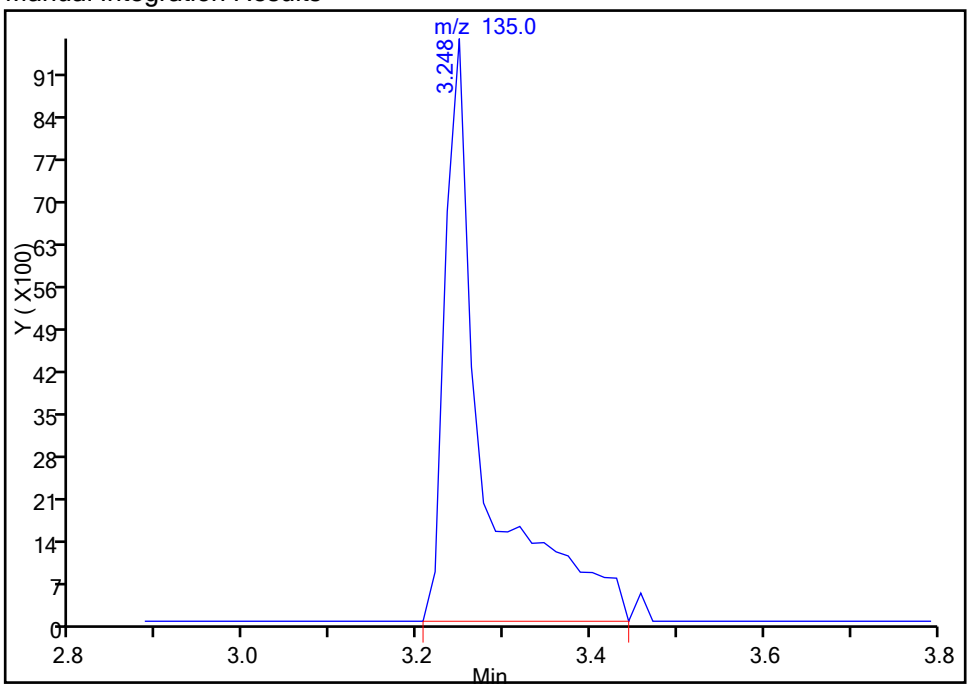
Processing Integration Results

RT: 3.25
Area: 22104
Amount: 0.768545
Amount Units: ug/l



Manual Integration Results

RT: 3.25
Area: 30017
Amount: 0.971083
Amount Units: ug/l



Reviewer: rhoadess, 15-Feb-2017 10:51:32

Audit Action: Manually Integrated Audit Reason: Peak Tail

Manual Integration/User Assign Peak Report

TestAmerica St. Louis

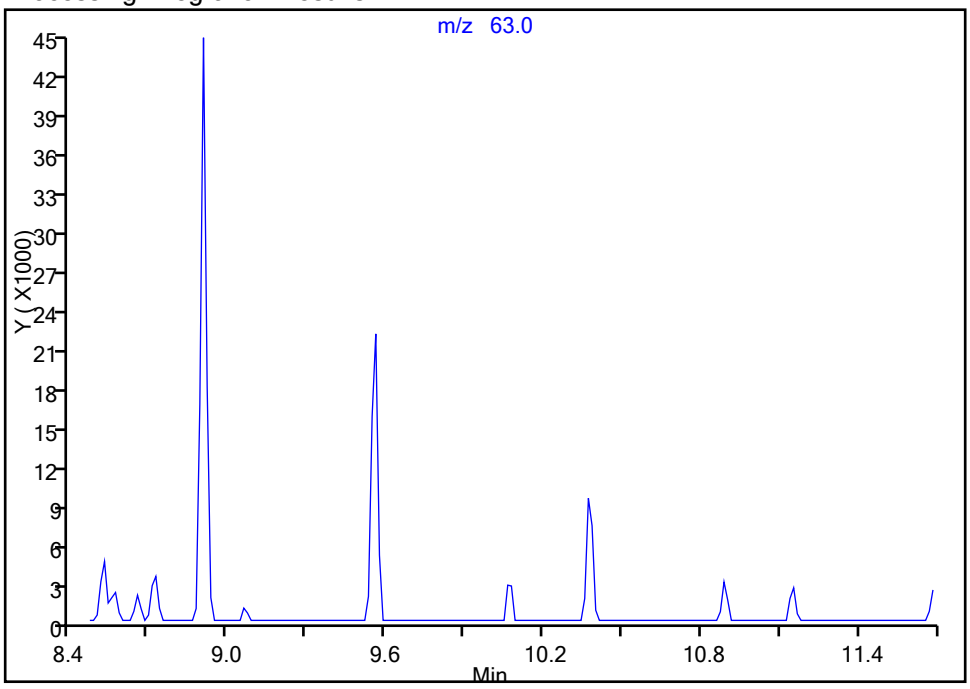
Data File:	\\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7559.D				
Injection Date:	14-Feb-2017 12:49:30	Instrument ID:	VMSL		
Lims ID:	ic				
Client ID:					
Operator ID:	SMCR	ALS Bottle#:	3	Worklist Smp#:	7
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		
Column:	RTX-VMS (40m) (0.18 mm)	Detector	MS SCAN		

66 2-Chloroethyl vinyl ether, CAS: 110-75-8

Signal: 1

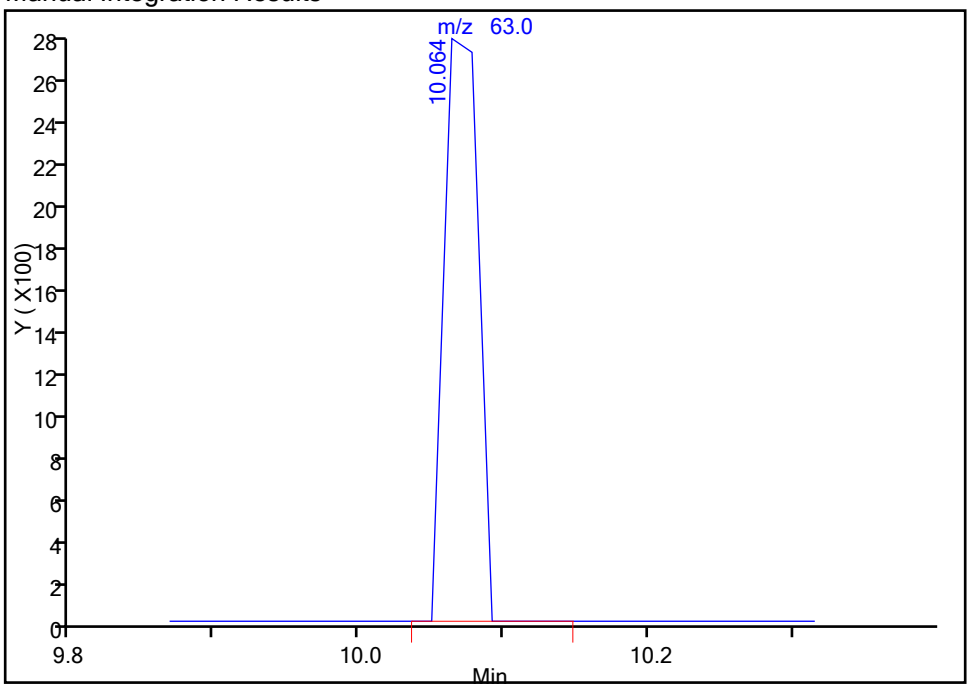
Not Detected
Expected RT: 10.08

Processing Integration Results



Manual Integration Results

RT: 10.06
Area: 4488
Amount: 0.951301
Amount Units: ug/l



Reviewer: rhoadess, 15-Feb-2017 10:51:32
Audit Action: Assigned Compound ID Audit Reason: Peak Tail

Manual Integration/User Assign Peak Report

TestAmerica St. Louis

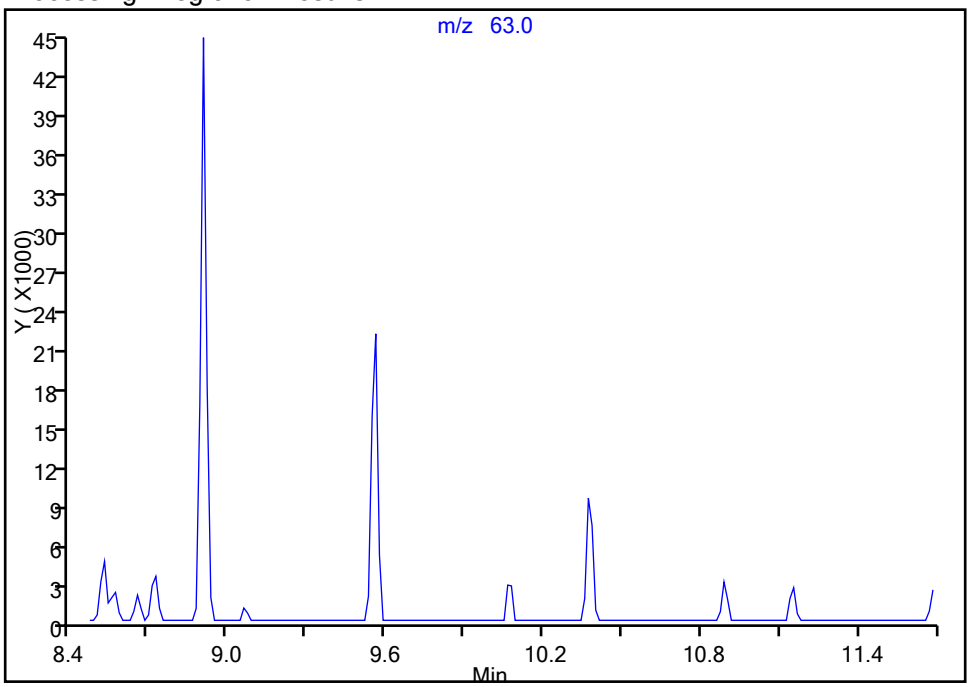
Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7559.D
Injection Date: 14-Feb-2017 12:49:30 Instrument ID: VMSL
Lims ID: ic
Client ID:
Operator ID: SMCR ALS Bottle#: 3 Worklist Smp#: 7
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Method: 25mL-8260-MSL Limit Group: MSV-8260
Column: RTX-VMS (40m) (0.18 mm) Detector MS SCAN

66 2-Chloroethyl vinyl ether, CAS: 110-75-8

Signal: 1

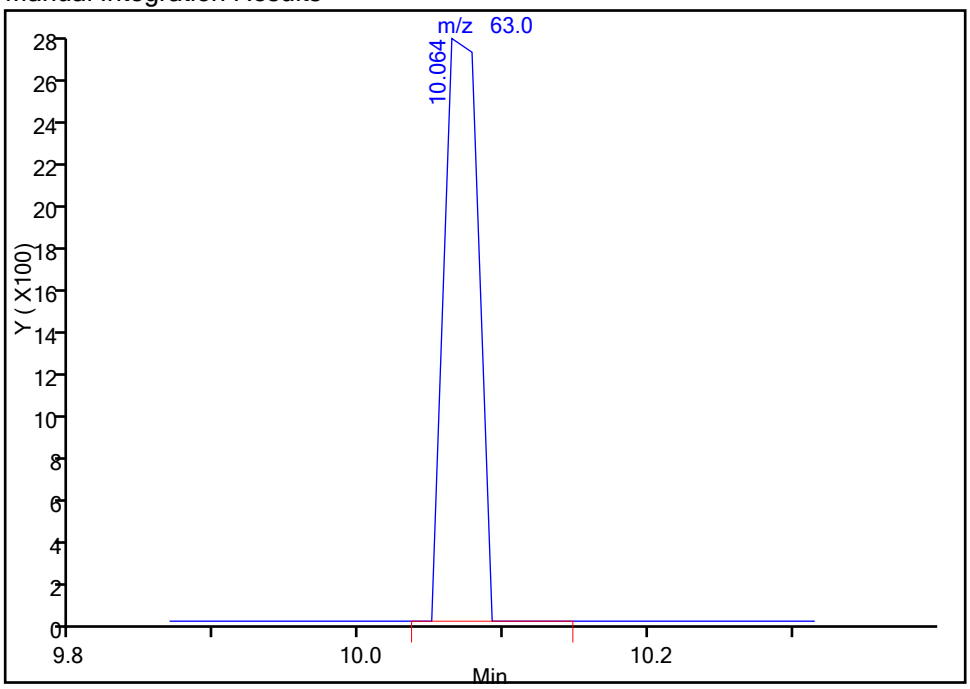
Not Detected
Expected RT: 10.08

Processing Integration Results



Manual Integration Results

RT: 10.06
Area: 4488
Amount: 0.951301
Amount Units: ug/l



Reviewer: rhoadess, 15-Feb-2017 10:51:32
Audit Action: Manually Integrated Audit Reason: Peak Tail

Manual Integration/User Assign Peak Report

TestAmerica St. Louis

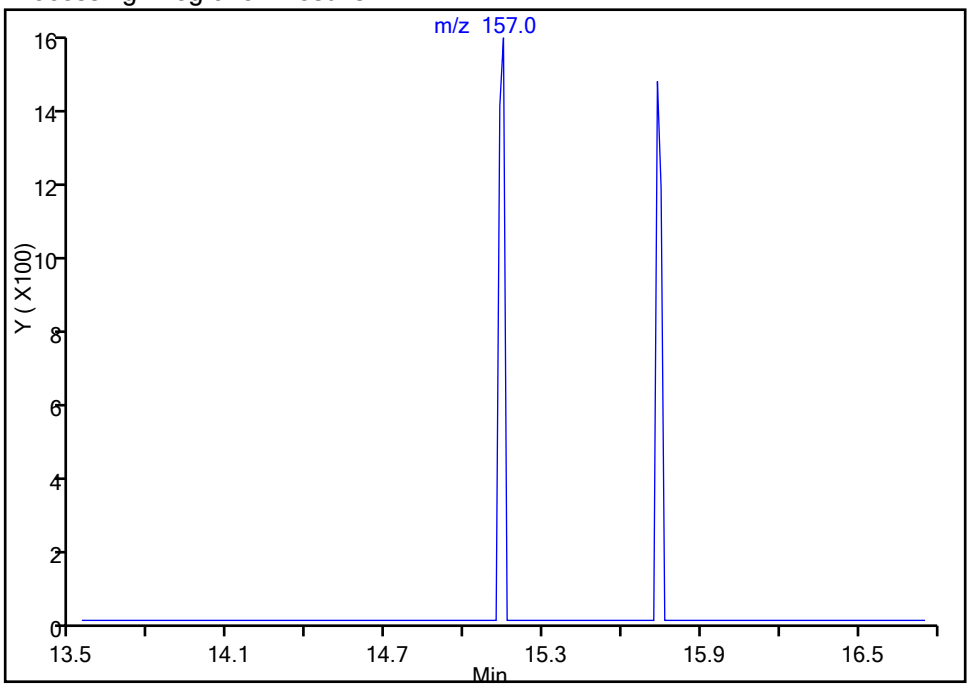
Data File:	\\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7559.D				
Injection Date:	14-Feb-2017 12:49:30	Instrument ID:	VMSL		
Lims ID:	ic				
Client ID:					
Operator ID:	SMCR	ALS Bottle#:	3	Worklist Smp#:	7
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		
Column:	RTX-VMS (40m) (0.18 mm)	Detector	MS SCAN		

115 1,2-Dibromo-3-Chloropropane, CAS: 96-12-8

Signal: 1

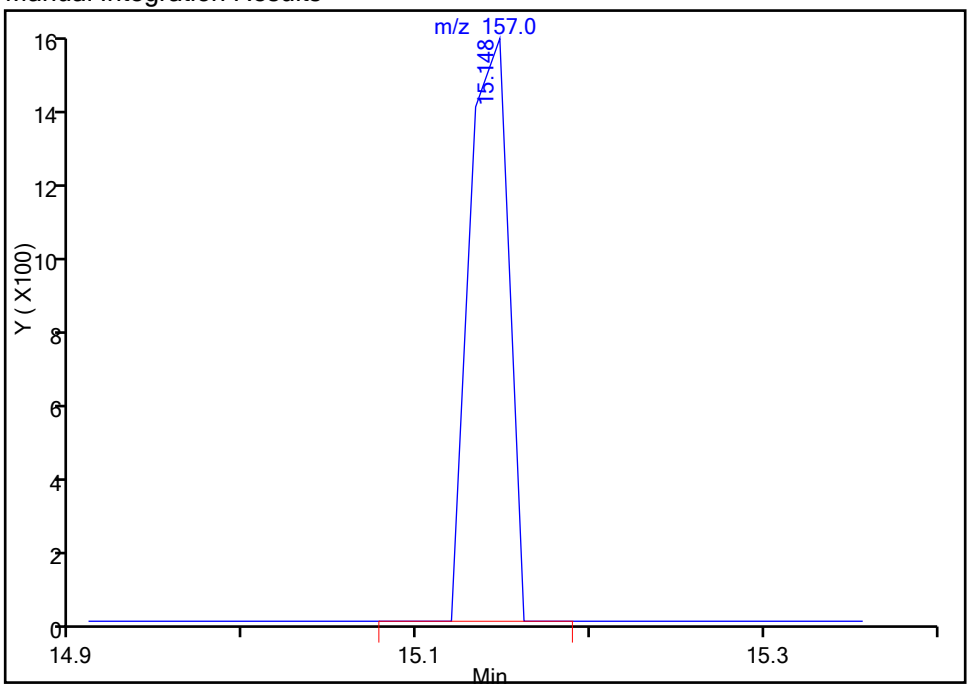
Not Detected
Expected RT: 15.15

Processing Integration Results



Manual Integration Results

RT: 15.15
Area: 2395
Amount: 0.773613
Amount Units: ug/l



Reviewer: rhoadess, 15-Feb-2017 10:51:32
Audit Action: Manually Integrated Audit Reason: Peak Tail

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7560.D
Lims ID: ic
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 14-Feb-2017 13:14:30 ALS Bottle#: 4 Worklist Smp#: 8
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: IC
Operator ID: SMCR Instrument ID: VMSL
Sublist: chrom-25mL-8260-MSL*sub17

Method: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 15-Feb-2017 11:40:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK023

First Level Reviewer: rhoadess Date: 15-Feb-2017 10:54:25

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85	3.011	3.011	0.000	99	94786	2.00	1.92	
2 1,2-Dichloro-1,1,2,2-tetra	135	3.248	3.248	0.000	99	47424	2.00	1.92	M
3 Chloromethane	50	3.346	3.346	0.000	99	103698	2.00	1.97	
4 Vinyl chloride	62	3.500	3.500	0.000	98	100871	2.00	1.91	
5 Butadiene	39	3.527	3.528	-0.001	92	111598	2.00	1.97	
6 Bromomethane	94	4.100	4.100	0.000	91	50603	2.00	2.11	
7 Chloroethane	64	4.324	4.324	0.000	99	59909	2.00	1.93	
8 Trichlorofluoromethane	101	4.561	4.561	0.000	99	125236	2.00	1.93	
9 Dichlorofluoromethane	67	4.659	4.659	0.000	98	138674	2.00	2.00	
10 Ethyl ether	74	5.078	5.064	0.014	91	22026	2.00	1.88	
11 Ethanol	45	5.315	5.315	0.000	97	8956	80.0	84.1	
12 1,1-Dichloroethene	96	5.371	5.371	0.000	96	69478	2.00	1.89	
13 Carbon disulfide	76	5.413	5.413	0.000	100	247896	2.00	1.91	
14 1,1,2-Trichloro-1,2,2-trif	151	5.427	5.427	0.000	90	68871	2.00	1.93	
16 Iodomethane	142	5.581	5.581	0.000	99	35578	2.00	1.57	
S 15 1,2-Dichloroethene, Total	96				0			3.91	
17 Acrolein	56	5.860	5.860	0.000	99	14001	10.0	9.41	
18 3-Chloro-1-propene	39	6.027	6.028	-0.001	91	79649	2.00	1.86	
19 Isopropyl alcohol	45	6.069	6.069	0.000	96	8671	20.0	17.8	
20 Methylene Chloride	84	6.167	6.167	0.000	97	62888	2.00	2.06	
21 Acetone	43	6.251	6.251	0.000	100	10735	2.00	2.12	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.000	98	75819	2.00	1.98	
23 Methyl acetate	74	6.391	6.391	0.000	98	15092	10.0	9.74	
24 Hexane	86	6.460	6.447	0.013	93	23768	2.00	1.79	
25 Methyl tert-butyl ether	73	6.502	6.502	0.000	92	76044	2.00	1.89	
26 2-Methyl-2-propanol	59	6.614	6.614	0.000	82	10695	20.0	18.5	
27 Acetonitrile	41	6.824	6.810	0.014	98	27352	20.0	20.6	
28 Isopropyl ether	45	6.921	6.921	0.000	92	164592	2.00	1.86	
29 2-Chloro-1,3-butadiene	53	7.061	7.061	0.000	93	118219	2.00	1.80	
30 1,1-Dichloroethane	63	7.103	7.103	0.000	97	138900	2.00	1.99	
31 Acrylonitrile	53	7.159	7.159	0.000	98	84073	20.0	20.8	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
32 Tert-butyl ethyl ether	59	7.326	7.326	0.000	93	107921	2.00	1.79	
33 Vinyl acetate	43	7.340	7.340	0.000	98	57193	2.00	2.02	
34 cis-1,2-Dichloroethene	96	7.675	7.676	-0.001	83	70138	2.00	1.93	
35 2,2-Dichloropropane	77	7.787	7.787	0.000	89	86524	2.00	1.83	
37 Chlorobromomethane	128	7.885	7.885	0.000	54	24000	2.00	2.06	
36 Cyclohexane	84	7.885	7.885	0.000	92	122294	2.00	1.84	
38 Chloroform	83	7.941	7.941	0.000	94	121095	2.00	1.99	
39 Ethyl acetate	45	8.039	8.039	0.000	99	4384	4.00	3.53	
40 Carbon tetrachloride	117	8.094	8.095	-0.001	99	104850	2.00	1.91	
41 Tetrahydrofuran	71	8.122	8.123	-0.001	43	3246	4.00	3.60	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.123	-0.001	94	50208	2.00	1.94	
43 1,1,1-Trichloroethane	97	8.164	8.164	0.000	97	119587	2.00	1.91	
45 2-Butanone (MEK)	43	8.248	8.248	0.000	97	14693	2.00	1.97	
47 1,1-Dichloropropene	75	8.276	8.276	0.000	95	101267	2.00	1.88	
44 Isooctane	57	8.360	8.360	0.000	96	346406	2.00	1.87	
46 n-Heptane	43	8.430	8.430	0.000	94	150266	2.00	1.93	
48 Benzene	78	8.527	8.528	-0.001	97	306491	2.00	2.02	
49 Propionitrile	54	8.555	8.555	0.000	43	31748	20.0	20.6	
50 Methacrylonitrile	41	8.569	8.555	0.014	93	171441	20.0	20.6	
51 Tert-amyl methyl ether	73	8.597	8.597	0.000	85	70287	2.00	1.78	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	91	52534	2.00	2.06	
52 Isobutyl alcohol	42	8.667	8.667	0.000	86	9832	50.0	46.6	
54 1,2-Dichloroethane	62	8.723	8.723	0.000	97	63265	2.00	2.07	
* 55 Fluorobenzene	96	8.904	8.905	-0.001	99	1399392	10.0	10.0	
58 Methylcyclohexane	55	9.058	9.058	0.000	94	131162	2.00	1.91	
57 Trichloroethene	95	9.058	9.058	0.000	67	83494	2.00	1.99	
59 n-Butanol	56	9.296	9.296	0.000	89	7463	50.0	56.2	
61 Dibromomethane	93	9.477	9.477	0.000	94	22385	2.00	2.05	
60 Ethyl acrylate	55	9.505	9.505	0.000	99	19435	2.00	1.67	
62 1,2-Dichloropropane	63	9.561	9.561	0.000	91	62263	2.00	1.99	
63 Dichlorobromomethane	83	9.603	9.603	0.000	99	67584	2.00	1.97	
64 Methyl methacrylate	69	9.687	9.687	0.000	94	24221	4.00	3.37	
65 1,4-Dioxane	88	9.798	9.785	0.014	85	2910	40.0	36.2	
66 2-Chloroethyl vinyl ether	63	10.078	10.078	0.000	92	8671	2.00	1.81	
67 cis-1,3-Dichloropropene	75	10.161	10.162	-0.001	94	66998	2.00	1.83	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	93	239384	2.00	1.85	
69 Toluene	92	10.371	10.371	0.000	98	181421	2.00	1.91	
70 2-Nitropropane	43	10.594	10.595	-0.001	92	8040	4.00	4.53	
71 4-Methyl-2-pentanone (MIBK	43	10.692	10.692	0.000	94	13989	2.00	1.78	
72 trans-1,3-Dichloropropene	75	10.734	10.734	0.000	71	48964	2.00	1.74	
73 Tetrachloroethene	164	10.734	10.734	0.000	98	70322	2.00	1.92	
74 Ethyl methacrylate	69	10.818	10.818	0.000	90	20484	2.00	1.51	
75 1,1,2-Trichloroethane	83	10.888	10.888	0.000	93	27931	2.00	1.97	
76 Chlorodibromomethane	129	11.069	11.069	0.000	90	35923	2.00	1.88	
77 1,3-Dichloropropane	76	11.153	11.153	0.000	95	58317	2.00	1.90	
78 n-Butyl acetate	43	11.307	11.307	0.000	95	20849	2.00	1.98	
79 Ethylene Dibromide	107	11.321	11.321	0.000	98	27278	2.00	1.89	
80 2-Hexanone	43	11.432	11.433	-0.001	95	10489	2.00	1.71	
81 1-Chlorohexane	91	11.684	11.684	0.000	90	90698	2.00	1.74	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	95	959330	10.0	10.0	
82 Ethylbenzene	91	11.754	11.754	0.000	69	367902	2.00	1.96	
84 Chlorobenzene	112	11.768	11.768	0.000	93	195059	2.00	1.99	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
85 1,1,1,2-Tetrachloroethane	131	11.809	11.810	-0.001	94	55546	2.00	1.88	
86 m-Xylene & p-Xylene	106	11.879	11.879	0.000	98	131779	2.00	1.89	
88 o-Xylene	106	12.284	12.284	0.000	96	107660	2.00	1.82	
89 Styrene	104	12.326	12.326	0.000	94	161592	2.00	1.84	
90 Bromoform	173	12.396	12.396	0.000	95	17245	2.00	1.79	
91 Isopropylbenzene	105	12.550	12.550	0.000	97	332264	2.00	1.85	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	73047	2.00	1.82	
93 N-Propylbenzene	91	12.941	12.941	0.000	98	389117	2.00	1.91	
94 Bromobenzene	156	12.983	12.983	0.000	93	69900	2.00	1.92	
95 1,1,2,2-Tetrachloroethane	83	13.011	13.011	0.000	97	30682	2.00	1.91	
96 1,3,5-Trimethylbenzene	105	13.108	13.108	0.000	95	256684	2.00	1.86	
97 2-Chlorotoluene	91	13.122	13.122	0.000	95	269160	2.00	1.96	
99 1,2,3-Trichloropropane	110	13.164	13.164	0.000	89	9955	2.00	1.86	
98 trans-1,4-Dichloro-2-buten	53	13.178	13.178	0.000	69	8335	2.00	1.76	
100 Cyclohexanone	55	13.248	13.248	0.000	90	4529	20.0	21.6	
101 4-Chlorotoluene	91	13.276	13.276	0.000	99	222316	2.00	1.90	
102 tert-Butylbenzene	119	13.430	13.430	0.000	94	246377	2.00	1.89	
103 1,2,4-Trimethylbenzene	105	13.485	13.486	-0.001	98	273297	2.00	1.93	
104 sec-Butylbenzene	105	13.597	13.597	0.000	94	398627	2.00	1.95	
105 4-Isopropyltoluene	119	13.709	13.709	0.000	97	314853	2.00	1.93	
106 1,3-Dichlorobenzene	146	13.849	13.849	0.000	98	150022	2.00	1.94	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.919	0.000	96	470593	10.0	10.0	
107 1,2,3-Trimethylbenzene	105	13.918	13.919	0.000	66	255734	2.00	1.90	
109 1,4-Dichlorobenzene	146	13.932	13.932	0.000	94	151387	2.00	1.96	
111 n-Butylbenzene	134	14.128	14.128	0.000	97	81572	2.00	1.89	
110 Benzyl chloride	126	14.156	14.156	0.000	87	6923	2.00	2.12	
112 1,2-Dichlorobenzene	146	14.351	14.351	0.000	97	117835	2.00	1.92	
113 n-Nonyl Aldehyde	57	15.078	15.078	0.000	84	5409	2.00	1.93	
115 1,2-Dibromo-3-Chloropropan	157	15.147	15.148	-0.001	20	4269	2.00	1.67	
114 1,3,5-Trichlorobenzene	180	15.161	15.162	-0.001	98	116179	2.00	1.91	
116 Hexachlorobutadiene	225	15.748	15.748	0.000	97	72618	2.00	1.97	
117 1,2,4-Trichlorobenzene	180	15.804	15.804	0.000	94	82275	2.00	1.85	
118 Naphthalene	128	16.153	16.153	0.000	97	71721	2.00	1.63	
120 1,2,3-Trichlorobenzene	180	16.348	16.349	-0.001	96	67346	2.00	1.90	
S 119 Xylenes, Total	106				0			3.71	
S 130 Trihalomethanes, Total	1				0			7.62	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

8260 Surr 25_00071	Amount Added: 2.00	Units: uL	
8260 NewWkMix_00206	Amount Added: 2.00	Units: uL	
I.S. Working_00143	Amount Added: 10.00	Units: uL	Run Reagent

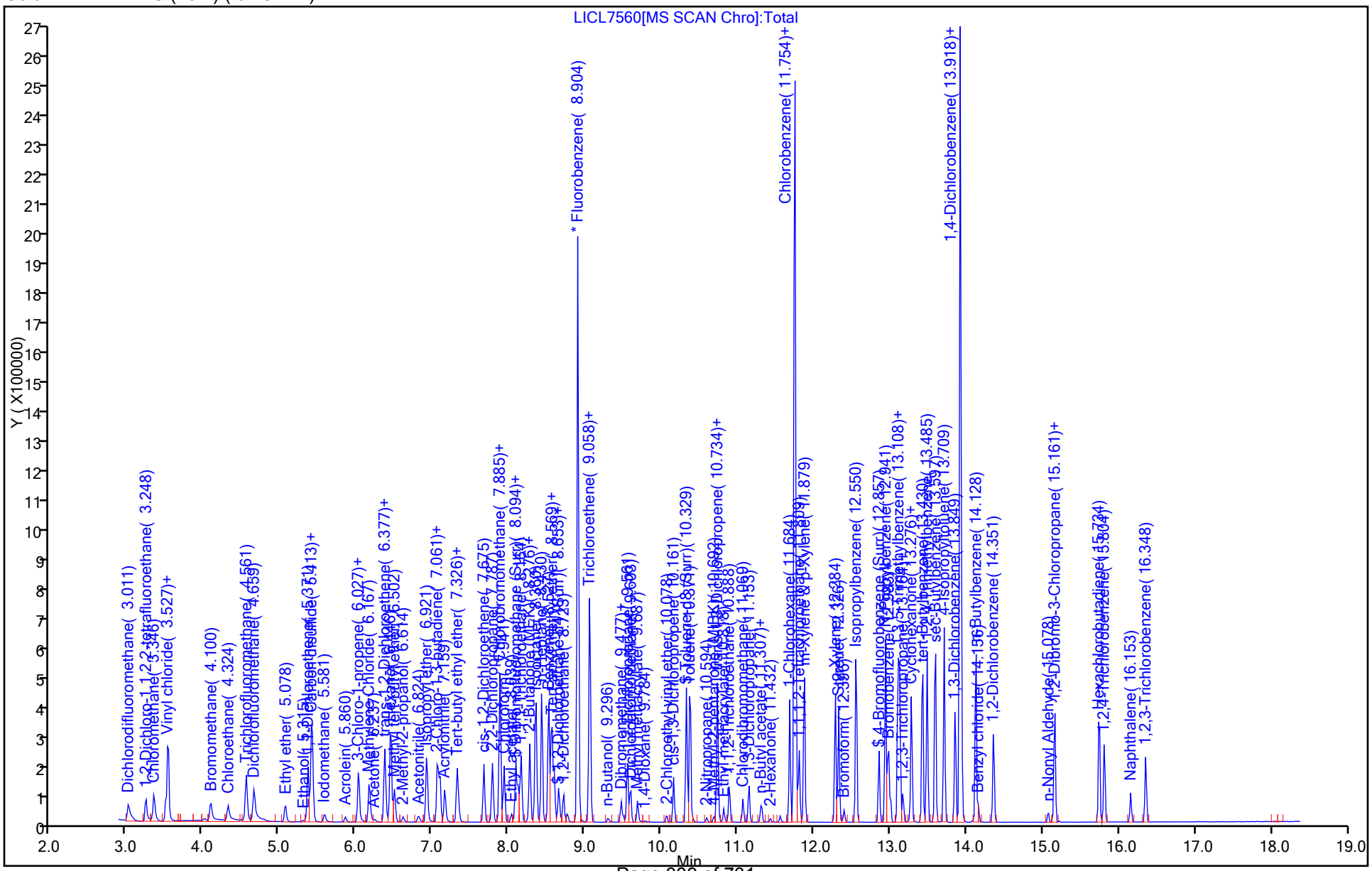
Report Date: 15-Feb-2017 11:40:52 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7560.D

Injection Date:	14-Feb-2017 13:14:30	Instrument ID:	VMSL	Operator ID:	SMCR
Lims ID:	ic			Worklist Smp#:	8
Client ID:					
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	4
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



Manual Integration/User Assign Peak Report

TestAmerica St. Louis

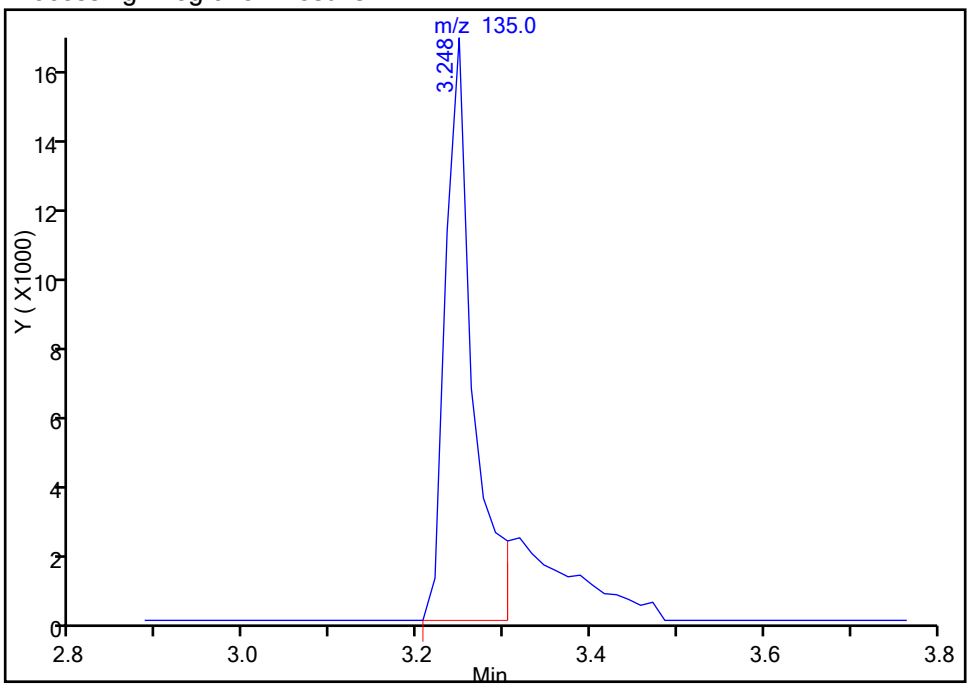
Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7560.D
Injection Date: 14-Feb-2017 13:14:30 Instrument ID: VMSL
Lims ID: ic
Client ID:
Operator ID: SMCR ALS Bottle#: 4 Worklist Smp#: 8
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Method: 25mL-8260-MSL Limit Group: MSV-8260
Column: RTX-VMS (40m) (0.18 mm) Detector MS SCAN

2 1,2-Dichloro-1,1,2,2-tetrafluoroethane, CAS: 76-14-2

Signal: 1

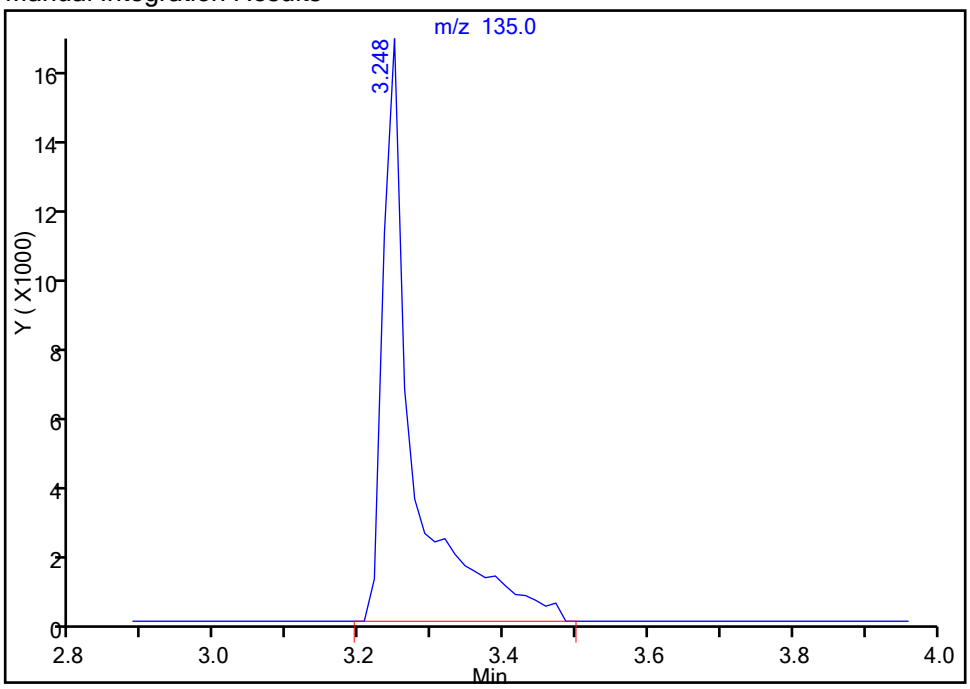
Processing Integration Results

RT: 3.25
Area: 36031
Amount: 1.510250
Amount Units: ug/l



Manual Integration Results

RT: 3.25
Area: 47424
Amount: 1.922224
Amount Units: ug/l



Reviewer: rhoadess, 15-Feb-2017 10:54:25
Audit Action: Manually Integrated Audit Reason: Peak Tail

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7561.D
Lims ID: ic
Client ID:
Sample Type: IC Calib Level: 4
Inject. Date: 14-Feb-2017 13:39:30 ALS Bottle#: 5 Worklist Smp#: 9
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: IC
Operator ID: SMCR Instrument ID: VMSL
Sublist: chrom-25mL-8260-MSL*sub17

Method: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 15-Feb-2017 11:40:53 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK023

First Level Reviewer: rhoadess Date: 15-Feb-2017 10:47:31

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85	3.011	3.011	0.000	100	251708	4.00	4.01	
2 1,2-Dichloro-1,1,2,2-tetra	135	3.248	3.248	0.000	99	126813	4.00	4.04	
3 Chloromethane	50	3.346	3.346	0.000	100	262120	4.00	3.91	
4 Vinyl chloride	62	3.514	3.500	0.014	99	267048	4.00	3.97	
5 Butadiene	39	3.542	3.528	0.014	90	292450	4.00	4.05	
6 Bromomethane	94	4.100	4.100	0.000	90	119430	4.00	3.91	
7 Chloroethane	64	4.324	4.324	0.000	100	160105	4.00	4.06	
8 Trichlorofluoromethane	101	4.561	4.561	0.000	100	332352	4.00	4.02	
9 Dichlorofluoromethane	67	4.659	4.659	0.000	98	354094	4.00	4.01	
10 Ethyl ether	74	5.078	5.064	0.014	92	58409	4.00	3.93	
11 Ethanol	45	5.315	5.315	0.000	99	20248	160.0	149.6	
12 1,1-Dichloroethene	96	5.371	5.371	0.000	96	185093	4.00	3.96	
13 Carbon disulfide	76	5.413	5.413	0.000	100	664241	4.00	4.02	
14 1,1,2-Trichloro-1,2,2-trif	151	5.427	5.427	0.000	90	184159	4.00	4.05	
16 Iodomethane	142	5.581	5.581	0.000	98	102207	4.00	3.09	
S 15 1,2-Dichloroethene, Total	96				0			7.98	
17 Acrolein	56	5.860	5.860	0.000	98	35197	20.0	18.6	
18 3-Chloro-1-propene	39	6.028	6.028	0.000	90	221460	4.00	4.07	
19 Isopropyl alcohol	45	6.069	6.069	0.000	96	23172	40.0	37.5	
20 Methylene Chloride	84	6.181	6.167	0.014	96	154556	4.00	3.99	
21 Acetone	43	6.251	6.251	0.000	99	22339	4.00	4.51	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.000	97	194844	4.00	4.00	
23 Methyl acetate	74	6.391	6.391	0.000	98	39770	20.0	20.2	
24 Hexane	86	6.460	6.447	0.013	92	69908	4.00	4.15	
25 Methyl tert-butyl ether	73	6.502	6.502	0.000	91	201413	4.00	3.94	
26 2-Methyl-2-propanol	59	6.614	6.614	0.000	84	29002	40.0	39.4	
27 Acetonitrile	41	6.810	6.810	0.000	99	64145	40.0	38.0	
28 Isopropyl ether	45	6.921	6.921	0.000	92	449409	4.00	3.99	
29 2-Chloro-1,3-butadiene	53	7.061	7.061	0.000	93	342420	4.00	4.11	
30 1,1-Dichloroethane	63	7.103	7.103	0.000	97	353362	4.00	3.99	
31 Acrylonitrile	53	7.159	7.159	0.000	99	208110	40.0	40.4	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
32 Tert-butyl ethyl ether	59	7.326	7.326	0.000	94	296816	4.00	3.87	
33 Vinyl acetate	43	7.340	7.340	0.000	98	142286	4.00	3.96	
34 cis-1,2-Dichloroethene	96	7.676	7.676	0.000	83	183466	4.00	3.98	
35 2,2-Dichloropropane	77	7.787	7.787	0.000	90	236272	4.00	3.93	
36 Cyclohexane	84	7.885	7.885	0.000	92	350857	4.00	4.14	
37 Chlorobromomethane	128	7.885	7.885	0.000	50	59405	4.00	4.02	
38 Chloroform	83	7.941	7.941	0.000	96	307859	4.00	3.98	
39 Ethyl acetate	45	8.039	8.039	0.000	99	12522	8.00	7.07	
40 Carbon tetrachloride	117	8.095	8.095	0.000	99	281071	4.00	4.03	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.123	-0.001	95	126704	4.00	3.85	
41 Tetrahydrofuran	71	8.122	8.123	-0.001	48	8609	8.00	6.75	
43 1,1,1-Trichloroethane	97	8.164	8.164	0.000	98	321490	4.00	4.04	
45 2-Butanone (MEK)	43	8.248	8.248	0.000	99	30021	4.00	3.92	
47 1,1-Dichloropropene	75	8.276	8.276	0.000	95	275394	4.00	4.02	
44 Isooctane	57	8.360	8.360	0.000	96	994490	4.00	4.21	
46 n-Heptane	43	8.430	8.430	0.000	95	413938	4.00	4.17	
48 Benzene	78	8.527	8.528	-0.001	97	769748	4.00	3.98	
50 Methacrylonitrile	41	8.569	8.555	0.014	93	427045	40.0	40.3	
49 Propionitrile	54	8.555	8.555	0.000	42	78442	40.0	39.9	
51 Tert-amyl methyl ether	73	8.597	8.597	0.000	88	193645	4.00	3.86	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	124885	4.00	3.85	
52 Isobutyl alcohol	42	8.667	8.667	0.000	89	26365	100.0	98.2	
54 1,2-Dichloroethane	62	8.723	8.723	0.000	97	154389	4.00	3.97	
* 55 Fluorobenzene	96	8.905	8.905	0.000	99	1779361	10.0	10.0	
57 Trichloroethene	95	9.058	9.058	0.000	91	214501	4.00	4.01	
58 Methylcyclohexane	55	9.058	9.058	0.000	96	355259	4.00	4.07	
59 n-Butanol	56	9.296	9.296	0.000	93	20579	100.0	88.8	
61 Dibromomethane	93	9.477	9.477	0.000	93	54513	4.00	3.92	
60 Ethyl acrylate	55	9.505	9.505	0.000	99	56902	4.00	3.32	
62 1,2-Dichloropropane	63	9.561	9.561	0.000	92	157474	4.00	3.97	
63 Dichlorobromomethane	83	9.603	9.603	0.000	99	171312	4.00	3.92	
64 Methyl methacrylate	69	9.687	9.687	0.000	94	71341	8.00	6.82	
65 1,4-Dioxane	88	9.784	9.785	0.000	92	8490	80.0	72.4	
66 2-Chloroethyl vinyl ether	63	10.078	10.078	0.000	93	23130	4.00	3.43	
67 cis-1,3-Dichloropropene	75	10.162	10.162	0.000	93	183326	4.00	3.94	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	94	630833	4.00	4.00	
69 Toluene	92	10.385	10.371	0.014	98	477515	4.00	4.12	
70 2-Nitropropane	43	10.594	10.595	-0.001	98	20833	8.00	7.31	
71 4-Methyl-2-pentanone (MIBK	43	10.692	10.692	0.000	96	34405	4.00	3.19	
73 Tetrachloroethene	164	10.734	10.734	0.000	98	177263	4.00	3.97	
72 trans-1,3-Dichloropropene	75	10.734	10.734	0.000	77	137047	4.00	3.99	
74 Ethyl methacrylate	69	10.818	10.818	0.000	91	68461	4.00	3.25	
75 1,1,2-Trichloroethane	83	10.888	10.888	0.000	95	68699	4.00	3.98	
76 Chlorodibromomethane	129	11.069	11.069	0.000	90	91923	4.00	3.94	
77 1,3-Dichloropropane	76	11.153	11.153	0.000	93	149063	4.00	3.99	
78 n-Butyl acetate	43	11.307	11.307	0.000	96	57900	4.00	3.47	
79 Ethylene Dibromide	107	11.321	11.321	0.000	99	69274	4.00	3.95	
80 2-Hexanone	43	11.432	11.433	-0.001	96	30653	4.00	3.64	
81 1-Chlorohexane	91	11.684	11.684	0.000	92	252136	4.00	3.96	
82 Ethylbenzene	91	11.754	11.754	0.000	95	913138	4.00	4.00	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	87	1169328	10.0	10.0	
84 Chlorobenzene	112	11.768	11.768	0.000	94	472052	4.00	3.95	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
85 1,1,1,2-Tetrachloroethane	131	11.810	11.810	0.000	95	143690	4.00	3.99	
86 m-Xylene & p-Xylene	106	11.879	11.879	0.000	98	343185	4.00	4.04	
88 o-Xylene	106	12.284	12.284	0.000	96	296261	4.00	4.11	
89 Styrene	104	12.326	12.326	0.000	95	442182	4.00	4.12	
90 Bromoform	173	12.396	12.396	0.000	96	44391	4.00	3.87	
91 Isopropylbenzene	105	12.550	12.550	0.000	97	881821	4.00	4.14	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	184835	4.00	3.88	
93 N-Propylbenzene	91	12.941	12.941	0.000	98	1010750	4.00	4.18	
94 Bromobenzene	156	12.983	12.983	0.000	90	173592	4.00	4.02	
95 1,1,2,2-Tetrachloroethane	83	13.011	13.011	0.000	96	75638	4.00	3.97	
96 1,3,5-Trimethylbenzene	105	13.108	13.108	0.000	95	683531	4.00	4.16	
97 2-Chlorotoluene	91	13.122	13.122	0.000	96	666024	4.00	4.08	
99 1,2,3-Trichloropropane	110	13.164	13.164	0.000	89	25017	4.00	3.94	
98 trans-1,4-Dichloro-2-buten	53	13.178	13.178	0.000	73	23138	4.00	4.11	
100 Cyclohexanone	55	13.248	13.248	0.000	94	11067	40.0	35.5	
101 4-Chlorotoluene	91	13.276	13.276	0.000	99	567876	4.00	4.09	
102 tert-Butylbenzene	119	13.430	13.430	0.000	93	638927	4.00	4.13	
103 1,2,4-Trimethylbenzene	105	13.486	13.486	0.000	97	702078	4.00	4.17	
104 sec-Butylbenzene	105	13.597	13.597	0.000	94	993992	4.00	4.08	
105 4-Isopropyltoluene	119	13.709	13.709	0.000	97	805672	4.00	4.16	
106 1,3-Dichlorobenzene	146	13.849	13.849	0.000	98	361693	4.00	3.94	
107 1,2,3-Trimethylbenzene	105	13.918	13.919	0.000	83	644762	4.00	4.04	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.919	0.000	96	559512	10.0	10.0	
109 1,4-Dichlorobenzene	146	13.932	13.932	0.000	94	366901	4.00	3.99	
111 n-Butylbenzene	134	14.128	14.128	0.000	96	206207	4.00	4.03	
110 Benzyl chloride	126	14.156	14.156	0.000	88	19040	4.00	3.61	
112 1,2-Dichlorobenzene	146	14.351	14.351	0.000	97	288210	4.00	3.96	
113 n-Nonyl Aldehyde	57	15.078	15.078	0.000	86	20217	4.00	3.10	
115 1,2-Dibromo-3-Chloropropan	157	15.147	15.148	-0.001	81	11637	4.00	3.83	
114 1,3,5-Trichlorobenzene	180	15.161	15.162	-0.001	98	290282	4.00	4.02	
116 Hexachlorobutadiene	225	15.748	15.748	0.000	97	167863	4.00	3.84	
117 1,2,4-Trichlorobenzene	180	15.804	15.804	0.000	94	208981	4.00	3.95	
118 Naphthalene	128	16.153	16.153	0.000	97	209562	4.00	3.48	
120 1,2,3-Trichlorobenzene	180	16.349	16.349	0.000	96	166827	4.00	3.95	
S 119 Xylenes, Total	106				0			8.14	
S 130 Trihalomethanes, Total	1				0			15.7	

Reagents:

8260 Surr 25_00071	Amount Added: 4.00	Units: uL	
8260 NewWkMix_00206	Amount Added: 4.00	Units: uL	
I.S. Working_00143	Amount Added: 10.00	Units: uL	Run Reagent

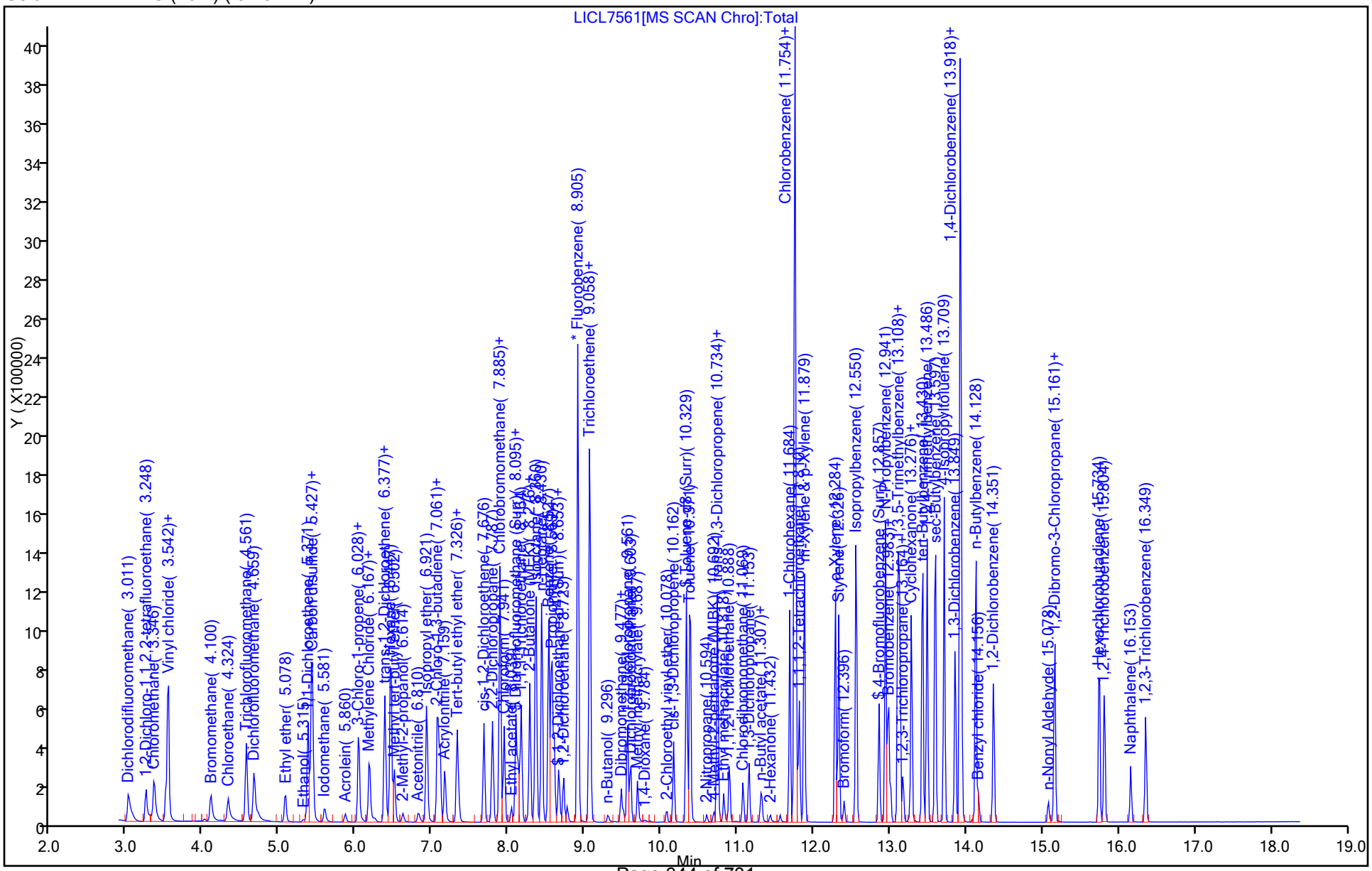
Report Date: 15-Feb-2017 11:40:54 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7561.D

Injection Date:	14-Feb-2017 13:39:30	Instrument ID:	VMSL	Operator ID:	SMCR
Lims ID:	ic			Worklist Smp#:	9
Client ID:					
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	5
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7562.D
Lims ID: icis
Client ID:
Sample Type: ICIS Calib Level: 5
Inject. Date: 14-Feb-2017 14:05:30 ALS Bottle#: 6 Worklist Smp#: 10
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: ICIS
Misc. Info.: 10
Operator ID: SMCR Instrument ID: VMSL
Sublist: chrom-25mL-8260-MSL*sub17

Method: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 15-Feb-2017 11:40:55 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK023

First Level Reviewer: rhoadess Date: 15-Feb-2017 10:55:38

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85	3.011	3.011	0.000	99	634852	10.0	9.85	
2 1,2-Dichloro-1,1,2,2-tetra	135	3.248	3.248	0.000	100	325126	10.0	10.1	
3 Chloromethane	50	3.346	3.346	0.000	99	637841	10.0	9.28	
4 Vinyl chloride	62	3.500	3.500	0.000	98	685127	10.0	9.93	
5 Butadiene	39	3.528	3.528	0.000	92	733049	10.0	9.90	
6 Bromomethane	94	4.100	4.100	0.000	91	296249	10.0	9.46	
7 Chloroethane	64	4.324	4.324	0.000	100	389941	10.0	9.65	
8 Trichlorofluoromethane	101	4.561	4.561	0.000	100	826896	10.0	9.75	
9 Dichlorofluoromethane	67	4.659	4.659	0.000	98	879082	10.0	9.71	
10 Ethyl ether	74	5.064	5.064	0.000	94	154033	10.0	10.1	
11 Ethanol	45	5.315	5.315	0.000	100	48991	400.0	352.8	
12 1,1-Dichloroethene	96	5.371	5.371	0.000	97	485900	10.0	10.1	
13 Carbon disulfide	76	5.413	5.413	0.000	100	1729860	10.0	10.2	
14 1,1,2-Trichloro-1,2,2-trif	151	5.427	5.427	0.000	91	460534	10.0	9.88	
16 Iodomethane	142	5.581	5.581	0.000	99	337296	10.0	9.15	
17 Acrolein	56	5.860	5.860	0.000	99	100915	50.0	52.0	
18 3-Chloro-1-propene	39	6.028	6.028	0.000	91	580706	10.0	10.4	
19 Isopropyl alcohol	45	6.069	6.069	0.000	97	62222	100.0	98.1	
20 Methylene Chloride	84	6.167	6.167	0.000	98	384047	10.0	9.65	
21 Acetone	43	6.251	6.251	0.000	99	44176	10.0	10.2	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.000	98	508224	10.0	10.2	
23 Methyl acetate	74	6.391	6.391	0.000	98	103417	50.0	51.2	
24 Hexane	86	6.447	6.447	0.000	91	189282	10.0	11.0	
25 Methyl tert-butyl ether	73	6.502	6.502	0.000	94	520732	10.0	9.94	
26 2-Methyl-2-propanol	59	6.614	6.614	0.000	85	73903	100.0	97.9	
27 Acetonitrile	41	6.810	6.810	0.000	99	155641	100.0	89.8	
28 Isopropyl ether	45	6.921	6.921	0.000	94	1211476	10.0	10.5	
29 2-Chloro-1,3-butadiene	53	7.061	7.061	0.000	94	936515	10.0	10.9	
30 1,1-Dichloroethane	63	7.103	7.103	0.000	97	898980	10.0	9.88	
31 Acrylonitrile	53	7.159	7.159	0.000	99	526284	100.0	99.6	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
32 Tert-butyl ethyl ether	59	7.326	7.326	0.000	96	809225	10.0	10.3	
33 Vinyl acetate	43	7.340	7.340	0.000	98	381135	10.0	10.3	
34 cis-1,2-Dichloroethene	96	7.676	7.676	0.000	83	480896	10.0	10.2	
35 2,2-Dichloropropane	77	7.787	7.787	0.000	92	625960	10.0	10.1	
37 Chlorobromomethane	128	7.885	7.885	0.000	49	148543	10.0	9.79	
36 Cyclohexane	84	7.885	7.885	0.000	91	948070	10.0	10.9	
38 Chloroform	83	7.941	7.941	0.000	95	789087	10.0	9.95	
39 Ethyl acetate	45	8.039	8.039	0.000	99	35763	20.0	18.5	
40 Carbon tetrachloride	117	8.095	8.095	0.000	99	734608	10.0	10.3	
41 Tetrahydrofuran	71	8.123	8.123	0.000	44	25802	20.0	18.4	
$ 42 Dibromofluoromethane (Surr	113	8.123	8.123	0.000	95	332989	10.0	9.86	
43 1,1,1-Trichloroethane	97	8.164	8.164	0.000	98	834642	10.0	10.2	
45 2-Butanone (MEK)	43	8.248	8.248	0.000	98	65567	10.0	9.75	
47 1,1-Dichloropropene	75	8.276	8.276	0.000	95	750406	10.0	10.7	
44 Isooctane	57	8.360	8.360	0.000	96	2621621	10.0	10.8	
46 n-Heptane	43	8.430	8.430	0.000	95	1115473	10.0	11.0	
48 Benzene	78	8.528	8.528	0.000	96	1967570	10.0	9.92	
49 Propionitrile	54	8.555	8.555	0.000	38	195483	100.0	97.0	
50 Methacrylonitrile	41	8.555	8.555	0.000	95	1090316	100.0	100.4	
51 Tert-amyl methyl ether	73	8.597	8.597	0.000	90	521833	10.0	10.1	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	91	312683	10.0	9.39	
52 Isobutyl alcohol	42	8.667	8.667	0.000	90	71036	250.0	257.9	
54 1,2-Dichloroethane	62	8.723	8.723	0.000	98	388949	10.0	9.74	
* 55 Fluorobenzene	96	8.905	8.905	0.000	99	1825688	10.0	10.0	
58 Methylcyclohexane	55	9.058	9.058	0.000	93	943803	10.0	10.5	
57 Trichloroethene	95	9.058	9.058	0.000	64	551055	10.0	10.0	
59 n-Butanol	56	9.296	9.296	0.000	91	64867	250.0	214.3	
61 Dibromomethane	93	9.477	9.477	0.000	93	138772	10.0	9.74	
60 Ethyl acrylate	55	9.505	9.505	0.000	99	165140	10.0	8.66	
62 1,2-Dichloropropane	63	9.561	9.561	0.000	93	409754	10.0	10.1	
63 Dichlorobromomethane	83	9.603	9.603	0.000	100	452220	10.0	10.1	
64 Methyl methacrylate	69	9.687	9.687	0.000	93	209912	20.0	18.2	
65 1,4-Dioxane	88	9.785	9.785	0.000	94	25179	200.0	193.6	
66 2-Chloroethyl vinyl ether	63	10.078	10.078	0.000	94	71667	10.0	9.65	
67 cis-1,3-Dichloropropene	75	10.162	10.162	0.000	94	515898	10.0	10.8	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	93	1707588	10.0	10.4	
69 Toluene	92	10.371	10.371	0.000	98	1272234	10.0	10.5	
70 2-Nitropropane	43	10.595	10.595	0.000	98	60307	20.0	16.6	
71 4-Methyl-2-pentanone (MIBK	43	10.692	10.692	0.000	97	102481	10.0	8.40	
72 trans-1,3-Dichloropropene	75	10.734	10.734	0.000	79	387135	10.0	10.8	
73 Tetrachloroethene	164	10.734	10.734	0.000	98	481253	10.0	10.3	
74 Ethyl methacrylate	69	10.818	10.818	0.000	91	215566	10.0	8.77	
75 1,1,2-Trichloroethane	83	10.888	10.888	0.000	94	176545	10.0	9.80	
76 Chlorodibromomethane	129	11.069	11.069	0.000	90	248800	10.0	10.2	
77 1,3-Dichloropropane	76	11.153	11.153	0.000	93	385361	10.0	9.90	
78 n-Butyl acetate	43	11.307	11.307	0.000	97	183885	10.0	8.75	
79 Ethylene Dibromide	107	11.321	11.321	0.000	99	184418	10.0	10.1	
80 2-Hexanone	43	11.433	11.433	0.000	96	87490	10.0	9.39	
81 1-Chlorohexane	91	11.684	11.684	0.000	95	778681	10.0	11.7	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	95	1220244	10.0	10.0	
82 Ethylbenzene	91	11.754	11.754	0.000	98	2486865	10.0	10.4	
84 Chlorobenzene	112	11.768	11.768	0.000	94	1233906	10.0	9.90	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
85 1,1,1,2-Tetrachloroethane	131	11.810	11.810	0.000	94	381864	10.0	10.2	
86 m-Xylene & p-Xylene	106	11.879	11.879	0.000	98	970153	10.0	10.9	
88 o-Xylene	106	12.284	12.284	0.000	96	845841	10.0	11.2	
89 Styrene	104	12.326	12.326	0.000	95	1271324	10.0	11.4	
90 Bromoform	173	12.396	12.396	0.000	97	120062	10.0	9.73	
91 Isopropylbenzene	105	12.550	12.550	0.000	97	2562749	10.0	11.2	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	519332	10.0	10.1	
93 N-Propylbenzene	91	12.941	12.941	0.000	98	2961062	10.0	11.4	
94 Bromobenzene	156	12.983	12.983	0.000	95	463522	10.0	9.98	
95 1,1,2,2-Tetrachloroethane	83	13.011	13.011	0.000	96	195643	10.0	9.55	
96 1,3,5-Trimethylbenzene	105	13.108	13.108	0.000	95	2019769	10.0	11.4	
97 2-Chlorotoluene	91	13.122	13.122	0.000	96	1825409	10.0	10.4	
99 1,2,3-Trichloropropane	110	13.164	13.164	0.000	88	64386	10.0	9.44	
98 trans-1,4-Dichloro-2-buten	53	13.178	13.178	0.000	86	58231	10.0	9.61	
100 Cyclohexanone	55	13.248	13.248	0.000	91	32256	100.0	81.9	
101 4-Chlorotoluene	91	13.276	13.276	0.000	99	1608761	10.0	10.8	
102 tert-Butylbenzene	119	13.430	13.430	0.000	93	1871331	10.0	11.2	
103 1,2,4-Trimethylbenzene	105	13.486	13.486	0.000	97	1995253	10.0	11.0	
104 sec-Butylbenzene	105	13.597	13.597	0.000	94	2931782	10.0	11.2	
105 4-Isopropyltoluene	119	13.709	13.709	0.000	97	2399495	10.0	11.5	
106 1,3-Dichlorobenzene	146	13.849	13.849	0.000	98	988692	10.0	10.0	
* 108 1,4-Dichlorobenzene-d4	152	13.919	13.919	0.000	72	601374	10.0	10.0	
107 1,2,3-Trimethylbenzene	105	13.919	13.919	0.000	97	1787977	10.0	10.4	
109 1,4-Dichlorobenzene	146	13.932	13.932	0.000	93	966912	10.0	9.79	
111 n-Butylbenzene	134	14.128	14.128	0.000	96	627877	10.0	11.4	
110 Benzyl chloride	126	14.156	14.156	0.000	98	60145	10.0	8.70	
112 1,2-Dichlorobenzene	146	14.351	14.351	0.000	97	785043	10.0	10.0	
113 n-Nonyl Aldehyde	57	15.078	15.078	0.000	90	91559	10.0	8.09	
115 1,2-Dibromo-3-Chloropropan	157	15.148	15.148	0.000	83	33140	10.0	10.2	
114 1,3,5-Trichlorobenzene	180	15.162	15.162	0.000	98	801900	10.0	10.3	
116 Hexachlorobutadiene	225	15.748	15.748	0.000	97	487449	10.0	10.4	
117 1,2,4-Trichlorobenzene	180	15.804	15.804	0.000	94	587581	10.0	10.3	
118 Naphthalene	128	16.153	16.153	0.000	97	631041	10.0	9.12	
120 1,2,3-Trichlorobenzene	180	16.349	16.349	0.000	96	458528	10.0	10.1	

Reagents:

8260 Surr 25_00071	Amount Added: 10.00	Units: uL	
8260 NewWkMix_00206	Amount Added: 10.00	Units: uL	
I.S. Working_00143	Amount Added: 10.00	Units: uL	Run Reagent

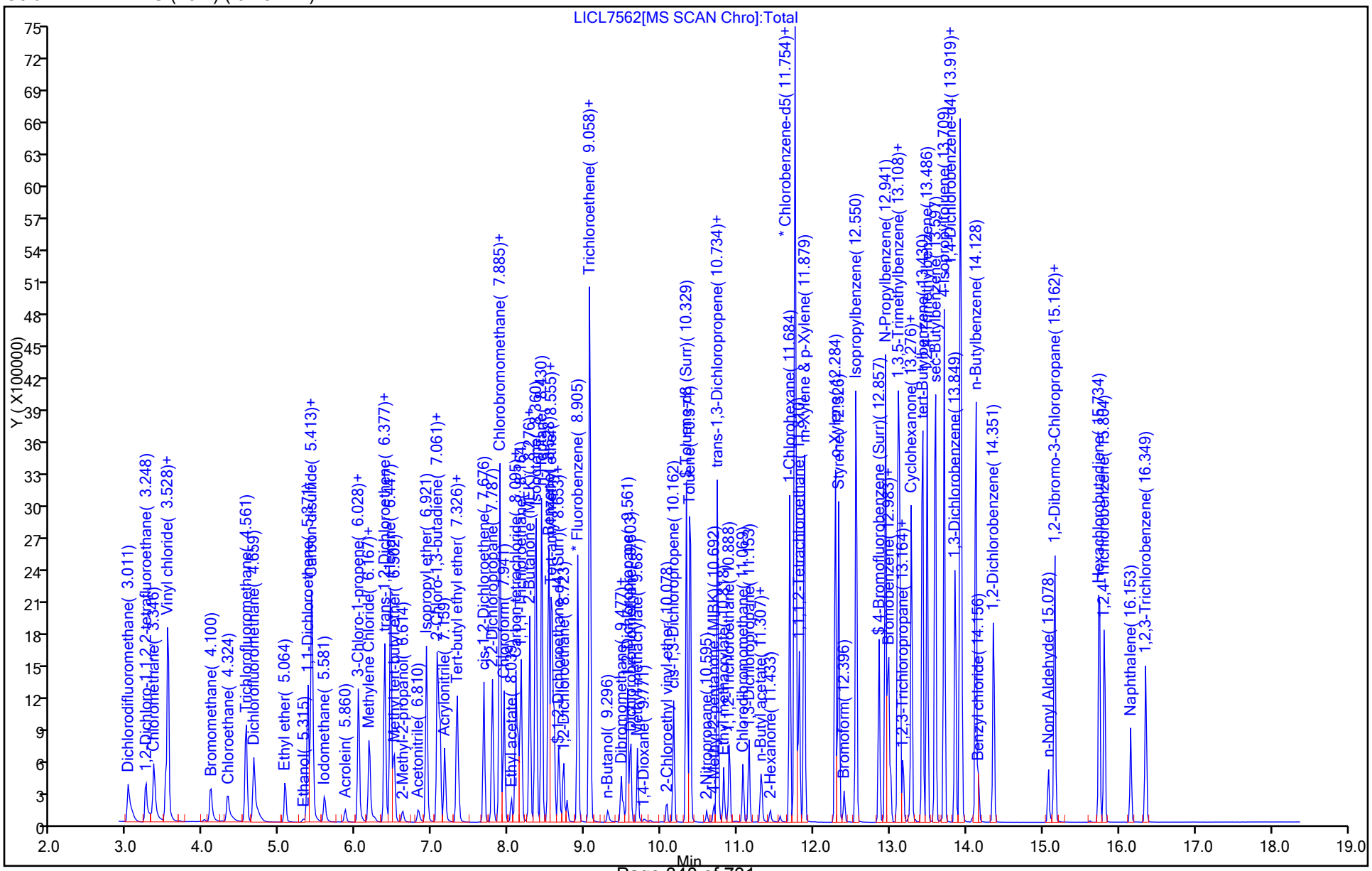
Report Date: 15-Feb-2017 11:40:56 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7562.D

Injection Date:	14-Feb-2017 14:05:30	Instrument ID:	VMSL	Operator ID:	SMCR
Lims ID:	icis			Worklist Smp#:	10
Client ID:					
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	6
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7563.D
Lims ID: ic
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 14-Feb-2017 14:30:30 ALS Bottle#: 7 Worklist Smp#: 11
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: IC
Misc. Info.: 20
Operator ID: SMCR Instrument ID: VMSL
Sublist: chrom-25mL-8260-MSL*sub17

Method: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 15-Feb-2017 11:40:57 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK023

First Level Reviewer: rhoadess Date: 15-Feb-2017 10:56:57

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85	3.011	3.011	0.000	99	1256427	20.0	20.4	
2 1,2-Dichloro-1,1,2,2-tetra	135	3.248	3.248	0.000	99	639957	20.0	20.9	
3 Chloromethane	50	3.346	3.346	0.000	99	1318934	20.0	20.1	
4 Vinyl chloride	62	3.500	3.500	0.000	98	1357335	20.0	20.6	
5 Butadiene	39	3.528	3.528	0.000	91	1446021	20.0	20.5	
6 Bromomethane	94	4.100	4.100	0.000	90	555055	20.0	18.6	
7 Chloroethane	64	4.324	4.324	0.000	100	753649	20.0	19.6	
8 Trichlorofluoromethane	101	4.561	4.561	0.000	100	1578822	20.0	19.5	
9 Dichlorofluoromethane	67	4.659	4.659	0.000	98	1696388	20.0	19.7	
10 Ethyl ether	74	5.064	5.064	0.000	94	329022	20.0	22.6	
11 Ethanol	45	5.315	5.315	0.000	100	102897	800.0	777.0	
12 1,1-Dichloroethene	96	5.371	5.371	0.000	97	951766	20.0	20.8	
13 Carbon disulfide	76	5.413	5.413	0.000	100	3302911	20.0	20.4	
14 1,1,2-Trichloro-1,2,2-trif	151	5.427	5.427	0.000	90	893873	20.0	20.1	
16 Iodomethane	142	5.581	5.581	0.000	99	738223	20.0	20.6	
S 15 1,2-Dichloroethene, Total	96				0			41.5	
17 Acrolein	56	5.860	5.860	0.000	99	216721	100.0	117.1	
18 3-Chloro-1-propene	39	6.028	6.028	0.000	91	1150529	20.0	21.6	
19 Isopropyl alcohol	45	6.069	6.069	0.000	97	137823	200.0	227.9	
20 Methylene Chloride	84	6.167	6.167	0.000	98	755598	20.0	19.9	
21 Acetone	43	6.251	6.251	0.000	99	80703	20.0	21.1	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.000	97	978176	20.0	20.5	
23 Methyl acetate	74	6.391	6.391	0.000	98	217091	100.0	112.7	
24 Hexane	86	6.461	6.447	0.014	90	360150	20.0	21.9	
25 Methyl tert-butyl ether	73	6.502	6.502	0.000	95	1126507	20.0	22.5	
26 2-Methyl-2-propanol	59	6.614	6.614	0.000	87	160322	200.0	222.7	
27 Acetonitrile	41	6.810	6.810	0.000	99	320302	200.0	193.7	
28 Isopropyl ether	45	6.921	6.921	0.000	94	2566082	20.0	23.3	
29 2-Chloro-1,3-butadiene	53	7.061	7.061	0.000	93	1845351	20.0	22.6	
30 1,1-Dichloroethane	63	7.103	7.103	0.000	97	1756056	20.0	20.2	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
31 Acrylonitrile	53	7.159	7.159	0.000	99	1073527	200.0	213.1	
32 Tert-butyl ethyl ether	59	7.326	7.326	0.000	97	1789705	20.0	23.9	
33 Vinyl acetate	43	7.340	7.340	0.000	98	801797	20.0	22.8	
34 cis-1,2-Dichloroethene	96	7.676	7.676	0.000	83	949313	20.0	21.0	
35 2,2-Dichloropropane	77	7.787	7.787	0.000	93	1233952	20.0	21.0	
36 Cyclohexane	84	7.885	7.885	0.000	91	1784571	20.0	21.5	
37 Chlorobromomethane	128	7.885	7.885	0.000	52	293577	20.0	20.3	
38 Chloroform	83	7.941	7.941	0.000	96	1534405	20.0	20.3	
39 Ethyl acetate	45	8.039	8.039	0.000	99	78629	40.0	41.7	
40 Carbon tetrachloride	117	8.095	8.095	0.000	98	1391641	20.0	20.4	
$ 42 Dibromofluoromethane (Surr	113	8.123	8.123	0.000	95	641092	20.0	19.9	
41 Tetrahydrofuran	71	8.123	8.123	0.000	89	56935	40.0	41.6	
43 1,1,1-Trichloroethane	97	8.164	8.164	0.000	98	1602853	20.0	20.6	
45 2-Butanone (MEK)	43	8.248	8.248	0.000	99	123054	20.0	20.4	
47 1,1-Dichloropropene	75	8.276	8.276	0.000	96	1410741	20.0	21.1	
44 Isooctane	57	8.360	8.360	0.000	96	5005583	20.0	21.7	
46 n-Heptane	43	8.430	8.430	0.000	95	1995284	20.0	20.6	
48 Benzene	78	8.528	8.528	0.000	97	3735154	20.0	19.7	
50 Methacrylonitrile	41	8.555	8.555	0.000	94	2220679	200.0	214.4	
49 Propionitrile	54	8.555	8.555	0.000	39	404254	200.0	210.4	
51 Tert-amyl methyl ether	73	8.597	8.597	0.000	92	1162260	20.0	23.7	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	91	599365	20.0	18.9	
52 Isobutyl alcohol	42	8.667	8.667	0.000	93	156359	500.0	595.2	
54 1,2-Dichloroethane	62	8.723	8.723	0.000	98	768531	20.0	20.2	
* 55 Fluorobenzene	96	8.905	8.905	0.000	99	1740931	10.0	10.0	
57 Trichloroethene	95	9.058	9.058	0.000	64	1019746	20.0	19.5	
58 Methylcyclohexane	55	9.058	9.058	0.000	93	1710274	20.0	20.0	
59 n-Butanol	56	9.296	9.296	0.000	91	152940	500.0	488.1	
61 Dibromomethane	93	9.477	9.477	0.000	93	279672	20.0	20.6	
60 Ethyl acrylate	55	9.505	9.505	0.000	99	390858	20.0	20.9	
62 1,2-Dichloropropane	63	9.561	9.561	0.000	94	813917	20.0	21.0	
63 Dichlorobromomethane	83	9.603	9.603	0.000	99	910493	20.0	21.3	
64 Methyl methacrylate	69	9.687	9.687	0.000	93	477155	40.0	42.3	
65 1,4-Dioxane	88	9.784	9.785	0.000	97	52672	400.0	414.9	
66 2-Chloroethyl vinyl ether	63	10.078	10.078	0.000	93	150856	20.0	20.9	
67 cis-1,3-Dichloropropene	75	10.162	10.162	0.000	94	1062639	20.0	23.3	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	93	3070026	20.0	20.2	
69 Toluene	92	10.385	10.371	0.014	99	2351671	20.0	21.0	
70 2-Nitropropane	43	10.595	10.595	0.000	99	144356	40.0	39.7	
71 4-Methyl-2-pentanone (MIBK	43	10.692	10.692	0.000	97	236579	20.0	20.4	
73 Tetrachloroethene	164	10.734	10.734	0.000	98	840730	20.0	19.5	
72 trans-1,3-Dichloropropene	75	10.734	10.734	0.000	84	803753	20.0	24.3	
74 Ethyl methacrylate	69	10.818	10.818	0.000	90	489901	20.0	20.8	
75 1,1,2-Trichloroethane	83	10.888	10.888	0.000	93	349969	20.0	21.0	
76 Chlorodibromomethane	129	11.069	11.069	0.000	91	510489	20.0	22.7	
77 1,3-Dichloropropane	76	11.153	11.153	0.000	93	770605	20.0	21.4	
78 n-Butyl acetate	43	11.307	11.307	0.000	97	455679	20.0	21.0	
79 Ethylene Dibromide	107	11.321	11.321	0.000	98	373536	20.0	22.1	
80 2-Hexanone	43	11.433	11.433	-0.001	96	184016	20.0	20.9	
81 1-Chlorohexane	91	11.684	11.684	0.000	96	1350872	20.0	22.0	
82 Ethylbenzene	91	11.754	11.754	0.000	98	4318403	20.0	19.6	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	86	1128155	10.0	10.0	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
84 Chlorobenzene	112	11.768	11.768	0.000	96	2243827	20.0	19.5	
85 1,1,1,2-Tetrachloroethane	131	11.810	11.810	0.000	95	737681	20.0	21.2	
86 m-Xylene & p-Xylene	106	11.879	11.879	0.000	98	1701756	20.0	20.7	
88 o-Xylene	106	12.284	12.284	0.000	96	1555500	20.0	22.3	
89 Styrene	104	12.326	12.326	0.000	95	2362178	20.0	22.8	
90 Bromoform	173	12.396	12.396	0.000	97	258142	20.0	23.6	
91 Isopropylbenzene	105	12.550	12.550	0.000	97	4361986	20.0	21.5	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	939146	20.0	20.7	
93 N-Propylbenzene	91	12.941	12.941	0.000	98	4890506	20.0	21.2	
94 Bromobenzene	156	12.983	12.983	0.000	89	851566	20.0	20.7	
95 1,1,2,2-Tetrachloroethane	83	13.011	13.011	0.000	96	392709	20.0	21.6	
96 1,3,5-Trimethylbenzene	105	13.108	13.108	0.000	95	3458399	20.0	22.1	
97 2-Chlorotoluene	91	13.122	13.122	0.000	96	3155446	20.0	20.3	
99 1,2,3-Trichloropropane	110	13.164	13.164	0.000	87	129986	20.0	21.5	
98 trans-1,4-Dichloro-2-buten	53	13.178	13.178	0.000	89	123446	20.0	23.0	
100 Cyclohexanone	55	13.248	13.248	0.000	92	74111	200.0	198.8	
101 4-Chlorotoluene	91	13.276	13.276	0.000	99	2788252	20.0	21.1	
102 tert-Butylbenzene	119	13.430	13.430	0.000	93	3106458	20.0	21.0	
103 1,2,4-Trimethylbenzene	105	13.486	13.486	0.000	97	3423809	20.0	21.4	
104 sec-Butylbenzene	105	13.597	13.597	0.000	94	4754921	20.0	20.5	
105 4-Isopropyltoluene	119	13.709	13.709	0.000	97	3917287	20.0	21.2	
106 1,3-Dichlorobenzene	146	13.849	13.849	0.000	98	1740580	20.0	19.9	
107 1,2,3-Trimethylbenzene	105	13.919	13.919	0.000	98	3199086	20.0	21.0	
* 108 1,4-Dichlorobenzene-d4	152	13.919	13.919	0.000	59	533491	10.0	10.0	
109 1,4-Dichlorobenzene	146	13.932	13.932	0.000	93	1705248	20.0	19.5	
111 n-Butylbenzene	134	14.128	14.128	0.000	96	1028489	20.0	21.1	
110 Benzyl chloride	126	14.156	14.156	0.000	89	129712	20.0	19.7	
112 1,2-Dichlorobenzene	146	14.351	14.351	0.000	97	1424008	20.0	20.5	
113 n-Nonyl Aldehyde	57	15.078	15.078	0.000	91	289588	20.0	21.2	
115 1,2-Dibromo-3-Chloropropan	157	15.148	15.148	0.000	84	72609	20.0	25.1	
114 1,3,5-Trichlorobenzene	180	15.161	15.162	-0.001	98	1413327	20.0	20.5	
116 Hexachlorobutadiene	225	15.748	15.748	0.000	98	781531	20.0	18.7	
117 1,2,4-Trichlorobenzene	180	15.804	15.804	0.000	94	1085567	20.0	21.5	
118 Naphthalene	128	16.153	16.153	0.000	97	1316312	20.0	21.0	
120 1,2,3-Trichlorobenzene	180	16.349	16.349	0.000	96	856069	20.0	21.3	
S 119 Xylenes, Total	106				0			43.1	
S 130 Trihalomethanes, Total	1				0			87.9	

Reagents:

8260 Surr 25_00071	Amount Added: 20.00	Units: uL	
8260NewHiWrk_00183	Amount Added: 4.00	Units: uL	
I.S. Working_00143	Amount Added: 10.00	Units: uL	Run Reagent

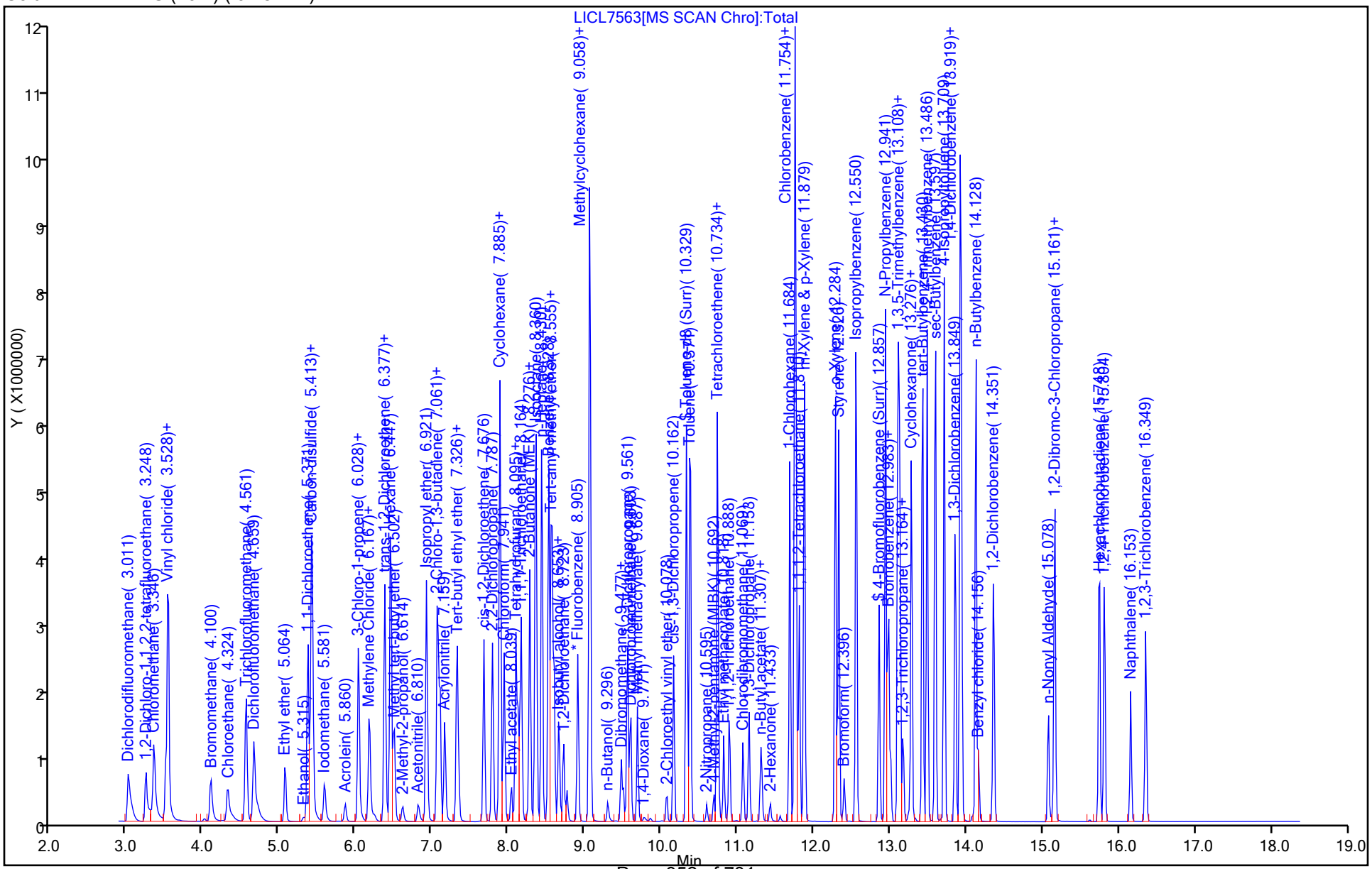
Report Date: 15-Feb-2017 11:40:58 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7563.D

Injection Date:	14-Feb-2017 14:30:30	Instrument ID:	VMSL	Operator ID:	SMCR
Lims ID:	ic			Worklist Smp#:	11
Client ID:					
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	7
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



Report Date: 15-Feb-2017 11:41:00 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D
Lims ID: ic
Client ID:
Sample Type: IC Calib Level: 7
Inject. Date: 14-Feb-2017 14:56:30 ALS Bottle#: 8 Worklist Smp#: 12
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: IC
Misc. Info.: 40
Operator ID: SMCR Instrument ID: VMSL
Sublist: chrom-25mL-8260-MSL*sub17

Method: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 15-Feb-2017 11:40:59 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK023

First Level Reviewer: rhoadess Date: 15-Feb-2017 10:58:38

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85	3.011	3.011	0.000	100	2636692	40.0	38.0	
2 1,2-Dichloro-1,1,2,2-tetra	135	3.248	3.248	0.000	99	1368515	40.0	39.5	
3 Chloromethane	50	3.346	3.346	0.000	100	2836166	40.0	38.4	
4 Vinyl chloride	62	3.500	3.500	0.000	98	2894691	40.0	39.0	
5 Butadiene	39	3.541	3.528	0.013	89	3009031	40.0	37.8	
6 Bromomethane	94	4.100	4.100	0.000	91	1250968	40.0	37.1	
7 Chloroethane	64	4.324	4.324	0.000	100	1587780	40.0	36.5	
8 Trichlorofluoromethane	101	4.561	4.561	0.000	100	3474861	40.0	38.1	
9 Dichlorofluoromethane	67	4.659	4.659	0.000	98	3574242	40.0	36.7	
10 Ethyl ether	74	5.064	5.064	0.000	94	708611	40.0	43.2	
11 Ethanol	45	5.301	5.315	-0.014	100	225956	1600.0	1513.2	
12 1,1-Dichloroethene	96	5.371	5.371	0.000	97	2119756	40.0	41.2	
13 Carbon disulfide	76	5.413	5.413	0.000	100	7274693	40.0	39.9	
14 1,1,2-Trichloro-1,2,2-trif	151	5.427	5.427	0.000	90	1929989	40.0	38.5	
16 Iodomethane	142	5.580	5.581	-0.001	99	1692176	40.0	41.4	
S 15 1,2-Dichloroethene, Total	96				0			80.7	
17 Acrolein	56	5.860	5.860	0.000	99	474485	200.0	227.4	
18 3-Chloro-1-propene	39	6.027	6.028	-0.001	92	2437693	40.0	40.6	
19 Isopropyl alcohol	45	6.069	6.069	0.000	98	302224	400.0	443.2	
20 Methylene Chloride	84	6.167	6.167	0.000	98	1612750	40.0	37.7	
21 Acetone	43	6.237	6.251	-0.014	99	160101	40.0	38.3	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.000	98	2156075	40.0	40.1	
23 Methyl acetate	74	6.377	6.391	-0.014	98	455488	200.0	209.6	
24 Hexane	86	6.460	6.447	0.013	90	808431	40.0	43.5	
25 Methyl tert-butyl ether	73	6.502	6.502	0.000	95	2479651	40.0	44.0	
26 2-Methyl-2-propanol	59	6.600	6.614	-0.014	89	365472	400.0	450.2	
27 Acetonitrile	41	6.810	6.810	0.000	99	664114	400.0	356.3	
28 Isopropyl ether	45	6.921	6.921	0.000	94	5490596	40.0	44.2	
29 2-Chloro-1,3-butadiene	53	7.061	7.061	0.000	94	4101400	40.0	44.6	
30 1,1-Dichloroethane	63	7.103	7.103	0.000	98	3757018	40.0	38.4	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
31 Acrylonitrile	53	7.159	7.159	0.000	99	2237698	400.0	393.9	
32 Tert-butyl ethyl ether	59	7.326	7.326	0.000	97	3989127	40.0	47.2	
33 Vinyl acetate	43	7.340	7.340	0.000	98	1775934	40.0	44.8	
34 cis-1,2-Dichloroethene	96	7.675	7.676	-0.001	82	2068435	40.0	40.7	
35 2,2-Dichloropropane	77	7.787	7.787	0.000	93	2860984	40.0	43.1	
37 Chlorobromomethane	128	7.885	7.885	0.000	48	615280	40.0	37.7	
36 Cyclohexane	84	7.885	7.885	0.000	91	3974985	40.0	42.6	
38 Chloroform	83	7.941	7.941	0.000	95	3286289	40.0	38.5	
39 Ethyl acetate	45	8.039	8.039	0.000	99	173553	80.0	81.0	
40 Carbon tetrachloride	117	8.094	8.095	-0.001	99	3109164	40.0	40.4	
41 Tetrahydrofuran	71	8.122	8.123	-0.001	89	126688	80.0	81.4	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.123	-0.001	95	1583491	40.0	43.6	
43 1,1,1-Trichloroethane	97	8.164	8.164	0.000	98	3531719	40.0	40.2	
45 2-Butanone (MEK)	43	8.248	8.248	0.000	99	264324	40.0	40.0	
47 1,1-Dichloropropene	75	8.276	8.276	0.000	96	3146503	40.0	41.7	
44 Isooctane	57	8.360	8.360	0.000	96	10902381	40.0	41.9	
46 n-Heptane	43	8.430	8.430	0.000	95	4469957	40.0	40.8	
48 Benzene	78	8.527	8.528	-0.001	97	8047817	40.0	37.7	
49 Propionitrile	54	8.555	8.555	0.000	40	838323	400.0	387.0	
50 Methacrylonitrile	41	8.569	8.555	0.014	93	4476859	400.0	383.3	
51 Tert-amyl methyl ether	73	8.597	8.597	0.000	94	2636896	40.0	47.7	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	1438479	40.0	40.2	
52 Isobutyl alcohol	42	8.667	8.667	0.000	94	365507	1000.0	1234.1	
54 1,2-Dichloroethane	62	8.723	8.723	0.000	98	1603847	40.0	37.4	
* 55 Fluorobenzene	96	8.904	8.905	-0.001	99	1962956	10.0	10.0	
58 Methylcyclohexane	55	9.058	9.058	0.000	92	3798739	40.0	39.5	
57 Trichloroethene	95	9.058	9.058	0.000	65	2236904	40.0	37.9	
59 n-Butanol	56	9.295	9.296	-0.001	89	370033	1000.0	1015.0	
61 Dibromomethane	93	9.477	9.477	0.000	93	593144	40.0	38.7	
60 Ethyl acrylate	55	9.505	9.505	0.000	99	878884	40.0	41.3	
62 1,2-Dichloropropane	63	9.561	9.561	0.000	95	1757801	40.0	40.1	
63 Dichlorobromomethane	83	9.603	9.603	0.000	99	1990323	40.0	41.3	
64 Methyl methacrylate	69	9.687	9.687	0.000	93	1041364	80.0	81.1	
65 1,4-Dioxane	88	9.784	9.785	0.000	96	115692	800.0	800.4	
66 2-Chloroethyl vinyl ether	63	10.078	10.078	0.000	93	329263	40.0	40.1	
67 cis-1,3-Dichloropropene	75	10.161	10.162	-0.001	95	2367621	40.0	46.1	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	93	7761722	40.0	44.9	
69 Toluene	92	10.385	10.371	0.014	99	5242977	40.0	41.3	
70 2-Nitropropane	43	10.594	10.595	-0.001	98	344381	80.0	81.0	
71 4-Methyl-2-pentanone (MIBK	43	10.692	10.692	0.000	96	560481	40.0	42.0	
72 trans-1,3-Dichloropropene	75	10.734	10.734	0.000	82	1739577	40.0	46.2	
73 Tetrachloroethene	164	10.734	10.734	0.000	98	1903799	40.0	38.9	
74 Ethyl methacrylate	69	10.818	10.818	0.000	90	1122615	40.0	41.4	
75 1,1,2-Trichloroethane	83	10.888	10.888	0.000	93	743923	40.0	39.3	
76 Chlorodibromomethane	129	11.069	11.069	0.000	90	1134461	40.0	44.3	
77 1,3-Dichloropropane	76	11.153	11.153	0.000	92	1649148	40.0	40.3	
78 n-Butyl acetate	43	11.307	11.307	0.000	98	1085856	40.0	39.9	
79 Ethylene Dibromide	107	11.321	11.321	0.000	99	809705	40.0	42.1	
80 2-Hexanone	43	11.432	11.433	-0.001	95	405071	40.0	40.2	
81 1-Chlorohexane	91	11.684	11.684	0.000	97	3360012	40.0	48.1	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	45	1282816	10.0	10.0	
82 Ethylbenzene	91	11.754	11.754	0.000	97	9469134	40.0	37.8	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
84 Chlorobenzene	112	11.768	11.768	0.000	93	4982702	40.0	38.0	
85 1,1,1,2-Tetrachloroethane	131	11.809	11.810	-0.001	95	1653307	40.0	41.9	
86 m-Xylene & p-Xylene	106	11.879	11.879	0.000	98	3971961	40.0	42.6	
88 o-Xylene	106	12.284	12.284	0.000	96	3621957	40.0	45.8	
89 Styrene	104	12.326	12.326	0.000	95	5449977	40.0	46.3	
90 Bromoform	173	12.396	12.396	0.000	97	581518	40.0	45.7	
91 Isopropylbenzene	105	12.550	12.550	0.000	97	10055299	40.0	42.6	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	92	2511754	40.0	47.6	
93 N-Propylbenzene	91	12.941	12.941	0.000	97	10929700	40.0	40.8	
94 Bromobenzene	156	12.983	12.983	0.000	88	1937781	40.0	40.4	
95 1,1,2,2-Tetrachloroethane	83	13.011	13.011	0.000	96	835618	40.0	39.6	
96 1,3,5-Trimethylbenzene	105	13.108	13.108	0.000	95	8044316	40.0	44.1	
97 2-Chlorotoluene	91	13.122	13.122	0.000	97	7255220	40.0	40.1	
99 1,2,3-Trichloropropane	110	13.164	13.164	0.000	87	270304	40.0	38.4	
98 trans-1,4-Dichloro-2-buten	53	13.178	13.178	0.000	96	263721	40.0	42.2	
100 Cyclohexanone	55	13.248	13.248	0.000	92	179553	400.0	405.2	
101 4-Chlorotoluene	91	13.276	13.276	0.000	99	6490968	40.0	42.1	
102 tert-Butylbenzene	119	13.430	13.430	0.000	93	7422275	40.0	43.2	
103 1,2,4-Trimethylbenzene	105	13.485	13.486	-0.001	97	7943513	40.0	42.6	
104 sec-Butylbenzene	105	13.597	13.597	0.000	94	10993079	40.0	40.7	
105 4-Isopropyltoluene	119	13.709	13.709	0.000	96	9136770	40.0	42.5	
106 1,3-Dichlorobenzene	146	13.862	13.849	0.013	99	4062756	40.0	40.0	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.919	0.000	52	620389	10.0	10.0	
107 1,2,3-Trimethylbenzene	105	13.918	13.919	0.000	98	7313522	40.0	41.3	
109 1,4-Dichlorobenzene	146	13.932	13.932	0.000	93	3861852	40.0	37.9	
111 n-Butylbenzene	134	14.128	14.128	0.000	95	2509452	40.0	44.2	
110 Benzyl chloride	126	14.156	14.156	0.000	91	317429	40.0	40.5	
112 1,2-Dichlorobenzene	146	14.351	14.351	0.000	98	3255106	40.0	40.3	
113 n-Nonyl Aldehyde	57	15.064	15.078	-0.014	91	811232	40.0	39.8	
115 1,2-Dibromo-3-Chloropropan	157	15.147	15.148	-0.001	85	160919	40.0	47.8	
114 1,3,5-Trichlorobenzene	180	15.161	15.162	-0.001	98	3297207	40.0	41.2	
116 Hexachlorobutadiene	225	15.748	15.748	0.000	98	1959840	40.0	40.4	
117 1,2,4-Trichlorobenzene	180	15.804	15.804	0.000	95	2522059	40.0	42.9	
118 Naphthalene	128	16.153	16.153	0.000	97	2992441	40.0	40.7	
120 1,2,3-Trichlorobenzene	180	16.348	16.349	-0.001	96	1974560	40.0	42.2	
S 119 Xylenes, Total	106				0			88.3	
S 130 Trihalomethanes, Total	1				0			169.8	

Reagents:

8260_Surr_00044	Amount Added: 0.40	Units: uL	
8260NewHiWrk_00183	Amount Added: 8.00	Units: uL	
I.S. Working_00143	Amount Added: 10.00	Units: uL	Run Reagent

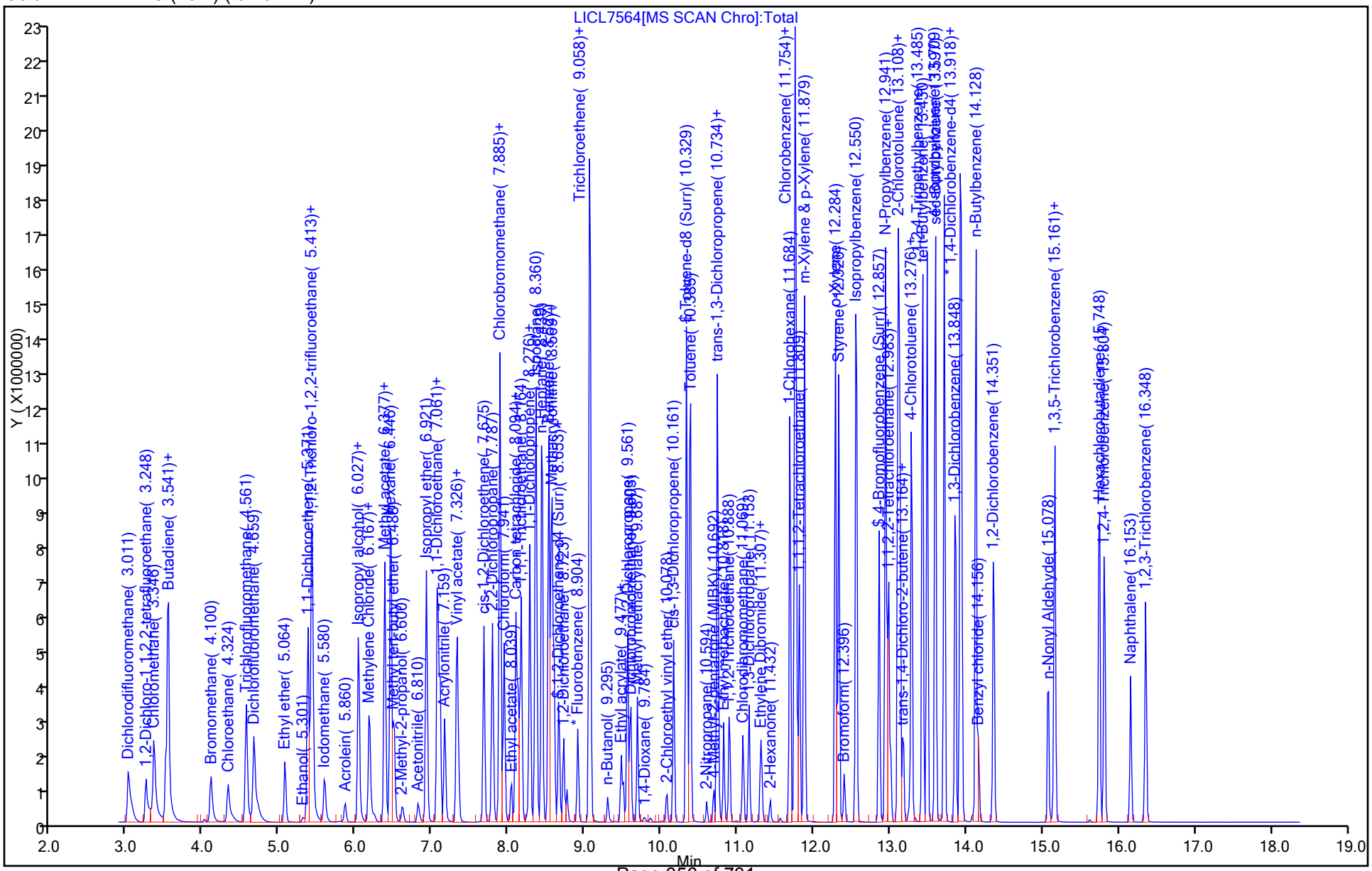
Report Date: 15-Feb-2017 11:41:00 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Injection Date:	14-Feb-2017 14:56:30	Instrument ID:	VMSL	Operator ID:	SMCR
Lims ID:	ic			Worklist Smp#:	12
Client ID:					
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	8
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



FORM VII
GC/MS VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Lab Sample ID: ICV 160-292232/14 Calibration Date: 02/14/2017 15:47

Instrument ID: VMSL Calib Start Date: 02/14/2017 12:23

GC Column: RTX-VMS40 ID: 0.18(mm) Calib End Date: 02/14/2017 14:56

Lab File ID: LICV7566.D Conc. Units: ug/L Heated Purge: (Y/N) Y

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Dichlorodifluoromethane	Ave	0.3532	0.4116	0.1000	11.7	10.0	16.5	30.0
1,2-Dichloro-1,1,2,2-tetrafluoroethane	Ave	0.1763	0.2046	0.0100	11.6	10.0	16.0	30.0
Chloromethane	Ave	0.3766	0.4244	0.1000	11.3	10.0	12.7	30.0
Vinyl chloride	Ave	0.3778	0.4098	0.1000	10.8	10.0	8.5	30.0
Butadiene	Ave	0.4055	0.3718	0.0100	9.17	10.0	-8.3	30.0
Methyl bromide	Ave	0.1716	0.1810	0.1000	10.5	10.0	5.5	30.0
Chloroethane	Ave	0.2214	0.2268	0.1000	10.2	10.0	2.4	30.0
Trichlorofluoromethane	Ave	0.4647	0.4739	0.1000	10.2	10.0	2.0	30.0
Dichlorofluoromethane	Ave	0.4956	0.5140	0.0100	10.4	10.0	3.7	30.0
Ethyl ether	Ave	0.0836	0.0916	0.0100	11.0	10.0	9.5	30.0
Ethanol	Ave	0.0008	0.0008*	0.0010	394	400	-1.4	30.0
1,1-Dichloroethene	Ave	0.2624	0.2760	0.1000	10.5	10.0	5.2	30.0
Carbon disulfide	Ave	0.9280	0.9575	0.1000	10.3	10.0	3.2	30.0
1,1,2-Trichloro-1,2,2-trifluoroethane	Ave	0.2552	0.2571	0.1000	10.1	10.0	0.7	30.0
Iodomethane	Lin1		0.1869	0.0100	9.26	10.0	-7.4	30.0
Acrolein	Ave	0.0106	0.0103	0.0010	48.2	50.0	-3.6	30.0
Allyl chloride	Ave	0.3056	0.3274	0.0100	10.7	10.0	7.1	30.0
Isopropyl alcohol	Ave	0.0035	0.0037*	0.0100	106	100	6.4	30.0
Methylene Chloride	Ave	0.2179	0.2152	0.1000	9.88	10.0	-1.2	30.0
Acetone	Lin1		0.0249*	0.1000	10.5	10.0	5.4	30.0
trans-1,2-Dichloroethene	Ave	0.2739	0.2945	0.1000	10.8	10.0	7.5	30.0
Methyl acetate	Ave	0.0111	0.0117*	0.1000	52.8	50.0	5.5	30.0
Hexane	Ave	0.0946	0.1100	0.0100	11.6	10.0	16.2	30.0
Methyl tert-butyl ether	Ave	0.2870	0.3049	0.1000	10.6	10.0	6.2	30.0
tert-Butyl alcohol	Ave	0.0041	0.0043*	0.0100	104	100	3.8	30.0
Acetonitrile	Ave	0.0095	0.0087	0.0010	91.5	100	-8.5	30.0
Isopropyl ether	Ave	0.6323	0.7409	0.0100	11.7	10.0	17.2	30.0
2-Chloro-1,3-butadiene	Ave	0.4688	0.5404	0.0100	11.5	10.0	15.3	30.0
1,1-Dichloroethane	Ave	0.4983	0.5108	0.2000	10.2	10.0	2.5	30.0
Acrylonitrile	Ave	0.0289	0.0296	0.0100	102	100	2.1	30.0
Tert-butyl ethyl ether	Ave	0.4307	0.4820	0.0100	11.2	10.0	11.9	30.0
Vinyl acetate	Ave	0.2020	0.1982	0.0100	9.81	10.0	-1.9	30.0
cis-1,2-Dichloroethene	Ave	0.2592	0.2714	0.1000	10.5	10.0	4.7	30.0
2,2-Dichloropropane	Ave	0.3381	0.3500	0.0100	10.4	10.0	3.5	30.0
Bromochloromethane	Ave	0.0831	0.0820	0.0100	9.87	10.0	-1.3	30.0
Cyclohexane	Ave	0.4759	0.5398	0.1000	11.3	10.0	13.4	30.0
Chloroform	Ave	0.4344	0.4430	0.2000	10.2	10.0	2.0	30.0
Ethyl acetate	Lin1		0.0106	0.0100	20.0	20.0	-0.2	30.0
Carbon tetrachloride	Ave	0.3916	0.4127	0.1000	10.5	10.0	5.4	30.0
Tetrahydrofuran	Lin1		0.0073	0.0010	18.9	20.0	-5.3	30.0

FORM VII
GC/MS VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Lab Sample ID: ICV 160-292232/14 Calibration Date: 02/14/2017 15:47

Instrument ID: VMSL Calib Start Date: 02/14/2017 12:23

GC Column: RTX-VMS40 ID: 0.18(mm) Calib End Date: 02/14/2017 14:56

Lab File ID: LICV7566.D Conc. Units: ug/L Heated Purge: (Y/N) Y

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
1,1,1-Trichloroethane	Ave	0.4471	0.4756	0.1000	10.6	10.0	6.4	30.0
2-Butanone	Lin1		0.0376*	0.1000	10.3	10.0	2.7	30.0
1,1-Dichloropropene	Ave	0.3847	0.4392	0.0100	11.4	10.0	14.1	30.0
Isooctane	Ave	1.327	1.491	0.0100	11.2	10.0	12.4	30.0
n-Heptane	Ave	0.5576	0.6143	0.0100	11.0	10.0	10.2	30.0
Benzene	Ave	1.086	1.118	0.5000	10.3	10.0	2.9	30.0
Methacrylonitrile	Ave	0.0595	0.0606	0.0100	102	100	1.8	30.0
Propionitrile	Ave	0.0110	0.0113	0.0010	102	100	2.2	30.0
Tert-amyl methyl ether	Ave	0.2817	0.3039	0.0100	10.8	10.0	7.9	30.0
Isobutanol	Ave	0.0015	0.0015	0.0010	255	250	1.8	30.0
1,2-Dichloroethane	Ave	0.2186	0.2141	0.1000	9.79	10.0	-2.1	30.0
Methylcyclohexane	Ave	0.4901	0.5212	0.1000	10.6	10.0	6.3	30.0
Trichloroethene	Ave	0.3004	0.3102	0.2000	10.3	10.0	3.3	30.0
n-Butanol	Lin		0.0015*	0.0100	223	250	-10.7	30.0
Dibromomethane	Ave	0.0781	0.0767	0.0100	9.82	10.0	-1.8	30.0
Ethyl acrylate	Lin1		0.0983	0.0100	9.38	10.0	-6.2	30.0
1,2-Dichloropropane	Ave	0.2232	0.2370	0.1000	10.6	10.0	6.2	30.0
Bromodichloromethane	Ave	0.2453	0.2590	0.2000	10.6	10.0	5.6	30.0
Methyl methacrylate	Lin1		0.0605	0.0100	19.1	20.0	-4.7	30.0
1,4-Dioxane	Lin1		0.0007*	0.0010	204	200	2.1	30.0
2-Chloroethyl vinyl ether	Lin1		0.0408	0.0100	10.0	10.0	0.1	30.0
cis-1,3-Dichloropropene	Ave	0.2615	0.2988	0.2000	11.4	10.0	14.3	30.0
Toluene	Ave	0.9907	1.100	0.4000	11.1	10.0	11.0	30.0
2-Nitropropane	Lin		0.0251	0.0100	16.8	20.0	-15.9	30.0
4-Methyl-2-pentanone	Lin1		0.0914*	0.1000	9.11	10.0	-8.9	30.0
Tetrachloroethene	Ave	0.3815	0.3970	0.2000	10.4	10.0	4.1	30.0
trans-1,3-Dichloropropene	Ave	0.2937	0.3313	0.1000	11.3	10.0	12.8	30.0
Ethyl methacrylate	Lin1		0.1992	0.0100	9.82	10.0	-1.8	30.0
1,1,2-Trichloroethane	Ave	0.1477	0.1548	0.1000	10.5	10.0	4.8	30.0
Chlorodibromomethane	Ave	0.1996	0.2129	0.1000	10.7	10.0	6.7	30.0
1,3-Dichloropropane	Ave	0.3191	0.3285	0.0100	10.3	10.0	2.9	30.0
n-Butyl acetate	Qua		0.1678	0.0100	9.61	10.0	-3.9	30.0
1,2-Dibromoethane	Ave	0.1501	0.1591	0.1000	10.6	10.0	6.0	30.0
2-Hexanone	Lin1		0.0759*	0.1000	9.91	10.0	-0.9	30.0
Ethylbenzene	Ave	1.953	2.060	0.1000	10.5	10.0	5.5	30.0
Chlorobenzene	Ave	1.021	1.036	0.5000	10.1	10.0	1.5	30.0
1,1,1,2-Tetrachloroethane	Ave	0.3079	0.3337	0.0100	10.8	10.0	8.4	30.0
m-Xylene & p-Xylene	Ave	0.7273	0.8133	0.1000	11.2	10.0	11.8	30.0
o-Xylene	Ave	0.6171	0.7229	0.3000	11.7	10.0	17.1	30.0
Styrene	Ave	0.9169	1.082	0.3000	11.8	10.0	18.0	30.0
Bromoform	Ave	0.2052	0.2165	0.1000	10.6	10.0	5.5	30.0

FORM VII
GC/MS VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Lab Sample ID: ICV 160-292232/14 Calibration Date: 02/14/2017 15:47

Instrument ID: VMSL Calib Start Date: 02/14/2017 12:23

GC Column: RTX-VMS40 ID: 0.18(mm) Calib End Date: 02/14/2017 14:56

Lab File ID: LICV7566.D Conc. Units: ug/L Heated Purge: (Y/N) Y

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Isopropylbenzene	Ave	3.807	4.402	0.1000	11.6	10.0	15.6	30.0
N-Propylbenzene	Ave	4.323	4.950	0.0100	11.5	10.0	14.5	30.0
Bromobenzene	Ave	0.7723	0.8222	0.0100	10.6	10.0	6.5	30.0
1,1,2,2-Tetrachloroethane	Ave	0.3405	0.3414	0.3000	10.0	10.0	0.3	30.0
1,3,5-Trimethylbenzene	Ave	2.938	3.446	0.0100	11.7	10.0	17.3	30.0
2-Chlorotoluene	Ave	2.914	3.157	0.0100	10.8	10.0	8.3	30.0
1,2,3-Trichloropropane	Ave	0.1134	0.1180	0.0100	10.4	10.0	4.0	30.0
trans-1,4-Dichloro-2-butene	Ave	0.1007	0.1092	0.0100	10.8	10.0	8.4	30.0
Cyclohexanone	Lin		0.0056	0.0010	85.2	100	-14.8	30.0
4-Chlorotoluene	Ave	2.483	2.804	0.0100	11.3	10.0	12.9	30.0
tert-Butylbenzene	Ave	2.767	3.157	0.0100	11.4	10.0	14.1	30.0
1,2,4-Trimethylbenzene	Ave	3.006	3.409	0.0100	11.3	10.0	13.4	30.0
sec-Butylbenzene	Ave	4.350	4.768	0.0100	11.0	10.0	9.6	30.0
4-Isopropyltoluene	Ave	3.465	3.818	0.0100	11.0	10.0	10.2	30.0
1,3-Dichlorobenzene	Ave	1.639	1.708	0.6000	10.4	10.0	4.2	30.0
1,2,3-Trimethylbenzene	Ave	2.855	3.156	0.0100	11.1	10.0	10.5	30.0
1,4-Dichlorobenzene	Ave	1.642	1.684	0.5000	10.3	10.0	2.6	30.0
n-Butylbenzene	Ave	0.9148	0.9800	0.0100	10.7	10.0	7.1	30.0
Benzyl chloride	Lin		0.1034	0.0100	8.96	10.0	-10.4	30.0
1,2-Dichlorobenzene	Ave	1.302	1.387	0.4000	10.6	10.0	6.5	30.0
Nonanal	Qua		0.1584	0.0100	8.34	10.0	-16.6	30.0
1,2-Dibromo-3-Chloropropane	Ave	0.0543	0.0604	0.0500	11.1	10.0	11.2	30.0
1,3,5-Trichlorobenzene	Ave	1.290	1.387	0.0100	10.8	10.0	7.5	30.0
Hexachlorobutadiene	Ave	0.7815	0.7473	0.0100	9.56	10.0	-4.4	30.0
1,2,4-Trichlorobenzene	Ave	0.9466	1.026	0.2000	10.8	10.0	8.4	30.0
Naphthalene	Lin1		1.169	0.0100	10.1	10.0	1.2	30.0
1,2,3-Trichlorobenzene	Ave	0.7544	0.8343	0.0100	11.1	10.0	10.6	30.0
Dibromofluoromethane (Surr)	Ave	0.1850	0.1856	0.0100	10.0	10.0	0.3	30.0
1,2-Dichloroethane-d4 (Surr)	Ave	0.1824	0.1739	0.0100	9.53	10.0	-4.7	30.0
Toluene-d8 (Surr)	Ave	1.347	1.440	0.0100	10.7	10.0	6.9	30.0
4-Bromofluorobenzene (Surr)	Ave	0.8510	0.9180	0.0100	10.8	10.0	7.9	30.0

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICV7566.D
Lims ID: icv
Client ID:
Sample Type: ICV
Inject. Date: 14-Feb-2017 15:47:30 ALS Bottle#: 10 Worklist Smp#: 14
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: ICV
Operator ID: SMCR Instrument ID: VMSL
Sublist:

Method: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 16-Feb-2017 12:23:06 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK012

First Level Reviewer: rhoadess Date: 15-Feb-2017 10:59:54

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85	3.011	3.011	0.000	99	750829	10.0	11.7	
2 1,2-Dichloro-1,1,2,2-tetra	135	3.248	3.248	0.000	99	373175	10.0	11.6	M
3 Chloromethane	50	3.346	3.346	0.000	99	774108	10.0	11.3	
4 Vinyl chloride	62	3.500	3.500	0.000	98	747478	10.0	10.8	
5 Butadiene	39	3.528	3.528	0.000	91	678250	10.0	9.17	
6 Bromomethane	94	4.100	4.100	0.000	91	330154	10.0	10.5	
7 Chloroethane	64	4.324	4.324	0.000	100	413603	10.0	10.2	
8 Trichlorofluoromethane	101	4.561	4.561	0.000	100	864467	10.0	10.2	
9 Dichlorofluoromethane	67	4.659	4.659	0.000	99	937585	10.0	10.4	
10 Ethyl ether	74	5.064	5.064	0.000	94	167056	10.0	11.0	
11 Ethanol	45	5.315	5.315	0.000	99	54725	400.0	394.4	
12 1,1-Dichloroethene	96	5.371	5.371	0.000	97	503470	10.0	10.5	
13 Carbon disulfide	76	5.413	5.413	0.000	100	1746549	10.0	10.3	
14 1,1,2-Trichloro-1,2,2-trif	151	5.427	5.427	0.000	91	468924	10.0	10.1	
16 Iodomethane	142	5.581	5.581	0.000	99	340986	10.0	9.26	
17 Acrolein	56	5.860	5.860	0.000	99	93488	50.0	48.2	
18 3-Chloro-1-propene	39	6.028	6.028	0.000	91	597175	10.0	10.7	
19 Isopropyl alcohol	45	6.069	6.069	0.000	97	67446	100.0	106.4	
20 Methylene Chloride	84	6.167	6.167	0.000	98	392554	10.0	9.88	
21 Acetone	43	6.251	6.251	0.000	99	45377	10.0	10.5	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.000	98	537259	10.0	10.8	
23 Methyl acetate	74	6.391	6.391	0.000	98	106547	50.0	52.8	
24 Hexane	86	6.460	6.447	0.013	90	200667	10.0	11.6	
25 Methyl tert-butyl ether	73	6.502	6.502	0.000	95	556125	10.0	10.6	
26 2-Methyl-2-propanol	59	6.614	6.614	0.000	87	78340	100.0	103.8	
27 Acetonitrile	41	6.810	6.810	0.000	99	158502	100.0	91.5	
28 Isopropyl ether	45	6.921	6.921	0.000	94	1351500	10.0	11.7	
29 2-Chloro-1,3-butadiene	53	7.061	7.061	0.000	94	985751	10.0	11.5	
30 1,1-Dichloroethane	63	7.103	7.103	0.000	97	931664	10.0	10.2	
31 Acrylonitrile	53	7.159	7.159	0.000	99	539125	100.0	102.1	
32 Tert-butyl ethyl ether	59	7.326	7.326	0.000	96	879108	10.0	11.2	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
33 Vinyl acetate	43	7.340	7.340	0.000	98	361466	10.0	9.81	
34 cis-1,2-Dichloroethene	96	7.676	7.676	0.000	83	495118	10.0	10.5	
35 2,2-Dichloropropane	77	7.787	7.787	0.000	93	638434	10.0	10.4	
37 Chlorobromomethane	128	7.885	7.885	0.000	49	149608	10.0	9.87	
36 Cyclohexane	84	7.885	7.885	0.000	91	984697	10.0	11.3	
38 Chloroform	83	7.941	7.941	0.000	95	808021	10.0	10.2	
39 Ethyl acetate	45	8.039	8.039	0.000	99	38734	20.0	20.0	
40 Carbon tetrachloride	117	8.095	8.095	-0.001	99	752861	10.0	10.5	
41 Tetrahydrofuran	71	8.122	8.123	-0.001	44	26611	20.0	18.9	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.123	-0.001	95	338474	10.0	10.0	
43 1,1,1-Trichloroethane	97	8.164	8.164	0.000	98	867493	10.0	10.6	
45 2-Butanone (MEK)	43	8.248	8.248	0.000	99	68595	10.0	10.3	
47 1,1-Dichloropropene	75	8.276	8.276	0.000	95	801040	10.0	11.4	
44 Isooctane	57	8.360	8.360	0.000	96	2720551	10.0	11.2	
46 n-Heptane	43	8.430	8.430	0.000	95	1120579	10.0	11.0	
48 Benzene	78	8.527	8.528	-0.001	97	2039699	10.0	10.3	
49 Propionitrile	54	8.555	8.555	0.000	39	205808	100.0	102.2	
50 Methacrylonitrile	41	8.555	8.555	0.000	94	1104564	100.0	101.8	
51 Tert-amyl methyl ether	73	8.597	8.597	0.000	91	554230	10.0	10.8	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	91	317134	10.0	9.53	
52 Isobutyl alcohol	42	8.667	8.667	0.000	92	70068	250.0	254.6	
54 1,2-Dichloroethane	62	8.723	8.723	0.000	98	390514	10.0	9.79	
* 55 Fluorobenzene	96	8.905	8.905	0.000	99	1824048	10.0	10.0	
58 Methylcyclohexane	55	9.058	9.058	0.000	93	950657	10.0	10.6	
57 Trichloroethene	95	9.058	9.058	0.000	64	565850	10.0	10.3	
59 n-Butanol	56	9.296	9.296	0.000	92	67962	250.0	223.3	
61 Dibromomethane	93	9.477	9.477	0.000	93	139895	10.0	9.82	
60 Ethyl acrylate	55	9.505	9.505	0.000	99	179304	10.0	9.38	
62 1,2-Dichloropropane	63	9.561	9.561	0.000	94	432297	10.0	10.6	
63 Dichlorobromomethane	83	9.603	9.603	0.000	100	472335	10.0	10.6	
64 Methyl methacrylate	69	9.687	9.687	0.000	94	220512	20.0	19.1	
65 1,4-Dioxane	88	9.784	9.785	0.000	96	26589	200.0	204.2	
66 2-Chloroethyl vinyl ether	63	10.078	10.078	0.000	93	74349	10.0	10.0	
67 cis-1,3-Dichloropropene	75	10.162	10.162	0.000	94	545105	10.0	11.4	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	93	1704613	10.0	10.7	
69 Toluene	92	10.371	10.371	0.000	99	1301324	10.0	11.1	
70 2-Nitropropane	43	10.594	10.595	-0.001	98	59349	20.0	16.8	
71 4-Methyl-2-pentanone (MIBK	43	10.692	10.692	0.000	97	108214	10.0	9.11	
72 trans-1,3-Dichloropropene	75	10.734	10.734	0.000	79	392074	10.0	11.3	
73 Tetrachloroethene	164	10.734	10.734	0.000	98	469860	10.0	10.4	
74 Ethyl methacrylate	69	10.818	10.818	0.000	91	235712	10.0	9.82	
75 1,1,2-Trichloroethane	83	10.888	10.888	0.000	93	183150	10.0	10.5	
76 Chlorodibromomethane	129	11.069	11.069	0.000	90	251993	10.0	10.7	
77 1,3-Dichloropropane	76	11.153	11.153	0.000	93	388766	10.0	10.3	
78 n-Butyl acetate	43	11.307	11.307	0.000	97	198609	10.0	9.61	
79 Ethylene Dibromide	107	11.321	11.321	0.000	99	188335	10.0	10.6	
80 2-Hexanone	43	11.432	11.433	-0.001	96	89760	10.0	9.91	
81 1-Chlorohexane	91	11.684	11.684	0.000	97	763642	10.0	11.8	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	95	1183461	10.0	10.0	
82 Ethylbenzene	91	11.754	11.754	0.000	98	2438328	10.0	10.5	
84 Chlorobenzene	112	11.768	11.768	0.000	94	1226427	10.0	10.1	
85 1,1,1,2-Tetrachloroethane	131	11.810	11.810	0.000	95	394896	10.0	10.8	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
86 m-Xylene & p-Xylene	106	11.879	11.879	0.000	98	962523	10.0	11.2	
88 o-Xylene	106	12.284	12.284	0.000	96	855462	10.0	11.7	
89 Styrene	104	12.326	12.326	0.000	95	1280226	10.0	11.8	
90 Bromoform	173	12.396	12.396	0.000	97	121685	10.0	10.6	
91 Isopropylbenzene	105	12.550	12.550	0.000	96	2474431	10.0	11.6	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	516004	10.0	10.8	
93 N-Propylbenzene	91	12.941	12.941	0.000	98	2782495	10.0	11.5	
94 Bromobenzene	156	12.983	12.983	0.000	89	462165	10.0	10.6	
95 1,1,2,2-Tetrachloroethane	83	13.011	13.011	0.000	96	191921	10.0	10.0	
96 1,3,5-Trimethylbenzene	105	13.108	13.108	0.000	95	1936880	10.0	11.7	
97 2-Chlorotoluene	91	13.122	13.122	0.000	96	1774697	10.0	10.8	
99 1,2,3-Trichloropropane	110	13.164	13.164	0.000	88	66329	10.0	10.4	
98 trans-1,4-Dichloro-2-buten	53	13.178	13.178	0.000	87	61363	10.0	10.8	
100 Cyclohexanone	55	13.248	13.248	0.000	92	31481	100.0	85.2	
101 4-Chlorotoluene	91	13.276	13.276	0.000	99	1576192	10.0	11.3	
102 tert-Butylbenzene	119	13.430	13.430	0.000	93	1774649	10.0	11.4	
103 1,2,4-Trimethylbenzene	105	13.485	13.486	-0.001	97	1916126	10.0	11.3	
104 sec-Butylbenzene	105	13.597	13.597	0.000	94	2680242	10.0	11.0	
105 4-Isopropyltoluene	119	13.709	13.709	0.000	97	2145914	10.0	11.0	
106 1,3-Dichlorobenzene	146	13.849	13.849	0.000	98	960098	10.0	10.4	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.919	0.000	71	562114	10.0	10.0	
107 1,2,3-Trimethylbenzene	105	13.918	13.919	0.000	97	1773996	10.0	11.1	
109 1,4-Dichlorobenzene	146	13.932	13.932	0.000	93	946578	10.0	10.3	
111 n-Butylbenzene	134	14.128	14.128	0.000	96	550867	10.0	10.7	
110 Benzyl chloride	126	14.156	14.156	0.000	97	58142	10.0	8.96	
112 1,2-Dichlorobenzene	146	14.351	14.351	0.000	97	779406	10.0	10.6	
113 n-Nonyl Aldehyde	57	15.078	15.078	0.000	90	89039	10.0	8.34	
115 1,2-Dibromo-3-Chloropropan	157	15.147	15.148	-0.001	82	33921	10.0	11.1	
114 1,3,5-Trichlorobenzene	180	15.161	15.162	-0.001	98	779569	10.0	10.8	
116 Hexachlorobutadiene	225	15.748	15.748	0.000	98	420064	10.0	9.56	
117 1,2,4-Trichlorobenzene	180	15.804	15.804	0.000	94	576964	10.0	10.8	
118 Naphthalene	128	16.153	16.153	0.000	97	657362	10.0	10.1	
120 1,2,3-Trichlorobenzene	180	16.349	16.349	0.000	96	468965	10.0	11.1	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

8260 Surr 25_00071	Amount Added: 10.00	Units: uL	
8260NewICVMix_00196	Amount Added: 10.00	Units: uL	
I.S. Working_00143	Amount Added: 10.00	Units: uL	Run Reagent

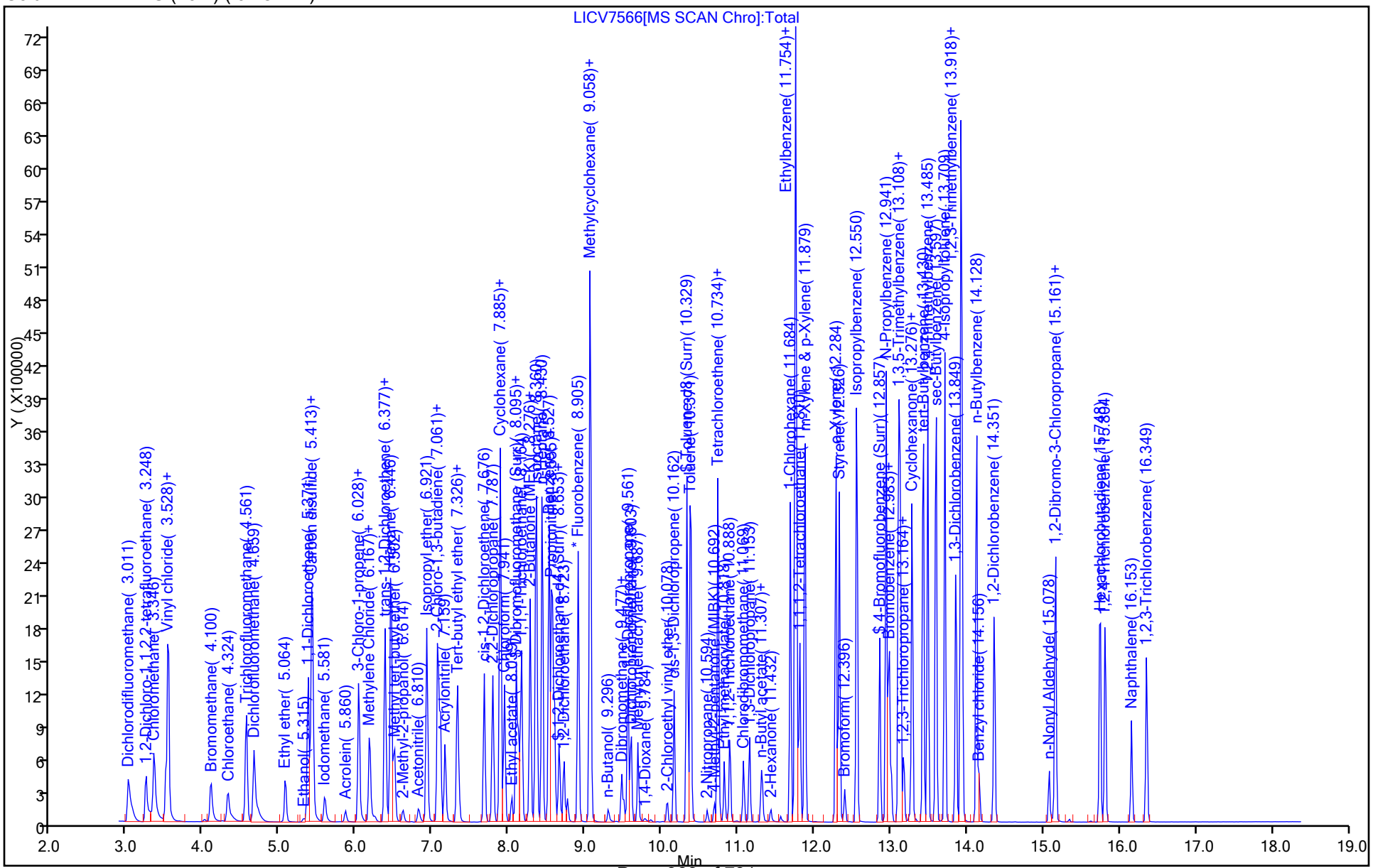
Report Date: 16-Feb-2017 13:20:56 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICV7566.D

Injection Date:	14-Feb-2017 15:47:30	Instrument ID:	VMSL	Operator ID:	SMCR
Lims ID:	icv			Worklist Smp#:	14
Client ID:					
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	10
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis

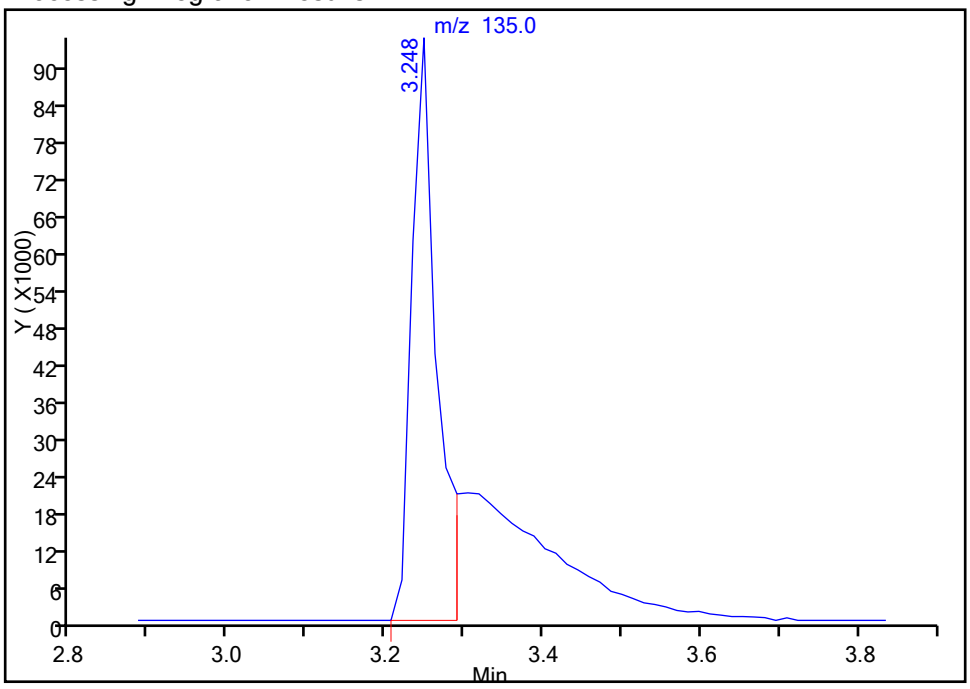
Data File:	\\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICV7566.D				
Injection Date:	14-Feb-2017 15:47:30	Instrument ID:	VMSL		
Lims ID:	icv				
Client ID:					
Operator ID:	SMCR	ALS Bottle#:	10	Worklist Smp#:	14
Purge Vol:	25.000 mL	Dil. Factor:	1.0000		
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		
Column:	RTX-VMS (40m) (0.18 mm)	Detector	MS SCAN		

2 1,2-Dichloro-1,1,2,2-tetrafluoroethane, CAS: 76-14-2

Signal: 1

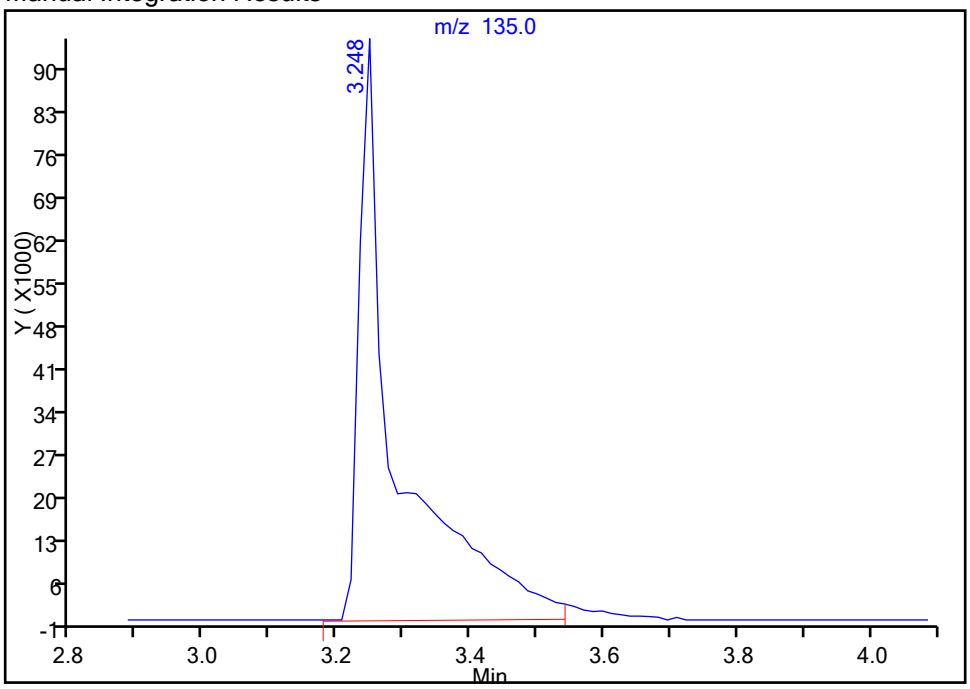
Processing Integration Results

RT: 3.25
Area: 210657
Amount: 6.550657
Amount Units: ug/l



Manual Integration Results

RT: 3.25
Area: 373175
Amount: 11.604369
Amount Units: ug/l



Reviewer: rhoadess, 15-Feb-2017 10:59:54
Audit Action: Manually Integrated Audit Reason: Peak Tail

FORM VII
GC/MS VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Lab Sample ID: CCVIS 160-293176/4 Calibration Date: 02/20/2017 10:07

Instrument ID: VMSL Calib Start Date: 02/14/2017 12:23

GC Column: RTX-VMS40 ID: 0.18(mm) Calib End Date: 02/14/2017 14:56

Lab File ID: LCCV7572.D Conc. Units: ug/L Heated Purge: (Y/N) Y

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Dichlorodifluoromethane	Ave	0.3532	0.3615	0.1000	10.2	10.0	2.3	20.0
1,2-Dichloro-1,1,2,2-tetrafluoroethane	Ave	0.1763	0.1632	0.0100	9.26	10.0	-7.4	20.0
Chloromethane	Ave	0.3766	0.3673	0.1000	9.75	10.0	-2.5	20.0
Vinyl chloride	Ave	0.3778	0.3823	0.1000	10.1	10.0	1.2	20.0
Butadiene	Ave	0.4055	0.4065	0.0100	10.0	10.0	0.3	20.0
Methyl bromide	Ave	0.1716	0.1729	0.1000	10.1	10.0	0.7	20.0
Chloroethane	Ave	0.2214	0.2153	0.1000	9.73	10.0	-2.7	20.0
Trichlorofluoromethane	Ave	0.4647	0.4524	0.1000	9.74	10.0	-2.6	20.0
Dichlorofluoromethane	Ave	0.4956	0.4802	0.0100	9.69	10.0	-3.1	20.0
Ethyl ether	Ave	0.0836	0.0922	0.0100	11.0	10.0	10.3	20.0
Ethanol	Ave	0.0008	0.0008*	0.0010	393	400	-1.8	20.0
1,1-Dichloroethene	Ave	0.2624	0.2698	0.1000	10.3	10.0	2.8	20.0
Carbon disulfide	Ave	0.9280	0.9643	0.1000	10.4	10.0	3.9	20.0
1,1,2-Trichloro-1,2,2-trifluoroethane	Ave	0.2552	0.2529	0.1000	9.91	10.0	-0.9	20.0
Iodomethane	Lin1		0.1977	0.0100	9.77	10.0	-2.3	20.0
Acrolein	Ave	0.0106	0.0125	0.0010	58.7	50.0	17.4	20.0
Allyl chloride	Ave	0.3056	0.3273	0.0100	10.7	10.0	7.1	20.0
Isopropyl alcohol	Ave	0.0035	0.0040*	0.0100	114	100	13.7	20.0
Methylene Chloride	Ave	0.2179	0.2122	0.1000	9.74	10.0	-2.6	20.0
Acetone	Lin1		0.0258*	0.1000	11.0	10.0	9.9	20.0
Methyl acetate	Ave	0.0111	0.0122*	0.1000	55.1	50.0	10.3	20.0
trans-1,2-Dichloroethene	Ave	0.2739	0.2823	0.1000	10.3	10.0	3.0	20.0
Hexane	Ave	0.0946	0.1061	0.0100	11.2	10.0	12.1	20.0
Methyl tert-butyl ether	Ave	0.2870	0.3290	0.1000	11.5	10.0	14.6	20.0
tert-Butyl alcohol	Ave	0.0041	0.0050*	0.0100	120	100	19.7	20.0
Acetonitrile	Ave	0.0095	0.0089	0.0010	94.1	100	-5.9	20.0
Isopropyl ether	Ave	0.6323	0.6962	0.0100	11.0	10.0	10.1	20.0
2-Chloro-1,3-butadiene	Ave	0.4688	0.5346	0.0100	11.4	10.0	14.0	20.0
1,1-Dichloroethane	Ave	0.4983	0.4975	0.2000	9.98	10.0	-0.2	20.0
Acrylonitrile	Ave	0.0289	0.0301	0.0100	104	100	4.1	20.0
Tert-butyl ethyl ether	Ave	0.4307	0.5073	0.0100	11.8	10.0	17.8	20.0
Vinyl acetate	Ave	0.2020	0.2734	0.0100	13.5	10.0	35.4*	20.0
cis-1,2-Dichloroethene	Ave	0.2592	0.2693	0.1000	10.4	10.0	3.9	20.0
2,2-Dichloropropane	Ave	0.3381	0.3987	0.0100	11.8	10.0	17.9	20.0
Bromochloromethane	Ave	0.0831	0.0840	0.0100	10.1	10.0	1.1	20.0
Cyclohexane	Ave	0.4759	0.5239	0.1000	11.0	10.0	10.1	20.0
Chloroform	Ave	0.4344	0.4315	0.2000	9.93	10.0	-0.7	20.0
Ethyl acetate	Lin1		0.0109	0.0100	20.4	20.0	2.0	20.0
Carbon tetrachloride	Ave	0.3916	0.4062	0.1000	10.4	10.0	3.7	20.0
Tetrahydrofuran	Lin1		0.0082	0.0010	21.1	20.0	5.6	20.0

FORM VII
GC/MS VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Lab Sample ID: CCVIS 160-293176/4 Calibration Date: 02/20/2017 10:07

Instrument ID: VMSL Calib Start Date: 02/14/2017 12:23

GC Column: RTX-VMS40 ID: 0.18(mm) Calib End Date: 02/14/2017 14:56

Lab File ID: LCCV7572.D Conc. Units: ug/L Heated Purge: (Y/N) Y

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
1,1,1-Trichloroethane	Ave	0.4471	0.4633	0.1000	10.4	10.0	3.6	20.0
2-Butanone	Lin1		0.0370*	0.1000	10.1	10.0	0.8	20.0
1,1-Dichloropropene	Ave	0.3847	0.4180	0.0100	10.9	10.0	8.7	20.0
Isooctane	Ave	1.327	1.457	0.0100	11.0	10.0	9.8	20.0
n-Heptane	Ave	0.5576	0.6098	0.0100	10.9	10.0	9.3	20.0
Benzene	Ave	1.086	1.087	0.5000	10.0	10.0	0.0	20.0
Propionitrile	Ave	0.0110	0.0113	0.0010	103	100	2.6	20.0
Methacrylonitrile	Ave	0.0595	0.0623	0.0100	105	100	4.7	20.0
Tert-amyl methyl ether	Ave	0.2817	0.3336	0.0100	11.8	10.0	18.4	20.0
Isobutanol	Ave	0.0015	0.0017	0.0010	283	250	13.2	20.0
1,2-Dichloroethane	Ave	0.2186	0.2177	0.1000	9.96	10.0	-0.4	20.0
Methylcyclohexane	Ave	0.4901	0.5115	0.1000	10.4	10.0	4.4	20.0
Trichloroethene	Ave	0.3004	0.2941	0.2000	9.79	10.0	-2.1	20.0
n-Butanol	Lin		0.0017*	0.0100	247	250	-1.2	20.0
Dibromomethane	Ave	0.0781	0.0794	0.0100	10.2	10.0	1.7	20.0
Ethyl acrylate	Lin1		0.1048	0.0100	9.97	10.0	-0.3	20.0
1,2-Dichloropropane	Ave	0.2232	0.2287	0.1000	10.3	10.0	2.5	20.0
Bromodichloromethane	Ave	0.2453	0.2561	0.2000	10.4	10.0	4.4	20.0
Methyl methacrylate	Lin1		0.0637	0.0100	20.1	20.0	0.3	20.0
1,4-Dioxane	Lin1		0.0008*	0.0010	210	200	5.2	20.0
2-Chloroethyl vinyl ether	Lin1		0.0433	0.0100	10.6	10.0	6.0	20.0
cis-1,3-Dichloropropene	Ave	0.2615	0.3048	0.2000	11.7	10.0	16.6	20.0
Toluene	Ave	0.9907	1.048	0.4000	10.6	10.0	5.8	20.0
2-Nitropropane	Lin		0.0296	0.0100	19.5	20.0	-2.6	20.0
4-Methyl-2-pentanone	Lin1		0.0989*	0.1000	9.82	10.0	-1.8	20.0
Tetrachloroethene	Ave	0.3815	0.3970	0.2000	10.4	10.0	4.0	20.0
trans-1,3-Dichloropropene	Ave	0.2937	0.3434	0.1000	11.7	10.0	16.9	20.0
Ethyl methacrylate	Lin1		0.1961	0.0100	9.68	10.0	-3.2	20.0
1,1,2-Trichloroethane	Ave	0.1477	0.1498	0.1000	10.1	10.0	1.5	20.0
Chlorodibromomethane	Ave	0.1996	0.2154	0.1000	10.8	10.0	7.9	20.0
1,3-Dichloropropane	Ave	0.3191	0.3264	0.0100	10.2	10.0	2.3	20.0
n-Butyl acetate	Qua		0.1802	0.0100	10.2	10.0	2.4	20.0
1,2-Dibromoethane	Ave	0.1501	0.1569	0.1000	10.5	10.0	4.6	20.0
2-Hexanone	Lin1		0.0785*	0.1000	10.2	10.0	2.4	20.0
Ethylbenzene	Ave	1.953	2.022	0.1000	10.4	10.0	3.5	20.0
Chlorobenzene	Ave	1.021	1.009	0.5000	9.88	10.0	-1.2	20.0
1,1,1,2-Tetrachloroethane	Ave	0.3079	0.3155	0.0100	10.2	10.0	2.5	20.0
m-Xylene & p-Xylene	Ave	0.7273	0.7995	0.1000	11.0	10.0	9.9	20.0
o-Xylene	Ave	0.6171	0.7064	0.3000	11.4	10.0	14.5	20.0
Styrene	Ave	0.9169	1.056	0.3000	11.5	10.0	15.2	20.0
Bromoform	Ave	0.2052	0.2219	0.1000	10.8	10.0	8.2	20.0

FORM VII
GC/MS VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Lab Sample ID: CCVIS 160-293176/4 Calibration Date: 02/20/2017 10:07

Instrument ID: VMSL Calib Start Date: 02/14/2017 12:23

GC Column: RTX-VMS40 ID: 0.18(mm) Calib End Date: 02/14/2017 14:56

Lab File ID: LCCV7572.D Conc. Units: ug/L Heated Purge: (Y/N) Y

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Isopropylbenzene	Ave	3.807	4.299	0.1000	11.3	10.0	12.9	20.0
N-Propylbenzene	Ave	4.323	4.958	0.0100	11.5	10.0	14.7	20.0
Bromobenzene	Ave	0.7723	0.7769	0.0100	10.1	10.0	0.6	20.0
1,1,2,2-Tetrachloroethane	Ave	0.3405	0.3507	0.3000	10.3	10.0	3.0	20.0
1,3,5-Trimethylbenzene	Ave	2.938	3.371	0.0100	11.5	10.0	14.8	20.0
2-Chlorotoluene	Ave	2.914	3.036	0.0100	10.4	10.0	4.2	20.0
1,2,3-Trichloropropane	Ave	0.1134	0.1133	0.0100	9.99	10.0	-0.0	20.0
trans-1,4-Dichloro-2-butene	Ave	0.1007	0.1059	0.0100	10.5	10.0	5.1	20.0
Cyclohexanone	Lin		0.0062	0.0010	93.4	100	-6.6	20.0
4-Chlorotoluene	Ave	2.483	2.684	0.0100	10.8	10.0	8.1	20.0
tert-Butylbenzene	Ave	2.767	3.107	0.0100	11.2	10.0	12.3	20.0
1,2,4-Trimethylbenzene	Ave	3.006	3.317	0.0100	11.0	10.0	10.4	20.0
sec-Butylbenzene	Ave	4.350	4.893	0.0100	11.3	10.0	12.5	20.0
4-Isopropyltoluene	Ave	3.465	4.022	0.0100	11.6	10.0	16.1	20.0
1,3-Dichlorobenzene	Ave	1.639	1.667	0.6000	10.2	10.0	1.7	20.0
1,2,3-Trimethylbenzene	Ave	2.855	3.007	0.0100	10.5	10.0	5.3	20.0
1,4-Dichlorobenzene	Ave	1.642	1.637	0.5000	9.97	10.0	-0.3	20.0
n-Butylbenzene	Ave	0.9148	1.064	0.0100	11.6	10.0	16.3	20.0
Benzyl chloride	Lin		0.1392	0.0100	11.7	10.0	17.2	20.0
1,2-Dichlorobenzene	Ave	1.302	1.327	0.4000	10.2	10.0	1.9	20.0
Nonanal	Qua		0.1912	0.0100	9.61	10.0	-3.9	20.0
1,2-Dibromo-3-Chloropropane	Ave	0.0543	0.0598	0.0500	11.0	10.0	10.2	20.0
1,3,5-Trichlorobenzene	Ave	1.290	1.379	0.0100	10.7	10.0	6.9	20.0
Hexachlorobutadiene	Ave	0.7815	0.8109	0.0100	10.4	10.0	3.8	20.0
1,2,4-Trichlorobenzene	Ave	0.9466	1.021	0.2000	10.8	10.0	7.8	20.0
Naphthalene	Lin1		1.149	0.0100	9.95	10.0	-0.5	20.0
1,2,3-Trichlorobenzene	Ave	0.7544	0.7874	0.0100	10.4	10.0	4.4	20.0
Dibromofluoromethane (Surr)	Ave	0.1850	0.1852	0.0100	10.0	10.0	0.0	20.0
1,2-Dichloroethane-d4 (Surr)	Ave	0.1824	0.1745	0.0100	9.57	10.0	-4.3	20.0
Toluene-d8 (Surr)	Ave	1.347	1.400	0.0100	10.4	10.0	3.9	20.0
4-Bromofluorobenzene (Surr)	Ave	0.8510	0.8871	0.0100	10.4	10.0	4.2	20.0

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LCCV7572.D
Lims ID: ccvis
Client ID:
Sample Type: CCVIS
Inject. Date: 20-Feb-2017 10:07:30 ALS Bottle#: 1 Worklist Smp#: 4
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: CCVIS
Operator ID: ADB Instrument ID: VMSL
Sublist: chrom-25mL-8260-MSL*sub17

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:52 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 20-Feb-2017 10:42:53

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85	3.011	3.011	0.000	100	677084	10.0	10.2	
2 1,2-Dichloro-1,1,2,2-tetra	135	3.248	3.248	0.000	100	305668	10.0	9.26	
3 Chloromethane	50	3.346	3.346	0.000	99	688104	10.0	9.75	
4 Vinyl chloride	62	3.499	3.499	0.000	98	716176	10.0	10.1	
5 Butadiene	39	3.527	3.527	0.000	91	761515	10.0	10.0	
6 Bromomethane	94	4.100	4.100	0.000	91	323861	10.0	10.1	
7 Chloroethane	64	4.310	4.310	0.000	100	403377	10.0	9.73	
8 Trichlorofluoromethane	101	4.561	4.561	0.000	100	847513	10.0	9.74	
9 Dichlorofluoromethane	67	4.659	4.659	0.000	98	899567	10.0	9.69	
10 Ethyl ether	74	5.064	5.064	0.000	93	172762	10.0	11.0	
11 Ethanol	45	5.301	5.301	0.000	99	55985	400.0	392.9	
12 1,1-Dichloroethene	96	5.371	5.371	0.000	97	505483	10.0	10.3	
13 Carbon disulfide	76	5.413	5.413	0.000	100	1806337	10.0	10.4	
14 1,1,2-Trichloro-1,2,2-trif	151	5.427	5.427	0.000	90	473703	10.0	9.91	
16 Iodomethane	142	5.580	5.580	0.000	99	370348	10.0	9.77	
17 Acrolein	56	5.860	5.860	0.000	99	116901	50.0	58.7	
18 3-Chloro-1-propene	39	6.027	6.027	0.000	91	613011	10.0	10.7	
19 Isopropyl alcohol	45	6.069	6.069	0.000	97	73985	100.0	113.7	
20 Methylene Chloride	84	6.167	6.167	0.000	96	397490	10.0	9.74	
21 Acetone	43	6.237	6.237	0.000	100	48311	10.0	11.0	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.000	98	528791	10.0	10.3	
23 Methyl acetate	74	6.377	6.377	0.000	98	114306	50.0	55.1	
24 Hexane	86	6.446	6.446	0.000	90	198792	10.0	11.2	
25 Methyl tert-butyl ether	73	6.502	6.502	0.000	96	616360	10.0	11.5	
26 2-Methyl-2-propanol	59	6.600	6.600	0.000	90	92732	100.0	119.7	
27 Acetonitrile	41	6.809	6.809	0.000	99	167310	100.0	94.1	
28 Isopropyl ether	45	6.921	6.921	0.000	94	1304106	10.0	11.0	
29 2-Chloro-1,3-butadiene	53	7.061	7.061	0.000	94	1001500	10.0	11.4	
30 1,1-Dichloroethane	63	7.103	7.103	0.000	95	931946	10.0	9.98	
31 Acrylonitrile	53	7.159	7.159	0.000	99	564076	100.0	104.1	
32 Tert-butyl ethyl ether	59	7.326	7.326	0.000	97	950230	10.0	11.8	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
33 Vinyl acetate	43	7.340	7.340	0.000	98	512181	10.0	13.5	
34 cis-1,2-Dichloroethene	96	7.675	7.675	0.000	82	504388	10.0	10.4	
35 2,2-Dichloropropane	77	7.787	7.787	0.000	94	746816	10.0	11.8	
37 Chlorobromomethane	128	7.885	7.885	0.000	49	157372	10.0	10.1	
36 Cyclohexane	84	7.885	7.885	0.000	91	981348	10.0	11.0	
38 Chloroform	83	7.941	7.941	0.000	95	808294	10.0	9.93	
39 Ethyl acetate	45	8.038	8.038	0.000	99	40671	20.0	20.4	
40 Carbon tetrachloride	117	8.094	8.094	0.000	99	760975	10.0	10.4	
41 Tetrahydrofuran	71	8.122	8.122	0.000	46	30607	20.0	21.1	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	95	346881	10.0	10.0	
43 1,1,1-Trichloroethane	97	8.164	8.164	0.000	98	867909	10.0	10.4	
45 2-Butanone (MEK)	43	8.248	8.248	0.000	99	69249	10.0	10.1	
47 1,1-Dichloropropene	75	8.276	8.276	0.000	96	783050	10.0	10.9	
44 Isooctane	57	8.360	8.360	0.000	96	2728567	10.0	11.0	
46 n-Heptane	43	8.430	8.430	0.000	93	1142241	10.0	10.9	
48 Benzene	78	8.527	8.527	0.000	96	2036218	10.0	10.0	
49 Propionitrile	54	8.541	8.541	0.000	89	212055	100.0	102.6	
50 Methacrylonitrile	41	8.555	8.555	0.000	94	1167338	100.0	104.7	
51 Tert-amyl methyl ether	73	8.597	8.597	0.000	92	624822	10.0	11.8	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	326826	10.0	9.57	
52 Isobutyl alcohol	42	8.653	8.653	0.000	94	79959	250.0	282.9	
54 1,2-Dichloroethane	62	8.723	8.723	0.000	97	407798	10.0	9.96	
* 55 Fluorobenzene	96	8.904	8.904	0.000	99	1873238	10.0	10.0	
58 Methylcyclohexane	55	9.058	9.058	0.000	92	958059	10.0	10.4	
57 Trichloroethene	95	9.058	9.058	0.000	61	550997	10.0	9.79	
59 n-Butanol	56	9.295	9.295	0.000	91	78272	250.0	247.0	
61 Dibromomethane	93	9.477	9.477	0.000	94	148660	10.0	10.2	
60 Ethyl acrylate	55	9.505	9.505	0.000	99	196359	10.0	9.97	
62 1,2-Dichloropropane	63	9.561	9.561	0.000	94	428487	10.0	10.3	
63 Dichlorobromomethane	83	9.589	9.589	0.000	99	479807	10.0	10.4	
64 Methyl methacrylate	69	9.687	9.687	0.000	93	238777	20.0	20.1	
65 1,4-Dioxane	88	9.770	9.770	0.000	96	28180	200.0	210.5	
66 2-Chloroethyl vinyl ether	63	10.064	10.064	0.000	92	81046	10.0	10.6	
67 cis-1,3-Dichloropropene	75	10.161	10.161	0.000	95	570909	10.0	11.7	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	93	1755257	10.0	10.4	
69 Toluene	92	10.371	10.371	0.000	98	1314116	10.0	10.6	
70 2-Nitropropane	43	10.594	10.594	0.000	99	74261	20.0	19.5	
71 4-Methyl-2-pentanone (MIBK	43	10.692	10.692	0.000	96	123986	10.0	9.82	
72 trans-1,3-Dichloropropene	75	10.734	10.734	0.000	79	430599	10.0	11.7	
73 Tetrachloroethene	164	10.734	10.734	0.000	98	497734	10.0	10.4	
74 Ethyl methacrylate	69	10.818	10.818	0.000	90	245897	10.0	9.68	
75 1,1,2-Trichloroethane	83	10.888	10.888	0.000	94	187883	10.0	10.1	
76 Chlorodibromomethane	129	11.069	11.069	0.000	90	270015	10.0	10.8	
77 1,3-Dichloropropane	76	11.153	11.153	0.000	93	409223	10.0	10.2	
78 n-Butyl acetate	43	11.293	11.293	0.000	98	225936	10.0	10.2	
79 Ethylene Dibromide	107	11.321	11.321	0.000	99	196735	10.0	10.5	
80 2-Hexanone	43	11.418	11.418	0.000	96	98373	10.0	10.2	
81 1-Chlorohexane	91	11.684	11.684	0.000	97	828835	10.0	12.1	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	95	1253864	10.0	10.0	
82 Ethylbenzene	91	11.754	11.754	0.000	98	2534880	10.0	10.4	
84 Chlorobenzene	112	11.767	11.767	0.000	97	1265758	10.0	9.88	
85 1,1,1,2-Tetrachloroethane	131	11.809	11.809	0.000	95	395595	10.0	10.2	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
86 m-Xylene & p-Xylene	106	11.879	11.879	0.000	98	1002431	10.0	11.0	
88 o-Xylene	106	12.284	12.284	0.000	97	885761	10.0	11.4	
89 Styrene	104	12.326	12.326	0.000	94	1324381	10.0	11.5	
90 Bromoform	173	12.396	12.396	0.000	97	136532	10.0	10.8	
91 Isopropylbenzene	105	12.550	12.550	0.000	96	2644473	10.0	11.3	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	96	545728	10.0	10.4	
93 N-Propylbenzene	91	12.941	12.941	0.000	98	3050263	10.0	11.5	
94 Bromobenzene	156	12.983	12.983	0.000	94	477929	10.0	10.1	
95 1,1,2,2-Tetrachloroethane	83	13.010	13.010	0.000	96	215720	10.0	10.3	
96 1,3,5-Trimethylbenzene	105	13.094	13.094	0.000	95	2073960	10.0	11.5	
97 2-Chlorotoluene	91	13.122	13.122	0.000	96	1867863	10.0	10.4	
99 1,2,3-Trichloropropane	110	13.164	13.164	0.000	87	69724	10.0	10.0	
98 trans-1,4-Dichloro-2-buten	53	13.178	13.178	0.000	80	65123	10.0	10.5	
100 Cyclohexanone	55	13.248	13.248	0.000	93	38133	100.0	93.4	
101 4-Chlorotoluene	91	13.276	13.276	0.000	98	1651332	10.0	10.8	
102 tert-Butylbenzene	119	13.429	13.429	0.000	92	1911486	10.0	11.2	
103 1,2,4-Trimethylbenzene	105	13.485	13.485	0.000	97	2040591	10.0	11.0	
104 sec-Butylbenzene	105	13.583	13.583	0.000	95	3010408	10.0	11.3	
105 4-Isopropyltoluene	119	13.709	13.709	0.000	97	2474503	10.0	11.6	
106 1,3-Dichlorobenzene	146	13.848	13.848	0.000	98	1025499	10.0	10.2	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	72	615187	10.0	10.0	
107 1,2,3-Trimethylbenzene	105	13.918	13.918	0.000	97	1849993	10.0	10.5	
109 1,4-Dichlorobenzene	146	13.932	13.932	0.000	93	1006891	10.0	9.97	
111 n-Butylbenzene	134	14.128	14.128	0.000	97	654269	10.0	11.6	
110 Benzyl chloride	126	14.156	14.156	0.000	92	85612	10.0	11.7	
112 1,2-Dichlorobenzene	146	14.351	14.351	0.000	97	816516	10.0	10.2	
113 n-Nonyl Aldehyde	57	15.064	15.064	0.000	89	117618	10.0	9.61	
115 1,2-Dibromo-3-Chloropropan	157	15.147	15.147	0.000	82	36777	10.0	11.0	
114 1,3,5-Trichlorobenzene	180	15.161	15.161	0.000	98	848203	10.0	10.7	
116 Hexachlorobutadiene	225	15.748	15.748	0.000	99	498874	10.0	10.4	
117 1,2,4-Trichlorobenzene	180	15.804	15.804	0.000	94	627869	10.0	10.8	
118 Naphthalene	128	16.153	16.153	0.000	97	706549	10.0	9.95	
120 1,2,3-Trichlorobenzene	180	16.348	16.348	0.000	96	484403	10.0	10.4	

Reagents:

8260 NewWkMix_00207	Amount Added: 10.00	Units: uL	
I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

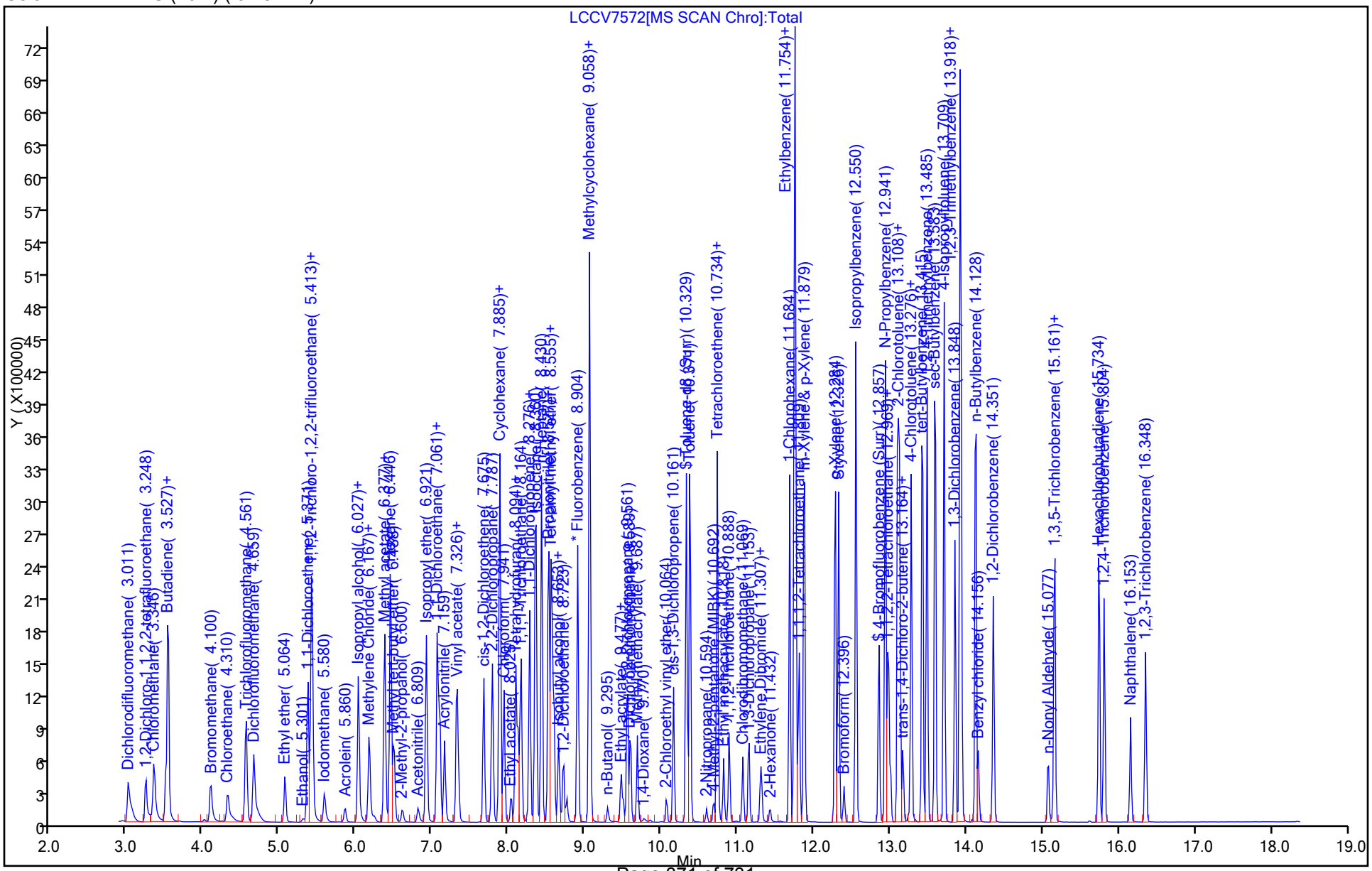
Report Date: 21-Feb-2017 08:24:53 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LCCV7572.D

Injection Date:	20-Feb-2017 10:07:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	ccvis			Worklist Smp#:	4
Client ID:					
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	1
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LBFB7556.D
Lims ID: bfb
Client ID:
Sample Type: BFB
Inject. Date: 14-Feb-2017 11:34:30 ALS Bottle#: 1 Worklist Smp#: 1
Injection Vol: 2.0 uL Dil. Factor: 1.0000
Sample Info: BFB
Operator ID: SMCR Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 15-Feb-2017 11:41:01 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK023

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
$ 124 BFB	95	4.036	4.036	0.000	0	1498652	NR	NR	

QC Flag Legend

Processing Flags
NR - Missing Quant Standard

Reagents:

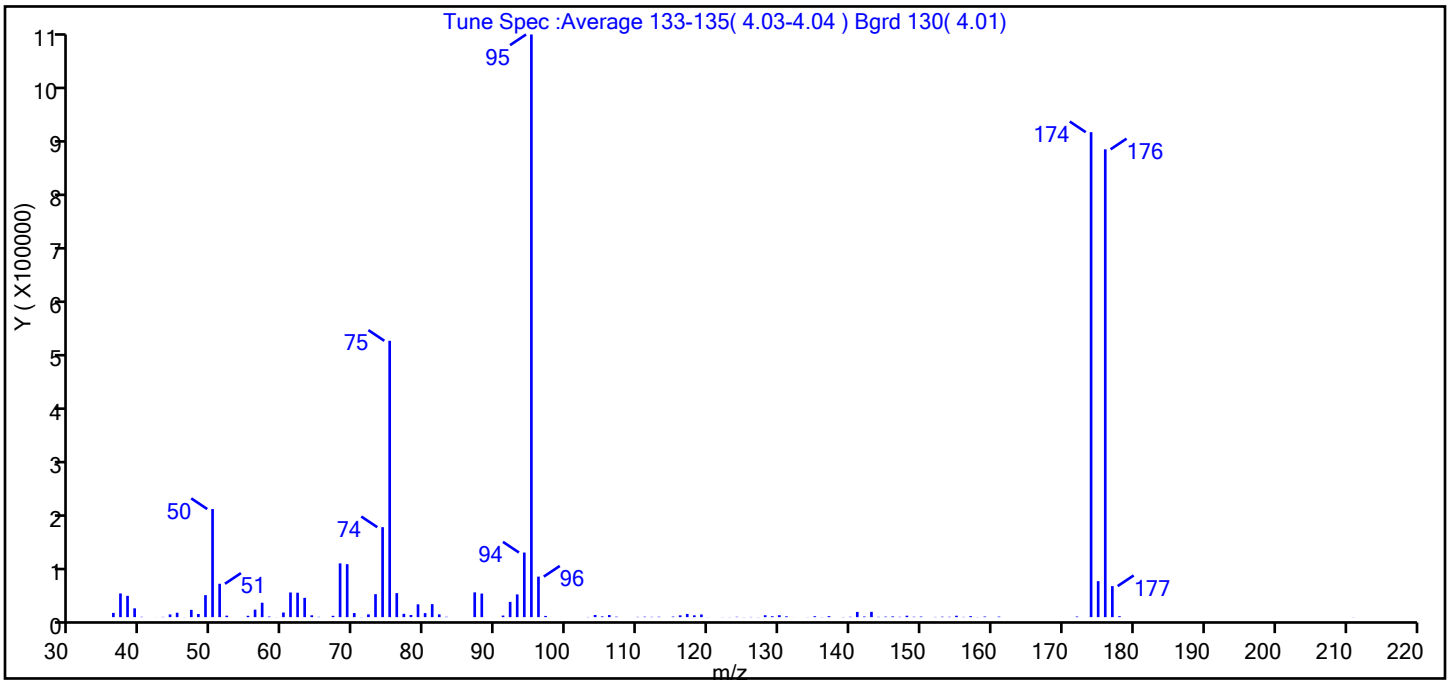
BFB_00067 Amount Added: 2.00 Units: uL

MS Tune Report

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LBFB7556.D
Injection Date: 14-Feb-2017 11:34:30 Instrument ID: VMSL
Lims ID: bfb
Client ID:
Operator ID: SMCR ALS Bottle#: 1 Worklist Smp#: 1
Injection Vol: 2.0 uL Dil. Factor: 1.0000
Method: 25mL-8260-MSL Limit Group: MSV-8260
Tune Method: BFB Method 8260

$ 124 BFB



m/z	Ion Abundance Criteria	% Relative Abundance
95	Base peak, 100% relative abundance	100.0
50	15 to 40% of m/z 95	18.6
75	30 to 60% of m/z 95	47.4
96	5 to 9% of m/z 95	7.0
173	Less than 2% of m/z 174	0.0 (0.0)
174	50 to 120% of m/z 95	83.2
175	5 to 9% of m/z 174	6.2 (7.4)
176	Greater than 95% but less than 101% of m/z 174	80.3 (96.5)
177	5 to 9% of m/z 176	5.3 (6.6)

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LBFB7556.D\25mL-8260-MSL.rslt\spectra.d
Injection Date: 14-Feb-2017 11:34:30
Spectrum: Tune Spec :Average 133-135(4.03-4.04) Bgrd 130(4.01)
Base Peak: 95.00
Minimum % Base Peak: 0
Number of Points: 113

m/z	Y	m/z	Y	m/z	Y	m/z	Y
36.00	7860	68.00	99216	107.00	859	142.00	1178
37.00	43768	69.00	97744	110.00	503	143.00	9808
38.00	39312	70.00	7574	111.00	846	144.00	570
39.00	16278	71.00	237	112.00	552	145.00	942
40.00	599	72.00	5132	113.00	762	146.00	1345
41.00	11	73.00	42392	115.00	1046	147.00	606
42.00	85	74.00	166016	116.00	3330	148.00	2658
43.00	474	75.00	509952	117.00	5946	149.00	717
44.00	5032	76.00	44352	118.00	3346	150.00	1031
45.00	8124	77.00	6206	119.00	4899	152.00	413
46.00	194	78.00	4008	120.00	107	153.00	814
47.00	13454	79.00	23648	122.00	199	154.00	651
48.00	5824	80.00	7453	123.00	233	155.00	2604
49.00	40600	81.00	24032	124.00	658	156.00	463
50.00	199488	82.00	5147	125.00	254	157.00	1834
51.00	61600	83.00	688	126.00	407	158.00	251
52.00	2749	87.00	45680	127.00	255	159.00	1152
55.00	2479	88.00	43536	128.00	3520	161.00	1025
56.00	13875	91.00	2936	129.00	1678	172.00	1129
57.00	26624	92.00	28168	130.00	3590	174.00	894912
58.00	1074	93.00	41936	131.00	1507	175.00	66392
59.00	126	94.00	119216	132.00	87	176.00	863296
60.00	8548	95.00	1075200	134.00	202	177.00	57280
61.00	45512	96.00	74792	135.00	1694	178.00	1680
62.00	45064	97.00	2266	136.00	264	207.00	41
63.00	35616	103.00	349	137.00	1817	211.00	240
64.00	3409	104.00	3962	139.00	331		
65.00	545	105.00	1354	140.00	667		
67.00	2473	106.00	3821	141.00	9645		

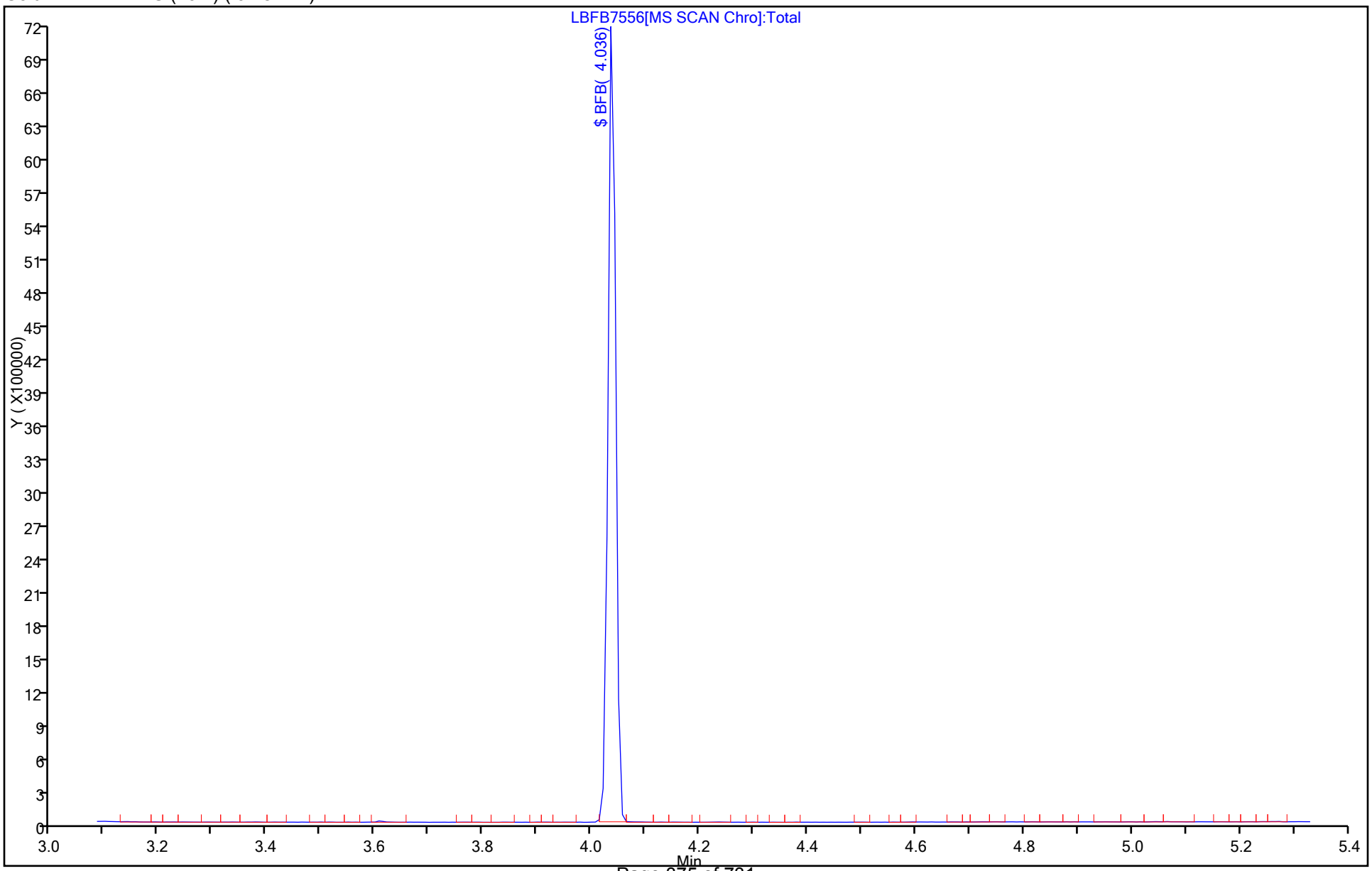
Report Date: 15-Feb-2017 11:41:02 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LBFB7556.D

Injection Date:	14-Feb-2017 11:34:30	Instrument ID:	VMSL	Operator ID:	SMCR
Lims ID:	bfb			Worklist Smp#:	1
Client ID:					
Injection Vol:	2.0 uL	Dil. Factor:	1.0000	ALS Bottle#:	1
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LBFB7571.D
Lims ID: bfb
Client ID:
Sample Type: BFB
Inject. Date: 20-Feb-2017 09:43:30 ALS Bottle#: 1 Worklist Smp#: 1
Injection Vol: 2.0 uL Dil. Factor: 1.0000
Sample Info: BFB
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:25:12 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 20-Feb-2017 10:36:02

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
$ 124 BFB	95	4.036	4.036	0.000	0	2200888	NR	NR	

QC Flag Legend

Processing Flags
NR - Missing Quant Standard

Reagents:

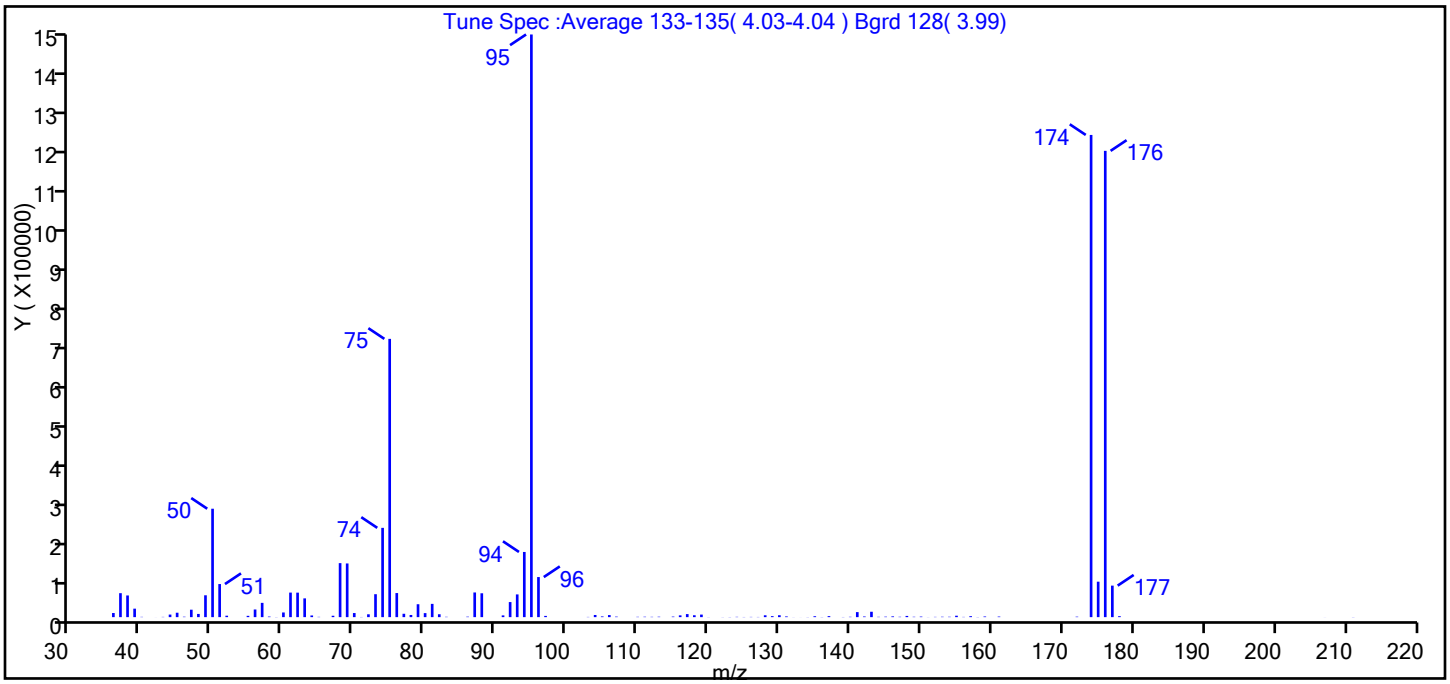
BFB_00067 Amount Added: 2.00 Units: uL

MS Tune Report

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LBFB7571.D
Injection Date: 20-Feb-2017 09:43:30 Instrument ID: VMSL
Lims ID: bfb
Client ID:
Operator ID: ADB ALS Bottle#: 1 Worklist Smp#: 1
Injection Vol: 2.0 uL Dil. Factor: 1.0000
Method: 25mL-8260-MSL Limit Group: MSV-8260
Tune Method: BFB Method 8260

$ 124 BFB



m/z	Ion Abundance Criteria	% Relative Abundance
95	Base peak, 100% relative abundance	100.0
50	15 to 40% of m/z 95	18.6
75	30 to 60% of m/z 95	47.8
96	5 to 9% of m/z 95	6.9
173	Less than 2% of m/z 174	0.0 (0.0)
174	50 to 120% of m/z 95	82.8
175	5 to 9% of m/z 174	6.1 (7.4)
176	Greater than 95% but less than 101% of m/z 174	80.0 (96.7)
177	5 to 9% of m/z 176	5.4 (6.8)

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LBFB7571.D\25mL-8260-MSL.rslt\spectra.d
Injection Date: 20-Feb-2017 09:43:30
Spectrum: Tune Spec :Average 133-135(4.03-4.04) Bgrd 128(3.99)
Base Peak: 95.00
Minimum % Base Peak: 0
Number of Points: 115

m/z	Y	m/z	Y	m/z	Y	m/z	Y
36.00	10483	69.00	136512	107.00	1332	141.00	12788
37.00	60960	70.00	10431	110.00	825	142.00	1628
38.00	55136	71.00	423	111.00	1054	143.00	13721
39.00	21576	72.00	7248	112.00	788	144.00	820
40.00	705	73.00	58344	113.00	1102	145.00	1209
42.00	88	74.00	227072	115.00	1401	146.00	1952
43.00	621	75.00	707648	116.00	4524	147.00	930
44.00	6532	76.00	61240	117.00	7755	148.00	3086
45.00	11229	77.00	8583	118.00	4806	149.00	952
46.00	1072	78.00	5501	119.00	6509	150.00	1417
47.00	18920	79.00	32840	120.00	238	151.00	208
48.00	8182	80.00	10250	122.00	247	152.00	678
49.00	55592	81.00	33744	123.00	365	153.00	1013
50.00	275712	82.00	7373	124.00	781	154.00	971
51.00	84160	83.00	841	125.00	414	155.00	3624
52.00	3662	86.00	1191	126.00	609	156.00	608
55.00	3333	87.00	62752	127.00	467	157.00	2435
56.00	19472	88.00	60688	128.00	4709	158.00	364
57.00	36320	91.00	4452	129.00	2503	159.00	1650
58.00	1458	92.00	38320	130.00	4852	161.00	1474
59.00	329	93.00	57800	131.00	1815	172.00	1211
60.00	11884	94.00	165760	132.00	178	174.00	1226240
61.00	62440	95.00	1481728	133.00	90	175.00	90168
62.00	62296	96.00	101928	134.00	293	176.00	1185792
63.00	47728	97.00	3154	135.00	2281	177.00	80152
64.00	4260	103.00	562	136.00	336	178.00	2401
65.00	714	104.00	5484	137.00	2545	207.00	119
67.00	3510	105.00	1791	139.00	396	211.00	299
68.00	137344	106.00	5250	140.00	886		

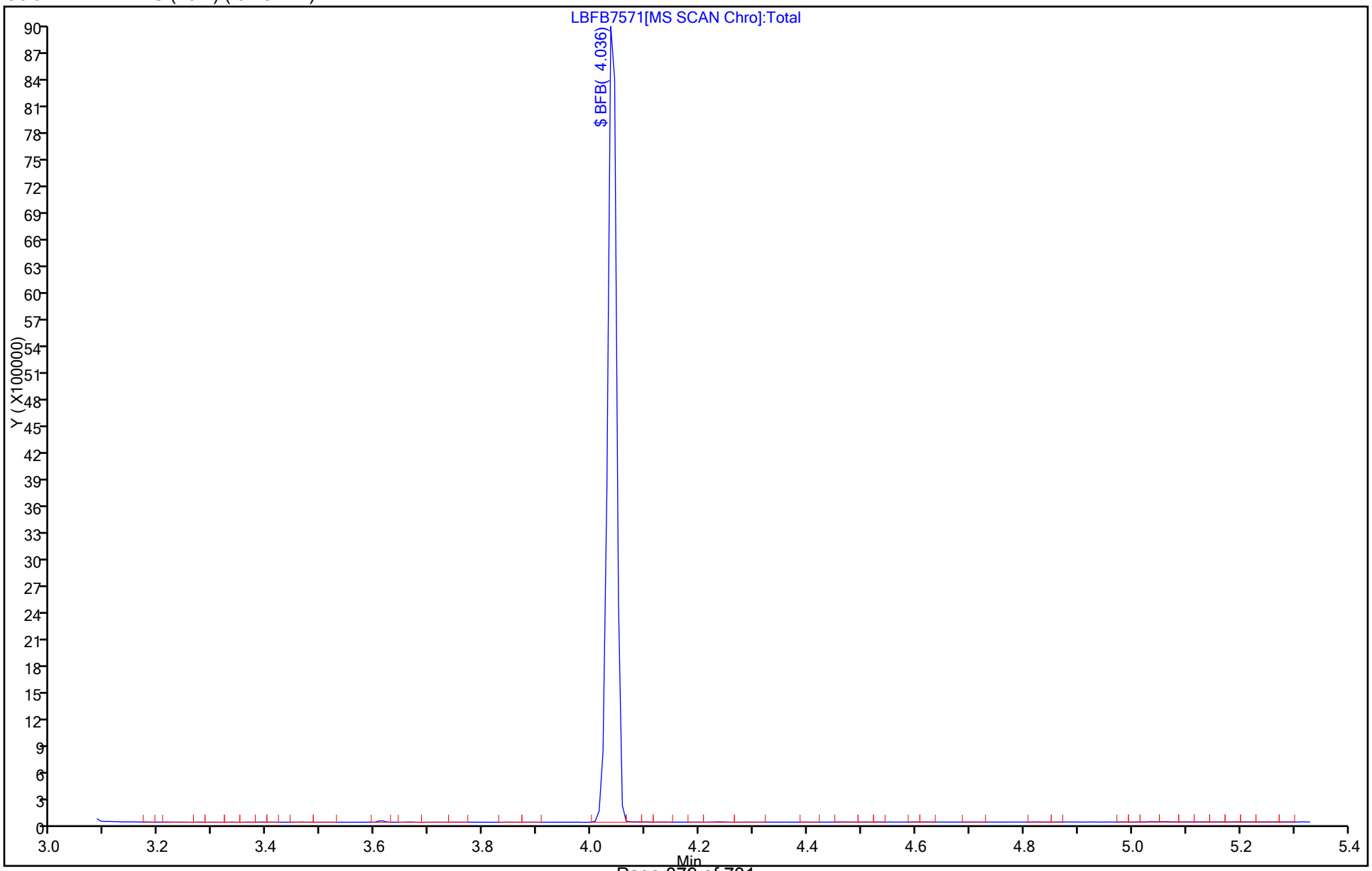
Report Date: 21-Feb-2017 08:25:13 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LBFB7571.D

Injection Date:	20-Feb-2017 09:43:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	bfb			Worklist Smp#:	1
Client ID:					
Injection Vol:	2.0 uL	Dil. Factor:	1.0000	ALS Bottle#:	1
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 160-293176/8

Matrix: Water | Lab File ID: LBLK7576.D

Analysis Method: 8260C | Date Collected:

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 11:47

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.10
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.13
75-35-4	1,1-Dichloroethene	ND		1.0	0.10
75-34-3	1,1-Dichloroethane	ND		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	ND		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	ND		1.0	0.41
107-06-2	1,2-Dichloroethane	ND		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	ND		2.0	0.14
78-87-5	1,2-Dichloropropane	ND		1.0	0.10
78-93-3	2-Butanone	ND		5.0	0.47
591-78-6	2-Hexanone	ND		5.0	0.25
108-10-1	4-Methyl-2-pentanone	ND		5.0	0.22
67-64-1	Acetone	ND		2.0	0.55
71-43-2	Benzene	ND		1.0	0.10
75-25-2	Bromoform	ND		1.0	0.17
74-83-9	Methyl bromide	ND		2.0	0.25
75-15-0	Carbon disulfide	ND		1.0	0.10
56-23-5	Carbon tetrachloride	ND		1.0	0.18
108-90-7	Chlorobenzene	ND		1.0	0.11
124-48-1	Chlorodibromomethane	ND		1.0	0.14
75-00-3	Chloroethane	ND		2.0	0.16
67-66-3	Chloroform	ND		1.0	0.10
74-87-3	Chloromethane	ND		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.16
75-27-4	Bromodichloromethane	ND		1.0	0.14
100-41-4	Ethylbenzene	ND		1.0	0.12
106-93-4	1,2-Dibromoethane	ND		1.0	0.13
75-09-2	Methylene Chloride	ND		1.0	0.27
71-36-3	n-Butanol	ND		50	12
100-42-5	Styrene	ND		1.0	0.13
127-18-4	Tetrachloroethene	ND		1.0	0.18
108-88-3	Toluene	ND		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 160-293176/8

Matrix: Water | Lab File ID: LBLK7576.D

Analysis Method: 8260C | Date Collected:

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 11:47

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		1.0	0.25
108-05-4	Vinyl acetate	ND		2.0	0.18
75-01-4	Vinyl chloride	ND		2.0	0.19
1330-20-7	Xylenes, Total	ND		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	95		75-129
460-00-4	4-Bromofluorobenzene (Surr)	106		81-130
1868-53-7	Dibromofluoromethane (Surr)	95		81-124
2037-26-5	Toluene-d8 (Surr)	106		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LBLK7576.D
Lims ID: mb
Client ID:
Sample Type: MB
Inject. Date: 20-Feb-2017 11:47:30 ALS Bottle#: 5 Worklist Smp#: 8
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: MB
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:31 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 20-Feb-2017 12:09:14

	Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1	Dichlorodifluoromethane	85		3.011					ND	
2	1,2-Dichloro-1,1,2,2-tetra	135		3.248					ND	
3	Chloromethane	50		3.346					ND	
4	Vinyl chloride	62		3.499					ND	
5	Butadiene	39		3.527					ND	
6	Bromomethane	94		4.100					ND	
7	Chloroethane	64		4.310					ND	
8	Trichlorofluoromethane	101		4.561					ND	
9	Dichlorofluoromethane	67		4.659					ND	
10	Ethyl ether	74		5.064					ND	
11	Ethanol	45		5.301					ND	
12	1,1-Dichloroethene	96		5.371					ND	
13	Carbon disulfide	76		5.413					ND	
14	1,1,2-Trichloro-1,2,2-trif	151		5.427					ND	
16	Iodomethane	142		5.580					ND	
S 15	1,2-Dichloroethene, Total	96		5.816					ND	
17	Acrolein	56		5.860					ND	
18	3-Chloro-1-propene	39		6.027					ND	
19	Isopropyl alcohol	45		6.069					ND	
20	Methylene Chloride	84		6.167					ND	
21	Acetone	43		6.237					ND	
22	trans-1,2-Dichloroethene	96		6.377					ND	
23	Methyl acetate	74		6.377					ND	
24	Hexane	86		6.446					ND	
25	Methyl tert-butyl ether	73		6.502					ND	
26	2-Methyl-2-propanol	59		6.600					ND	
27	Acetonitrile	41		6.809					ND	
28	Isopropyl ether	45		6.921					ND	
29	2-Chloro-1,3-butadiene	53		7.061					ND	
30	1,1-Dichloroethane	63		7.103					ND	
31	Acrylonitrile	53		7.159					ND	
32	Tert-butyl ethyl ether	59		7.326					ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
33 Vinyl acetate	43		7.340					ND	
34 cis-1,2-Dichloroethene	96		7.675					ND	
35 2,2-Dichloropropane	77		7.787					ND	
37 Chlorobromomethane	128		7.885					ND	
36 Cyclohexane	84		7.885					ND	
38 Chloroform	83		7.941					ND	
39 Ethyl acetate	45		8.038					ND	
40 Carbon tetrachloride	117		8.094					ND	
41 Tetrahydrofuran	71		8.122					ND	
$ 42 Dibromofluoromethane (Surr	113	8.123	8.122	0.001	94	311793	10.0	9.48	
43 1,1,1-Trichloroethane	97		8.164					ND	
45 2-Butanone (MEK)	43		8.248					ND	
47 1,1-Dichloropropene	75		8.276					ND	
44 Isooctane	57		8.360					ND	
46 n-Heptane	43		8.430					ND	
48 Benzene	78		8.527					ND	
49 Propionitrile	54		8.541					ND	
50 Methacrylonitrile	41		8.555					ND	
51 Tert-amyl methyl ether	73		8.597					ND	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	306537	10.0	9.46	
52 Isobutyl alcohol	42		8.653					ND	
54 1,2-Dichloroethane	62		8.723					ND	
* 55 Fluorobenzene	96	8.905	8.904	0.001	99	1777137	10.0	10.0	
58 Methylcyclohexane	55		9.058					ND	
57 Trichloroethene	95		9.058					ND	
56 1,4-Difluorobenzene	114		9.256					ND	
59 n-Butanol	56		9.295					ND	
61 Dibromomethane	93		9.477					ND	
60 Ethyl acrylate	55		9.505					ND	
62 1,2-Dichloropropane	63		9.561					ND	
63 Dichlorobromomethane	83		9.589					ND	
64 Methyl methacrylate	69		9.687					ND	
65 1,4-Dioxane	88		9.770					ND	
66 2-Chloroethyl vinyl ether	63		10.064					ND	
67 cis-1,3-Dichloropropene	75		10.161					ND	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	93	1652995	10.0	10.6	
69 Toluene	92		10.371					ND	
70 2-Nitropropane	43		10.594					ND	
71 4-Methyl-2-pentanone (MIBK	43		10.692					ND	
72 trans-1,3-Dichloropropene	75		10.734					ND	
73 Tetrachloroethene	164		10.734					ND	
74 Ethyl methacrylate	69		10.818					ND	
75 1,1,2-Trichloroethane	83		10.888					ND	
76 Chlorodibromomethane	129		11.069					ND	
77 1,3-Dichloropropane	76		11.153					ND	
78 n-Butyl acetate	43		11.293					ND	
79 Ethylene Dibromide	107		11.321					ND	
80 2-Hexanone	43		11.418					ND	
81 1-Chlorohexane	91		11.684					ND	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	87	1153349	10.0	10.0	
82 Ethylbenzene	91		11.754					ND	
84 Chlorobenzene	112		11.767					ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
85 1,1,1,2-Tetrachloroethane	131		11.809					ND	
86 m-Xylene & p-Xylene	106		11.879					ND	
88 o-Xylene	106		12.284					ND	
89 Styrene	104		12.326					ND	
90 Bromoform	173		12.396					ND	
91 Isopropylbenzene	105		12.550					ND	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	495546	10.0		10.6
93 N-Propylbenzene	91		12.941					ND	
94 Bromobenzene	156		12.983					ND	
95 1,1,2,2-Tetrachloroethane	83		13.010					ND	
96 1,3,5-Trimethylbenzene	105		13.094					ND	
97 2-Chlorotoluene	91		13.122					ND	
99 1,2,3-Trichloropropane	110		13.164					ND	
98 trans-1,4-Dichloro-2-buten	53		13.178					ND	
100 Cyclohexanone	55		13.248					ND	
101 4-Chlorotoluene	91		13.276					ND	
102 tert-Butylbenzene	119		13.429					ND	
103 1,2,4-Trimethylbenzene	105		13.485					ND	
87 Pentachloroethane	167		13.558					ND	
104 sec-Butylbenzene	105		13.583					ND	
105 4-Isopropyltoluene	119		13.709					ND	
106 1,3-Dichlorobenzene	146		13.848					ND	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	96	547149	10.0		10.0
107 1,2,3-Trimethylbenzene	105		13.918					ND	
109 1,4-Dichlorobenzene	146		13.932					ND	
111 n-Butylbenzene	134		14.128					ND	
110 Benzyl chloride	126		14.156					ND	
112 1,2-Dichlorobenzene	146		14.351					ND	
113 n-Nonyl Aldehyde	57		15.064					ND	
115 1,2-Dibromo-3-Chloropropan	157		15.147					ND	
114 1,3,5-Trichlorobenzene	180		15.161					ND	
116 Hexachlorobutadiene	225		15.748					ND	
117 1,2,4-Trichlorobenzene	180		15.804					ND	
118 Naphthalene	128		16.153					ND	
120 1,2,3-Trichlorobenzene	180		16.348					ND	
S 119 Xylenes, Total	106		16.500					ND	
121 2-Pentanone	1		0.000					ND	
S 130 Trihalomethanes, Total	1		0.000					ND	

Reagents:

I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

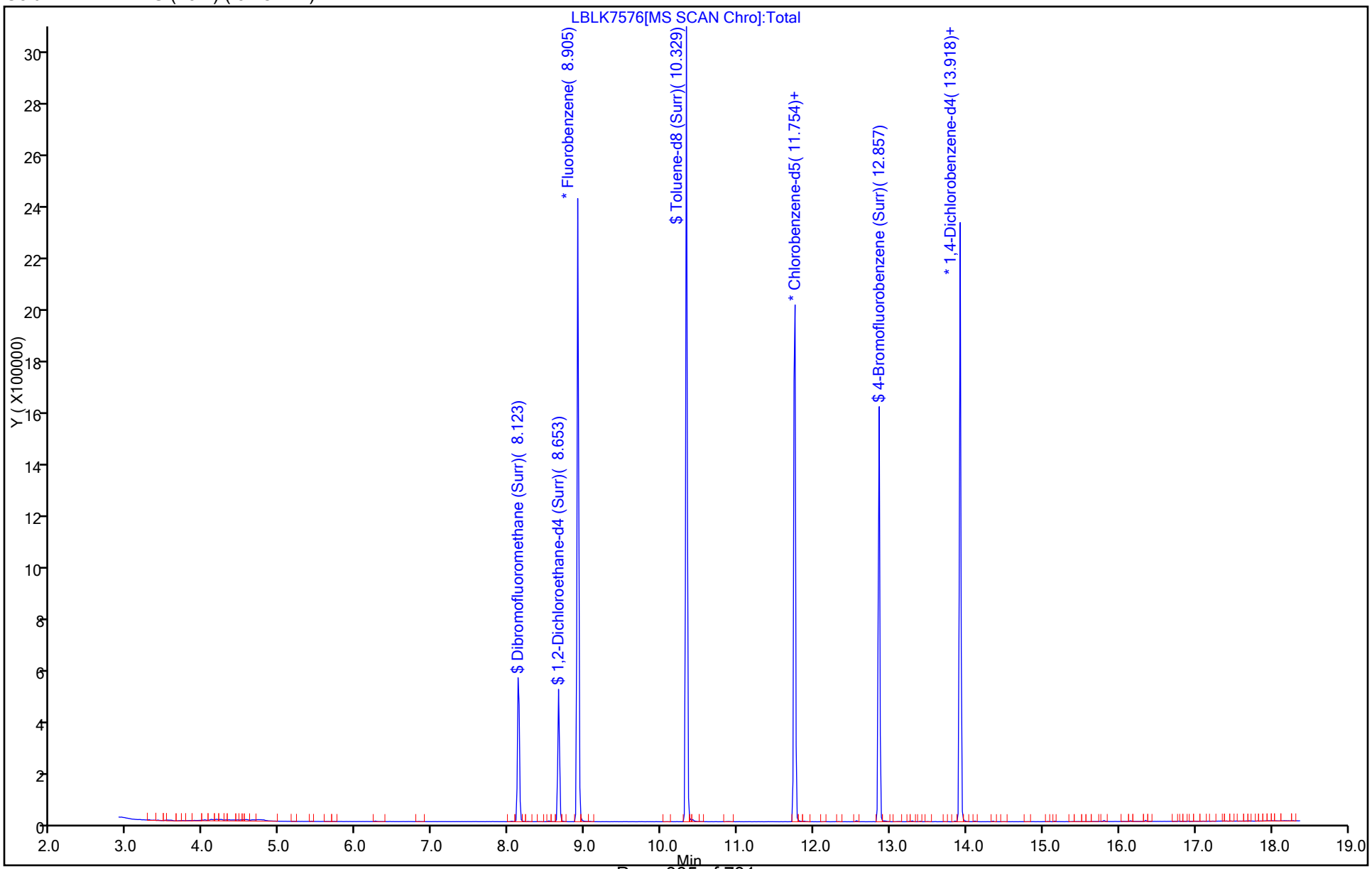
Report Date: 21-Feb-2017 08:24:47 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LBLK7576.D

Injection Date:	20-Feb-2017 11:47:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	mb			Worklist Smp#:	8
Client ID:					
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	5
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LBLK7576.D
Lims ID: mb
Client ID:
Sample Type: MB
Inject. Date: 20-Feb-2017 11:47:30 ALS Bottle#: 5 Worklist Smp#: 8
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: MB
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:31 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 20-Feb-2017 12:09:14

Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	9.48	94.83
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	9.46	94.59
$ 68 Toluene-d8 (Surr)	10.0	10.6	106.40
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.6	106.42

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCS 160-293176/5

Matrix: Water | Lab File ID: LLCS7573.D

Analysis Method: 8260C | Date Collected:

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 10:32

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	10.1		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	10.3		1.0	0.10
79-00-5	1,1,2-Trichloroethane	10.0		1.0	0.13
75-35-4	1,1-Dichloroethene	10.2		1.0	0.10
75-34-3	1,1-Dichloroethane	9.80		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	10.6		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	11.3		1.0	0.41
107-06-2	1,2-Dichloroethane	9.78		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	20.4		2.0	0.14
78-87-5	1,2-Dichloropropane	10.1		1.0	0.10
78-93-3	2-Butanone	9.75		5.0	0.47
591-78-6	2-Hexanone	10.9		5.0	0.25
108-10-1	4-Methyl-2-pentanone	9.94		5.0	0.22
67-64-1	Acetone	11.2		2.0	0.55
71-43-2	Benzene	9.70		1.0	0.10
75-25-2	Bromoform	10.6		1.0	0.17
74-83-9	Methyl bromide	9.46		2.0	0.25
75-15-0	Carbon disulfide	9.97		1.0	0.10
56-23-5	Carbon tetrachloride	10.2		1.0	0.18
108-90-7	Chlorobenzene	9.65		1.0	0.11
124-48-1	Chlorodibromomethane	10.6		1.0	0.14
75-00-3	Chloroethane	9.37		2.0	0.16
67-66-3	Chloroform	9.80		1.0	0.10
74-87-3	Chloromethane	9.55		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	10.2		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	11.5		1.0	0.16
75-27-4	Bromodichloromethane	10.2		1.0	0.14
100-41-4	Ethylbenzene	10.1		1.0	0.12
106-93-4	1,2-Dibromoethane	10.6		1.0	0.13
75-09-2	Methylene Chloride	9.62		1.0	0.27
71-36-3	n-Butanol	258		50	12
100-42-5	Styrene	11.3		1.0	0.13
127-18-4	Tetrachloroethene	10.1		1.0	0.18
108-88-3	Toluene	10.3		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	10.2		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	11.6		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCS 160-293176/5

Matrix: Water | Lab File ID: LLCS7573.D

Analysis Method: 8260C | Date Collected:

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 10:32

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	9.66		1.0	0.25
108-05-4	Vinyl acetate	13.4		2.0	0.18
75-01-4	Vinyl chloride	9.81		2.0	0.19
1330-20-7	Xylenes, Total	22.0		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	97		75-129
460-00-4	4-Bromofluorobenzene (Surr)	106		81-130
1868-53-7	Dibromofluoromethane (Surr)	101		81-124
2037-26-5	Toluene-d8 (Surr)	105		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LLCS7573.D
Lims ID: lcs
Client ID:
Sample Type: LCS
Inject. Date: 20-Feb-2017 10:32:30 ALS Bottle#: 2 Worklist Smp#: 5
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: LCS
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:31 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 20-Feb-2017 11:22:27

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85	3.011	3.011	0.000	100	671516	10.0	9.87	
2 1,2-Dichloro-1,1,2,2-tetra	135	3.248	3.248	0.000	99	308619	10.0	9.09	
3 Chloromethane	50	3.346	3.346	0.000	100	693133	10.0	9.55	
4 Vinyl chloride	62	3.499	3.499	0.000	98	714122	10.0	9.81	
5 Butadiene	39	3.527	3.527	0.000	91	750383	10.0	9.61	
6 Bromomethane	94	4.100	4.100	0.000	91	312752	10.0	9.46	
7 Chloroethane	64	4.323	4.310	0.013	100	399584	10.0	9.37	
8 Trichlorofluoromethane	101	4.561	4.561	0.000	100	843258	10.0	9.42	
9 Dichlorofluoromethane	67	4.659	4.659	0.000	98	891651	10.0	9.34	
10 Ethyl ether	74	5.064	5.064	0.000	94	180739	10.0	11.2	
11 Ethanol	45	5.315	5.301	0.014	100	61608	400.0	420.4	
12 1,1-Dichloroethene	96	5.371	5.371	0.000	98	513443	10.0	10.2	
13 Carbon disulfide	76	5.413	5.413	0.000	100	1781870	10.0	9.97	
14 1,1,2-Trichloro-1,2,2-trif	151	5.427	5.427	0.000	90	474211	10.0	9.64	
16 Iodomethane	142	5.580	5.580	0.000	99	382024	10.0	9.80	
17 Acrolein	56	5.860	5.860	0.000	99	123527	50.0	60.3	
18 3-Chloro-1-propene	39	6.027	6.027	0.000	91	612564	10.0	10.4	
19 Isopropyl alcohol	45	6.069	6.069	0.000	97	78719	100.0	117.6	
20 Methylene Chloride	84	6.167	6.167	0.000	98	403832	10.0	9.62	
21 Acetone	43	6.237	6.237	0.000	99	50361	10.0	11.2	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.001	98	535747	10.0	10.2	
23 Methyl acetate	74	6.391	6.377	0.014	98	120796	50.0	56.7	
24 Hexane	86	6.446	6.446	0.000	91	200482	10.0	11.0	
25 Methyl tert-butyl ether	73	6.502	6.502	0.000	95	637395	10.0	11.5	
26 2-Methyl-2-propanol	59	6.614	6.600	0.014	90	99662	100.0	125.1	
27 Acetonitrile	41	6.809	6.809	0.000	99	171775	100.0	93.9	
28 Isopropyl ether	45	6.921	6.921	0.000	94	1355037	10.0	11.1	
29 2-Chloro-1,3-butadiene	53	7.061	7.061	0.000	94	1006008	10.0	11.1	
30 1,1-Dichloroethane	63	7.103	7.103	0.000	97	941059	10.0	9.80	
31 Acrylonitrile	53	7.159	7.159	0.000	99	579681	100.0	104.0	
32 Tert-butyl ethyl ether	59	7.326	7.326	0.000	97	967744	10.0	11.7	
33 Vinyl acetate	43	7.340	7.340	0.000	97	520580	10.0	13.4	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
34 cis-1,2-Dichloroethene	96	7.675	7.675	0.000	83	507648	10.0	10.2	
35 2,2-Dichloropropane	77	7.787	7.787	0.000	93	735050	10.0	11.3	
37 Chlorobromomethane	128	7.885	7.885	0.000	49	159851	10.0	9.98	
36 Cyclohexane	84	7.885	7.885	0.000	91	981400	10.0	10.7	
38 Chloroform	83	7.941	7.941	0.000	95	820146	10.0	9.80	
39 Ethyl acetate	45	8.039	8.038	0.001	99	42786	20.0	20.9	
40 Carbon tetrachloride	117	8.094	8.094	0.000	98	769637	10.0	10.2	
41 Tetrahydrofuran	71	8.122	8.122	0.000	46	30711	20.0	20.6	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	95	361505	10.0	10.1	
43 1,1,1-Trichloroethane	97	8.164	8.164	0.000	99	867370	10.0	10.1	
45 2-Butanone (MEK)	43	8.248	8.248	0.000	98	69154	10.0	9.75	
47 1,1-Dichloropropene	75	8.276	8.276	0.000	96	790775	10.0	10.7	
44 Isooctane	57	8.360	8.360	0.000	96	2744382	10.0	10.7	
46 n-Heptane	43	8.430	8.430	0.000	93	1145939	10.0	10.7	
48 Benzene	78	8.527	8.527	0.000	97	2030168	10.0	9.70	
49 Propionitrile	54	8.541	8.541	0.000	51	221214	100.0	104.0	
50 Methacrylonitrile	41	8.555	8.555	0.000	94	1198729	100.0	104.6	
51 Tert-amyl methyl ether	73	8.597	8.597	0.000	92	634852	10.0	11.7	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	91	340778	10.0	9.70	
52 Isobutyl alcohol	42	8.667	8.653	0.014	93	85184	250.0	293.1	
54 1,2-Dichloroethane	62	8.723	8.723	0.000	98	411915	10.0	9.78	
* 55 Fluorobenzene	96	8.904	8.904	0.000	99	1926482	10.0	10.0	
58 Methylcyclohexane	55	9.058	9.058	0.000	92	966559	10.0	10.2	
57 Trichloroethene	95	9.058	9.058	0.000	62	559043	10.0	9.66	
59 n-Butanol	56	9.295	9.295	0.000	91	84644	250.0	258.3	
61 Dibromomethane	93	9.477	9.477	0.000	94	151443	10.0	10.1	
60 Ethyl acrylate	55	9.505	9.505	0.000	99	209026	10.0	10.3	
62 1,2-Dichloropropane	63	9.561	9.561	0.000	94	434128	10.0	10.1	
63 Dichlorobromomethane	83	9.603	9.589	0.014	100	482870	10.0	10.2	
64 Methyl methacrylate	69	9.687	9.687	0.001	93	249209	20.0	20.3	
65 1,4-Dioxane	88	9.770	9.770	0.000	97	29498	200.0	214.1	
66 2-Chloroethyl vinyl ether	63	10.064	10.064	0.000	93	85924	10.0	10.9	
67 cis-1,3-Dichloropropene	75	10.161	10.161	0.000	95	577873	10.0	11.5	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	93	1826465	10.0	10.5	
69 Toluene	92	10.371	10.371	0.000	99	1321031	10.0	10.3	
70 2-Nitropropane	43	10.594	10.594	0.000	98	75966	20.0	19.3	
71 4-Methyl-2-pentanone (MIBK	43	10.692	10.692	0.000	96	129701	10.0	9.94	
72 trans-1,3-Dichloropropene	75	10.734	10.734	0.000	80	440471	10.0	11.6	
73 Tetrachloroethene	164	10.734	10.734	0.000	98	500348	10.0	10.1	
74 Ethyl methacrylate	69	10.818	10.818	0.000	90	258438	10.0	9.85	
75 1,1,2-Trichloroethane	83	10.888	10.888	0.000	93	191239	10.0	10.0	
76 Chlorodibromomethane	129	11.069	11.069	0.000	90	274656	10.0	10.6	
77 1,3-Dichloropropane	76	11.153	11.153	0.000	93	422481	10.0	10.2	
78 n-Butyl acetate	43	11.307	11.293	0.014	97	237588	10.0	10.4	
79 Ethylene Dibromide	107	11.321	11.321	0.000	98	205934	10.0	10.6	
80 2-Hexanone	43	11.432	11.418	0.014	96	108071	10.0	10.9	
81 1-Chlorohexane	91	11.684	11.684	0.000	97	846820	10.0	12.0	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	94	1293973	10.0	10.0	
82 Ethylbenzene	91	11.754	11.754	0.000	98	2565343	10.0	10.1	
84 Chlorobenzene	112	11.768	11.767	0.001	97	1275132	10.0	9.65	
85 1,1,1,2-Tetrachloroethane	131	11.809	11.809	0.000	95	399087	10.0	10.0	
86 m-Xylene & p-Xylene	106	11.879	11.879	0.000	98	1017334	10.0	10.8	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
88 o-Xylene	106	12.284	12.284	0.000	96	895263	10.0	11.2	
89 Styrene	104	12.326	12.326	0.000	95	1341418	10.0	11.3	
90 Bromoform	173	12.396	12.396	0.000	97	138737	10.0	10.6	
91 Isopropylbenzene	105	12.550	12.550	0.000	96	2677877	10.0	11.0	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	96	574866	10.0	10.6	
93 N-Propylbenzene	91	12.941	12.941	0.000	98	3096124	10.0	11.2	
94 Bromobenzene	156	12.983	12.983	0.000	92	491888	10.0	10.0	
95 1,1,2,2-Tetrachloroethane	83	13.010	13.010	0.000	96	222529	10.0	10.3	
96 1,3,5-Trimethylbenzene	105	13.094	13.094	0.000	95	2099802	10.0	11.2	
97 2-Chlorotoluene	91	13.122	13.122	0.000	96	1886465	10.0	10.2	
99 1,2,3-Trichloropropane	110	13.164	13.164	0.000	87	71247	10.0	9.86	
98 trans-1,4-Dichloro-2-buten	53	13.178	13.178	0.000	79	67042	10.0	10.4	
100 Cyclohexanone	55	13.248	13.248	0.000	92	38014	100.0	90.2	
101 4-Chlorotoluene	91	13.276	13.276	0.000	98	1684393	10.0	10.7	
102 tert-Butylbenzene	119	13.429	13.429	0.000	93	1942084	10.0	11.0	
103 1,2,4-Trimethylbenzene	105	13.485	13.485	0.000	97	2082703	10.0	10.9	
104 sec-Butylbenzene	105	13.583	13.583	0.000	95	3047239	10.0	11.0	
105 4-Isopropyltoluene	119	13.709	13.709	0.000	97	2496468	10.0	11.3	
106 1,3-Dichlorobenzene	146	13.848	13.848	0.000	98	1040755	10.0	9.97	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	72	637053	10.0	10.0	
107 1,2,3-Trimethylbenzene	105	13.918	13.918	0.000	97	1883039	10.0	10.4	
109 1,4-Dichlorobenzene	146	13.932	13.932	0.000	93	1015471	10.0	9.71	
111 n-Butylbenzene	134	14.128	14.128	0.000	97	665376	10.0	11.4	
110 Benzyl chloride	126	14.156	14.156	0.000	93	84677	10.0	11.2	
112 1,2-Dichlorobenzene	146	14.351	14.351	0.000	98	829890	10.0	10.0	
113 n-Nonyl Aldehyde	57	15.064	15.064	0.000	89	122636	10.0	9.66	
115 1,2-Dibromo-3-Chloropropan	157	15.147	15.147	0.000	83	38922	10.0	11.3	
114 1,3,5-Trichlorobenzene	180	15.161	15.161	0.000	98	860892	10.0	10.5	
116 Hexachlorobutadiene	225	15.734	15.748	-0.014	98	517969	10.0	10.4	
117 1,2,4-Trichlorobenzene	180	15.804	15.804	0.000	94	640270	10.0	10.6	
118 Naphthalene	128	16.153	16.153	0.000	97	744703	10.0	10.1	
120 1,2,3-Trichlorobenzene	180	16.348	16.348	0.000	96	501190	10.0	10.4	

Reagents:

8260 NewWkMix_00207	Amount Added: 10.00	Units: uL	
I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

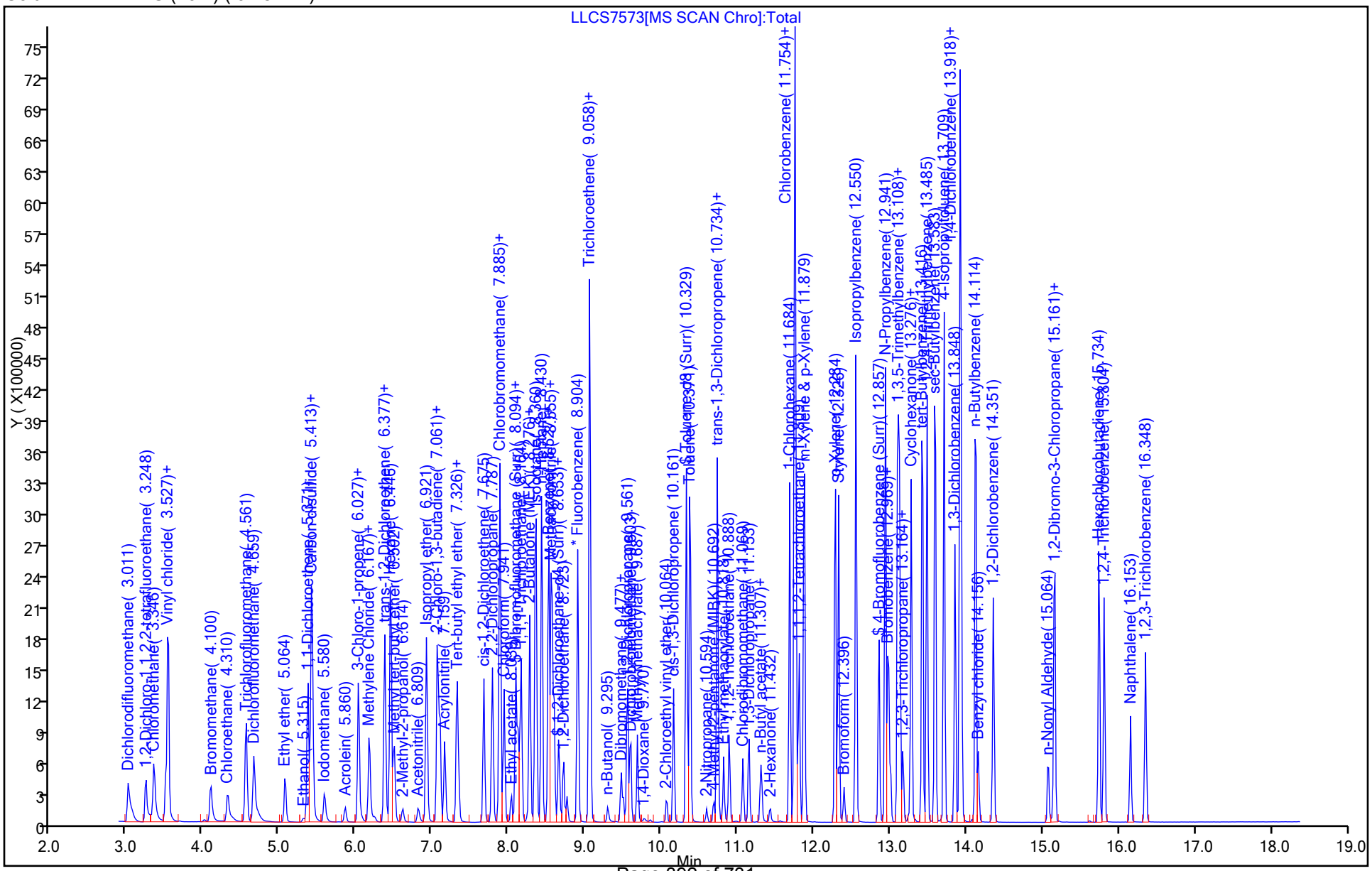
Report Date: 21-Feb-2017 08:24:51 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LLCS7573.D

Injection Date:	20-Feb-2017 10:32:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	lcs			Worklist Smp#:	5
Client ID:					
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	2
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LLCS7573.D
Lims ID: lcs
Client ID:
Sample Type: LCS
Inject. Date: 20-Feb-2017 10:32:30 ALS Bottle#: 2 Worklist Smp#: 5
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: LCS
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:31 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 20-Feb-2017 11:22:27

Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	10.1	101.42
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	9.70	97.01
$ 68 Toluene-d8 (Surr)	10.0	10.5	104.79
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.6	106.03

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCSD 160-293176/6

Matrix: Water | Lab File ID: LLCS7574.D

Analysis Method: 8260C | Date Collected:

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 10:57

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	10.1		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	10.4		1.0	0.10
79-00-5	1,1,2-Trichloroethane	9.94		1.0	0.13
75-35-4	1,1-Dichloroethene	10.1		1.0	0.10
75-34-3	1,1-Dichloroethane	9.75		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	10.6		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	11.2		1.0	0.41
107-06-2	1,2-Dichloroethane	9.82		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	20.3		2.0	0.14
78-87-5	1,2-Dichloropropane	10.1		1.0	0.10
78-93-3	2-Butanone	10.1		5.0	0.47
591-78-6	2-Hexanone	11.0		5.0	0.25
108-10-1	4-Methyl-2-pentanone	9.87		5.0	0.22
67-64-1	Acetone	10.9		2.0	0.55
71-43-2	Benzene	9.74		1.0	0.10
75-25-2	Bromoform	10.7		1.0	0.17
74-83-9	Methyl bromide	9.51		2.0	0.25
75-15-0	Carbon disulfide	9.99		1.0	0.10
56-23-5	Carbon tetrachloride	10.0		1.0	0.18
108-90-7	Chlorobenzene	9.62		1.0	0.11
124-48-1	Chlorodibromomethane	10.7		1.0	0.14
75-00-3	Chloroethane	9.35		2.0	0.16
67-66-3	Chloroform	9.80		1.0	0.10
74-87-3	Chloromethane	9.24		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	10.2		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	11.4		1.0	0.16
75-27-4	Bromodichloromethane	10.1		1.0	0.14
100-41-4	Ethylbenzene	10.0		1.0	0.12
106-93-4	1,2-Dibromoethane	10.6		1.0	0.13
75-09-2	Methylene Chloride	9.61		1.0	0.27
71-36-3	n-Butanol	253		50	12
100-42-5	Styrene	11.2		1.0	0.13
127-18-4	Tetrachloroethene	10.1		1.0	0.18
108-88-3	Toluene	10.4		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	10.1		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	11.5		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCSD 160-293176/6

Matrix: Water | Lab File ID: LLCS7574.D

Analysis Method: 8260C | Date Collected:

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 10:57

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	9.58		1.0	0.25
108-05-4	Vinyl acetate	13.3		2.0	0.18
75-01-4	Vinyl chloride	9.78		2.0	0.19
1330-20-7	Xylenes, Total	21.7		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	96		75-129
460-00-4	4-Bromofluorobenzene (Surr)	106		81-130
1868-53-7	Dibromofluoromethane (Surr)	101		81-124
2037-26-5	Toluene-d8 (Surr)	104		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LLCS7574.D
Lims ID: lcsd
Client ID:
Sample Type: LCSD
Inject. Date: 20-Feb-2017 10:57:30 ALS Bottle#: 3 Worklist Smp#: 6
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: LCS
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:31 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 20-Feb-2017 12:06:52

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85	3.011	3.011	0.000	100	670528	10.0	9.95	
2 1,2-Dichloro-1,1,2,2-tetra	135	3.248	3.248	0.000	99	308377	10.0	9.17	
3 Chloromethane	50	3.346	3.346	0.000	99	664256	10.0	9.24	
4 Vinyl chloride	62	3.500	3.499	0.001	99	705434	10.0	9.78	
5 Butadiene	39	3.528	3.527	0.001	91	740292	10.0	9.57	
6 Bromomethane	94	4.100	4.100	0.000	90	311505	10.0	9.51	
7 Chloroethane	64	4.310	4.310	0.000	100	394963	10.0	9.35	
8 Trichlorofluoromethane	101	4.561	4.561	0.000	100	831860	10.0	9.38	
9 Dichlorofluoromethane	67	4.659	4.659	0.000	99	881020	10.0	9.31	
10 Ethyl ether	74	5.064	5.064	0.000	95	178564	10.0	11.2	
11 Ethanol	45	5.315	5.301	0.014	100	59481	400.0	409.7	
12 1,1-Dichloroethene	96	5.371	5.371	0.000	97	505171	10.0	10.1	
13 Carbon disulfide	76	5.413	5.413	0.000	100	1768836	10.0	9.99	
14 1,1,2-Trichloro-1,2,2-trif	151	5.427	5.427	0.000	90	470998	10.0	9.67	
16 Iodomethane	142	5.581	5.580	0.001	99	379106	10.0	9.82	
17 Acrolein	56	5.860	5.860	0.000	99	121340	50.0	59.8	
18 3-Chloro-1-propene	39	6.028	6.027	0.001	91	611584	10.0	10.5	
19 Isopropyl alcohol	45	6.069	6.069	0.000	97	77250	100.0	116.5	
20 Methylene Chloride	84	6.167	6.167	0.000	98	399625	10.0	9.61	
21 Acetone	43	6.251	6.237	0.014	99	48948	10.0	10.9	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.001	97	530327	10.0	10.1	
23 Methyl acetate	74	6.391	6.377	0.015	98	117389	50.0	55.6	
24 Hexane	86	6.447	6.446	0.001	91	198770	10.0	11.0	
25 Methyl tert-butyl ether	73	6.502	6.502	0.000	95	622638	10.0	11.4	
26 2-Methyl-2-propanol	59	6.614	6.600	0.014	89	95366	100.0	120.8	
27 Acetonitrile	41	6.810	6.809	0.001	99	171964	100.0	94.9	
28 Isopropyl ether	45	6.921	6.921	0.000	94	1356945	10.0	11.2	
29 2-Chloro-1,3-butadiene	53	7.061	7.061	0.000	94	992632	10.0	11.1	
30 1,1-Dichloroethane	63	7.103	7.103	0.000	96	927342	10.0	9.75	
31 Acrylonitrile	53	7.159	7.159	0.000	99	577770	100.0	104.6	
32 Tert-butyl ethyl ether	59	7.326	7.326	0.000	97	954753	10.0	11.6	
33 Vinyl acetate	43	7.340	7.340	0.000	98	513265	10.0	13.3	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
34 cis-1,2-Dichloroethene	96	7.676	7.675	0.001	83	502742	10.0	10.2	
35 2,2-Dichloropropane	77	7.787	7.787	0.000	93	716590	10.0	11.1	
37 Chlorobromomethane	128	7.885	7.885	0.000	50	156536	10.0	9.87	
36 Cyclohexane	84	7.885	7.885	0.000	91	970109	10.0	10.7	
38 Chloroform	83	7.941	7.941	0.000	95	812321	10.0	9.80	
39 Ethyl acetate	45	8.039	8.038	0.001	99	41784	20.0	20.6	
40 Carbon tetrachloride	117	8.095	8.094	0.001	99	749801	10.0	10.0	
41 Tetrahydrofuran	71	8.122	8.122	0.000	46	30436	20.0	20.6	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	95	354987	10.0	10.1	
43 1,1,1-Trichloroethane	97	8.164	8.164	0.000	98	860605	10.0	10.1	
45 2-Butanone (MEK)	43	8.248	8.248	0.000	99	71008	10.0	10.1	
47 1,1-Dichloropropene	75	8.276	8.276	0.000	96	782051	10.0	10.7	
44 Isooctane	57	8.360	8.360	0.000	96	2711036	10.0	10.7	
46 n-Heptane	43	8.430	8.430	0.000	95	1123776	10.0	10.6	
48 Benzene	78	8.528	8.527	0.001	96	2018653	10.0	9.74	
49 Propionitrile	54	8.555	8.541	0.014	93	218136	100.0	103.6	
50 Methacrylonitrile	41	8.555	8.555	0.000	94	1179344	100.0	103.9	
51 Tert-amyl methyl ether	73	8.597	8.597	0.000	92	625862	10.0	11.6	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	91	333843	10.0	9.59	
52 Isobutyl alcohol	42	8.667	8.653	0.014	92	83792	250.0	291.0	
54 1,2-Dichloroethane	62	8.723	8.723	0.000	97	409819	10.0	9.82	
* 55 Fluorobenzene	96	8.905	8.904	0.001	99	1908472	10.0	10.0	
58 Methylcyclohexane	55	9.058	9.058	0.000	92	955033	10.0	10.2	
57 Trichloroethene	95	9.058	9.058	0.000	62	549495	10.0	9.58	
59 n-Butanol	56	9.296	9.295	0.001	90	82073	250.0	253.4	
61 Dibromomethane	93	9.477	9.477	0.000	94	148999	10.0	10.0	
60 Ethyl acrylate	55	9.505	9.505	0.000	99	204874	10.0	10.2	
62 1,2-Dichloropropane	63	9.561	9.561	0.000	94	431983	10.0	10.1	
63 Dichlorobromomethane	83	9.603	9.589	0.014	100	474971	10.0	10.1	
64 Methyl methacrylate	69	9.687	9.687	0.001	94	245697	20.0	20.2	
65 1,4-Dioxane	88	9.784	9.770	0.014	96	30016	200.0	219.7	
66 2-Chloroethyl vinyl ether	63	10.078	10.064	0.014	93	87433	10.0	11.2	
67 cis-1,3-Dichloropropene	75	10.162	10.161	0.001	95	568581	10.0	11.4	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	93	1780825	10.0	10.4	
69 Toluene	92	10.371	10.371	0.000	99	1307038	10.0	10.4	
70 2-Nitropropane	43	10.595	10.594	0.001	99	74857	20.0	19.4	
71 4-Methyl-2-pentanone (MIBK	43	10.692	10.692	0.000	97	126478	10.0	9.87	
72 trans-1,3-Dichloropropene	75	10.734	10.734	0.000	80	431192	10.0	11.5	
73 Tetrachloroethene	164	10.734	10.734	0.000	98	489611	10.0	10.1	
74 Ethyl methacrylate	69	10.818	10.818	0.000	90	254059	10.0	9.85	
75 1,1,2-Trichloroethane	83	10.888	10.888	0.000	93	186712	10.0	9.94	
76 Chlorodibromomethane	129	11.069	11.069	0.000	90	272932	10.0	10.7	
77 1,3-Dichloropropane	76	11.153	11.153	0.000	93	415806	10.0	10.2	
78 n-Butyl acetate	43	11.307	11.293	0.014	98	231927	10.0	10.3	
79 Ethylene Dibromide	107	11.321	11.321	0.000	99	201449	10.0	10.6	
80 2-Hexanone	43	11.432	11.418	0.014	96	106967	10.0	11.0	
81 1-Chlorohexane	91	11.684	11.684	0.000	97	813054	10.0	11.7	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	94	1271853	10.0	10.0	
82 Ethylbenzene	91	11.754	11.754	0.000	98	2486880	10.0	10.0	
84 Chlorobenzene	112	11.768	11.767	0.001	93	1250201	10.0	9.62	
85 1,1,1,2-Tetrachloroethane	131	11.810	11.809	0.001	95	396690	10.0	10.1	
86 m-Xylene & p-Xylene	106	11.879	11.879	0.000	98	980938	10.0	10.6	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
88 o-Xylene	106	12.284	12.284	0.000	96	873271	10.0	11.1	
89 Styrene	104	12.326	12.326	0.000	95	1302492	10.0	11.2	
90 Bromoform	173	12.396	12.396	0.000	97	134965	10.0	10.7	
91 Isopropylbenzene	105	12.550	12.550	0.000	96	2577702	10.0	11.0	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	94	553914	10.0	10.6	
93 N-Propylbenzene	91	12.941	12.941	0.000	98	2931439	10.0	11.1	
94 Bromobenzene	156	12.983	12.983	0.000	90	475680	10.0	10.0	
95 1,1,2,2-Tetrachloroethane	83	13.011	13.010	0.001	96	217494	10.0	10.4	
96 1,3,5-Trimethylbenzene	105	13.108	13.094	0.014	95	2016947	10.0	11.2	
97 2-Chlorotoluene	91	13.122	13.122	0.000	96	1813382	10.0	10.1	
99 1,2,3-Trichloropropane	110	13.164	13.164	0.000	87	70072	10.0	10.1	
98 trans-1,4-Dichloro-2-buten	53	13.178	13.178	0.000	82	64060	10.0	10.4	
100 Cyclohexanone	55	13.248	13.248	0.000	92	38282	100.0	94.0	
101 4-Chlorotoluene	91	13.276	13.276	0.000	99	1609687	10.0	10.6	
102 tert-Butylbenzene	119	13.430	13.429	0.001	93	1859773	10.0	11.0	
103 1,2,4-Trimethylbenzene	105	13.486	13.485	0.001	97	1986573	10.0	10.8	
104 sec-Butylbenzene	105	13.597	13.583	0.014	94	2881193	10.0	10.8	
105 4-Isopropyltoluene	119	13.709	13.709	0.000	97	2361675	10.0	11.1	
106 1,3-Dichlorobenzene	146	13.849	13.848	0.001	98	1005013	10.0	10.0	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	72	613039	10.0	10.0	
107 1,2,3-Trimethylbenzene	105	13.918	13.918	0.000	97	1795304	10.0	10.3	
109 1,4-Dichlorobenzene	146	13.932	13.932	0.000	93	973112	10.0	9.67	
111 n-Butylbenzene	134	14.128	14.128	0.000	97	620205	10.0	11.1	
110 Benzyl chloride	126	14.156	14.156	0.000	91	80866	10.0	11.2	
112 1,2-Dichlorobenzene	146	14.351	14.351	0.000	97	807609	10.0	10.1	
113 n-Nonyl Aldehyde	57	15.078	15.064	0.014	90	110205	10.0	9.17	
115 1,2-Dibromo-3-Chloropropan	157	15.148	15.147	0.001	83	37115	10.0	11.2	
114 1,3,5-Trichlorobenzene	180	15.161	15.161	0.000	98	819377	10.0	10.4	
116 Hexachlorobutadiene	225	15.748	15.748	0.000	98	473374	10.0	9.88	
117 1,2,4-Trichlorobenzene	180	15.804	15.804	0.000	94	613398	10.0	10.6	
118 Naphthalene	128	16.153	16.153	0.000	97	721154	10.0	10.2	
120 1,2,3-Trichlorobenzene	180	16.349	16.348	0.001	96	482714	10.0	10.4	

Reagents:

8260 NewWkMix_00207	Amount Added: 10.00	Units: uL	
I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

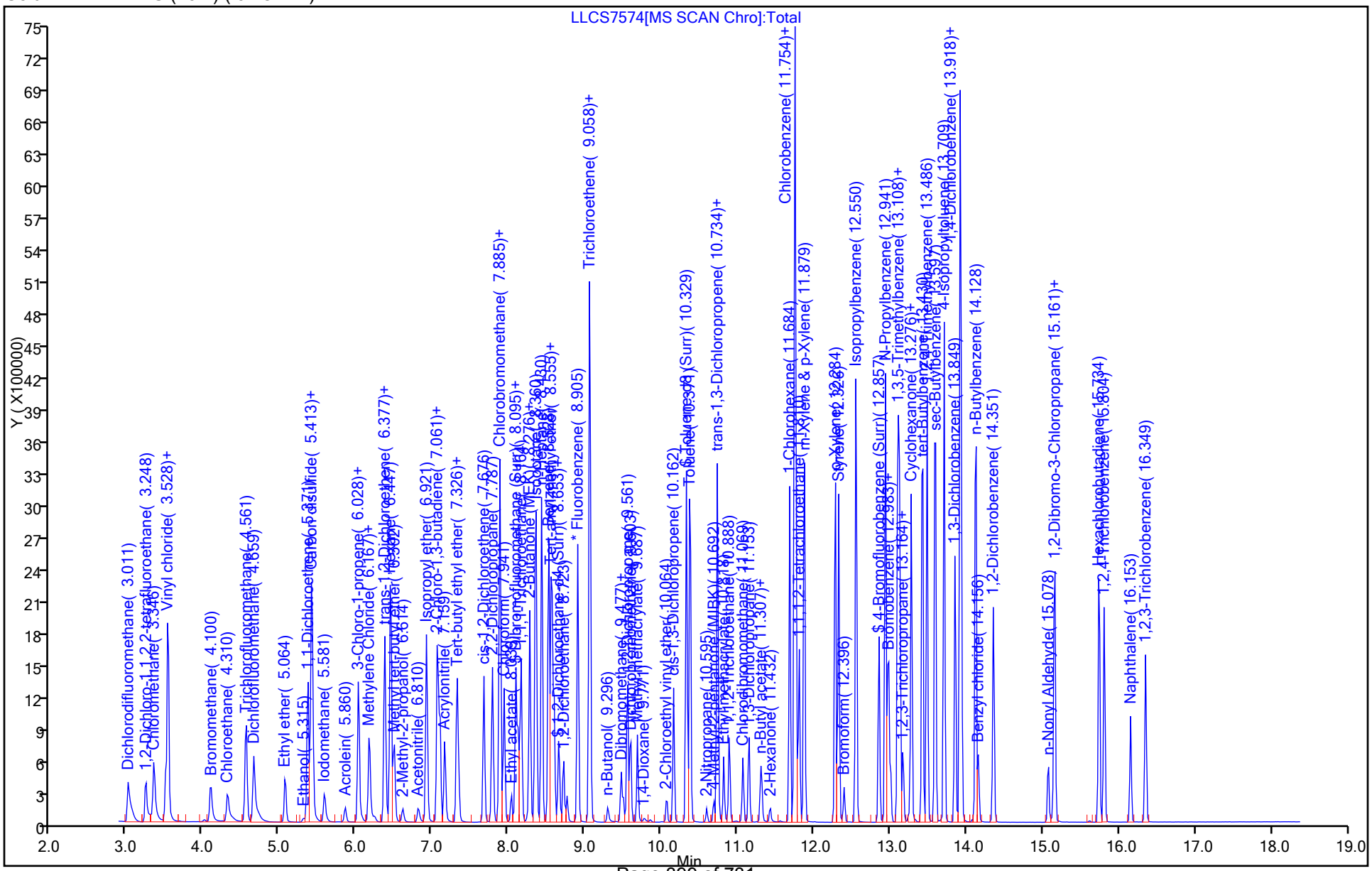
Report Date: 21-Feb-2017 08:24:50 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LLCS7574.D

Injection Date:	20-Feb-2017 10:57:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	lcsd			Worklist Smp#:	6
Client ID:					
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	3
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LLCS7574.D
Lims ID: lcsd
Client ID:
Sample Type: LCSD
Inject. Date: 20-Feb-2017 10:57:30 ALS Bottle#: 3 Worklist Smp#: 6
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: LCS
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:31 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 20-Feb-2017 12:06:52

Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	10.1	100.53
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	9.59	95.93
$ 68 Toluene-d8 (Surr)	10.0	10.4	103.95
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.6	106.17

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR04RB-021517 MS | Lab Sample ID: 160-21079-7 MS

Matrix: Water | Lab File ID: LSMP7578.D

Analysis Method: 8260C | Date Collected: 02/15/2017 13:45

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 12:38

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	10.3		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	9.58		1.0	0.10
79-00-5	1,1,2-Trichloroethane	9.41		1.0	0.13
75-35-4	1,1-Dichloroethene	10.2		1.0	0.10
75-34-3	1,1-Dichloroethane	9.84		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	10.5		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	9.68		1.0	0.41
107-06-2	1,2-Dichloroethane	9.49		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	20.4		2.0	0.14
78-87-5	1,2-Dichloropropane	10.1		1.0	0.10
78-93-3	2-Butanone	8.42		5.0	0.47
591-78-6	2-Hexanone	8.79		5.0	0.25
108-10-1	4-Methyl-2-pentanone	8.35		5.0	0.22
67-64-1	Acetone	9.61		2.0	0.55
71-43-2	Benzene	9.98		1.0	0.10
75-25-2	Bromoform	9.68		1.0	0.17
74-83-9	Methyl bromide	7.32		2.0	0.25
75-15-0	Carbon disulfide	10.2		1.0	0.10
56-23-5	Carbon tetrachloride	10.3		1.0	0.18
108-90-7	Chlorobenzene	9.82		1.0	0.11
124-48-1	Chlorodibromomethane	10.1		1.0	0.14
75-00-3	Chloroethane	9.52		2.0	0.16
67-66-3	Chloroform	9.72		1.0	0.10
74-87-3	Chloromethane	10.1		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	10.2		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	10.7		1.0	0.16
75-27-4	Bromodichloromethane	9.97		1.0	0.14
100-41-4	Ethylbenzene	10.4		1.0	0.12
106-93-4	1,2-Dibromoethane	9.52		1.0	0.13
75-09-2	Methylene Chloride	9.54		1.0	0.27
71-36-3	n-Butanol	216		50	12
100-42-5	Styrene	11.3		1.0	0.13
127-18-4	Tetrachloroethene	10.4		1.0	0.18
108-88-3	Toluene	10.5		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	10.2		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	10.7		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR04RB-021517 MS | Lab Sample ID: 160-21079-7 MS

Matrix: Water | Lab File ID: LSMP7578.D

Analysis Method: 8260C | Date Collected: 02/15/2017 13:45

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 12:38

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	9.78		1.0	0.25
108-05-4	Vinyl acetate	13.2		2.0	0.18
75-01-4	Vinyl chloride	9.83		2.0	0.19
1330-20-7	Xylenes, Total	22.3		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	92		75-129
460-00-4	4-Bromofluorobenzene (Surr)	104		81-130
1868-53-7	Dibromofluoromethane (Surr)	100		81-124
2037-26-5	Toluene-d8 (Surr)	105		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7578.D
Lims ID: 160-21079-A-7 MS
Client ID: GW-BR04RB-021517
Sample Type: MS
Inject. Date: 20-Feb-2017 12:38:30 ALS Bottle#: 7 Worklist Smp#: 10
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-010
Misc. Info.: 160-21079-a-7 ms
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:31 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:15:21

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85	3.053	3.011	0.042	100	662057	10.0	9.93	
2 1,2-Dichloro-1,1,2,2-tetra	135	3.248	3.248	0.000	98	299471	10.0	8.99	
3 Chloromethane	50	3.388	3.346	0.042	99	715609	10.0	10.1	
4 Vinyl chloride	62	3.514	3.499	0.015	99	701546	10.0	9.83	
5 Butadiene	39	3.542	3.527	0.015	89	750913	10.0	9.81	
6 Bromomethane	94	4.100	4.100	0.000	91	237113	10.0	7.32	
7 Chloroethane	64	4.324	4.310	0.014	100	397930	10.0	9.52	
8 Trichlorofluoromethane	101	4.561	4.561	0.000	99	846725	10.0	9.65	
9 Dichlorofluoromethane	67	4.673	4.659	0.014	97	900137	10.0	9.62	
10 Ethyl ether	74	5.078	5.064	0.014	94	157025	10.0	9.94	
11 Ethanol	45	5.315	5.301	0.014	100	51767	400.0	360.3	
12 1,1-Dichloroethene	96	5.371	5.371	0.000	96	505947	10.0	10.2	
13 Carbon disulfide	76	5.413	5.413	0.000	99	1780614	10.0	10.2	
14 1,1,2-Trichloro-1,2,2-trif	151	5.427	5.427	0.000	89	469114	10.0	9.73	
16 Iodomethane	142	5.595	5.580	0.015	99	181186	10.0	4.93	
S 15 1,2-Dichloroethene, Total	96				0			20.4	
17 Acrolein	56	5.860	5.860	0.000	100	106238	50.0	52.9	
18 3-Chloro-1-propene	39	6.028	6.027	0.001	91	599221	10.0	10.4	
19 Isopropyl alcohol	45	6.069	6.069	0.000	97	69813	100.0	106.4	
20 Methylene Chloride	84	6.181	6.167	0.014	96	392465	10.0	9.54	
21 Acetone	43	6.251	6.237	0.014	99	43372	10.0	9.61	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.001	97	526991	10.0	10.2	
23 Methyl acetate	74	6.391	6.377	0.015	98	102211	50.0	48.9	
24 Hexane	86	6.460	6.446	0.014	91	195682	10.0	10.9	
25 Methyl tert-butyl ether	73	6.502	6.502	0.000	93	531402	10.0	9.80	
26 2-Methyl-2-propanol	59	6.614	6.600	0.014	88	74817	100.0	95.8	
27 Acetonitrile	41	6.824	6.809	0.015	100	151805	100.0	84.6	
28 Isopropyl ether	45	6.921	6.921	0.000	94	1267707	10.0	10.6	
29 2-Chloro-1,3-butadiene	53	7.061	7.061	0.000	94	996505	10.0	11.3	
30 1,1-Dichloroethane	63	7.103	7.103	0.000	98	926086	10.0	9.84	
31 Acrylonitrile	53	7.159	7.159	0.000	98	513496	100.0	94.0	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
32 Tert-butyl ethyl ether	59	7.326	7.326	0.000	96	844181	10.0	10.4	
33 Vinyl acetate	43	7.340	7.340	0.000	98	502688	10.0	13.2	
34 cis-1,2-Dichloroethene	96	7.676	7.675	0.001	81	500017	10.0	10.2	
35 2,2-Dichloropropane	77	7.787	7.787	0.000	94	706983	10.0	11.1	
37 Chlorobromomethane	128	7.885	7.885	0.000	49	148343	10.0	9.45	
36 Cyclohexane	84	7.885	7.885	0.000	92	976129	10.0	10.9	
38 Chloroform	83	7.941	7.941	0.000	95	797234	10.0	9.72	
39 Ethyl acetate	45	8.039	8.038	0.001	99	35523	20.0	17.8	
40 Carbon tetrachloride	117	8.095	8.094	0.001	99	759475	10.0	10.3	
41 Tetrahydrofuran	71	8.122	8.122	0.000	50	24999	20.0	17.2	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	95	349723	10.0	10.0	
43 1,1,1-Trichloroethane	97	8.164	8.164	0.000	98	869209	10.0	10.3	
45 2-Butanone (MEK)	43	8.248	8.248	0.000	98	59604	10.0	8.42	
47 1,1-Dichloropropene	75	8.276	8.276	0.000	96	788700	10.0	10.9	
44 Isooctane	57	8.360	8.360	0.000	96	2748359	10.0	11.0	
46 n-Heptane	43	8.430	8.430	0.000	95	1154178	10.0	11.0	
48 Benzene	78	8.527	8.527	0.000	97	2047243	10.0	9.98	
49 Propionitrile	54	8.555	8.541	0.014	39	195281	100.0	93.7	
50 Methacrylonitrile	41	8.569	8.555	0.014	92	1066436	100.0	94.9	
51 Tert-amyl methyl ether	73	8.597	8.597	0.000	90	538859	10.0	10.1	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	93	318391	10.0	9.25	
52 Isobutyl alcohol	42	8.667	8.653	0.014	92	69255	250.0	243.0	
54 1,2-Dichloroethane	62	8.723	8.723	0.000	97	391977	10.0	9.49	
* 55 Fluorobenzene	96	8.905	8.904	0.001	99	1888573	10.0	10.0	
58 Methylcyclohexane	55	9.058	9.058	0.000	93	971628	10.0	10.5	
57 Trichloroethene	95	9.058	9.058	0.000	63	554614	10.0	9.78	
56 1,4-Difluorobenzene	114		9.256					ND	
59 n-Butanol	56	9.296	9.295	0.001	92	67684	250.0	215.9	
61 Dibromomethane	93	9.477	9.477	0.000	93	138629	10.0	9.40	
60 Ethyl acrylate	55	9.505	9.505	0.000	99	173275	10.0	8.78	
62 1,2-Dichloropropane	63	9.561	9.561	0.000	94	424556	10.0	10.1	
63 Dichlorobromomethane	83	9.603	9.589	0.014	99	462068	10.0	9.97	
64 Methyl methacrylate	69	9.687	9.687	0.001	94	212362	20.0	17.8	
65 1,4-Dioxane	88	9.770	9.770	0.000	98	24972	200.0	186.0	
66 2-Chloroethyl vinyl ether	63		10.064				ND	ND	
67 cis-1,3-Dichloropropene	75	10.162	10.161	0.001	94	527663	10.0	10.7	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	93	1792255	10.0	10.5	
69 Toluene	92	10.385	10.371	0.014	98	1322269	10.0	10.5	
70 2-Nitropropane	43	10.594	10.594	0.000	98	63211	20.0	16.7	
71 4-Methyl-2-pentanone (MIBK	43	10.692	10.692	0.000	97	105802	10.0	8.35	
72 trans-1,3-Dichloropropene	75	10.734	10.734	0.000	77	396909	10.0	10.7	
73 Tetrachloroethene	164	10.734	10.734	0.000	98	501571	10.0	10.4	
74 Ethyl methacrylate	69	10.818	10.818	0.000	91	218560	10.0	8.58	
75 1,1,2-Trichloroethane	83	10.888	10.888	0.000	94	176096	10.0	9.41	
76 Chlorodibromomethane	129	11.069	11.069	0.000	90	255169	10.0	10.1	
77 1,3-Dichloropropane	76	11.153	11.153	0.000	93	387042	10.0	9.57	
78 n-Butyl acetate	43	11.307	11.293	0.014	97	191388	10.0	8.77	
79 Ethylene Dibromide	107	11.321	11.321	0.000	99	180994	10.0	9.52	
80 2-Hexanone	43	11.432	11.418	0.014	96	84769	10.0	8.79	
81 1-Chlorohexane	91	11.684	11.684	0.000	96	835186	10.0	12.1	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	74	1266835	10.0	10.0	
82 Ethylbenzene	91	11.754	11.754	0.000	98	2575518	10.0	10.4	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
84 Chlorobenzene	112	11.768	11.767	0.001	94	1270918	10.0	9.82	
85 1,1,1,2-Tetrachloroethane	131	11.810	11.809	0.001	94	395332	10.0	10.1	
86 m-Xylene & p-Xylene	106	11.879	11.879	0.000	98	1015445	10.0	11.0	
88 o-Xylene	106	12.284	12.284	0.000	96	885179	10.0	11.3	
89 Styrene	104	12.326	12.326	0.000	95	1315357	10.0	11.3	
90 Bromoform	173	12.396	12.396	0.000	97	122083	10.0	9.68	
91 Isopropylbenzene	105	12.550	12.550	0.000	96	2669146	10.0	11.4	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	543003	10.0	10.4	
93 N-Propylbenzene	91	12.941	12.941	0.000	98	3090472	10.0	11.6	
94 Bromobenzene	156	12.983	12.983	0.000	95	472833	10.0	9.96	
95 1,1,2,2-Tetrachloroethane	83	13.011	13.010	0.001	96	200568	10.0	9.58	
96 1,3,5-Trimethylbenzene	105	13.108	13.094	0.014	95	2097867	10.0	11.6	
97 2-Chlorotoluene	91	13.122	13.122	0.000	96	1881232	10.0	10.5	
99 1,2,3-Trichloropropane	110	13.164	13.164	0.000	89	62634	10.0	8.98	
98 trans-1,4-Dichloro-2-buten	53	13.178	13.178	0.000	92	57007	10.0	9.21	
100 Cyclohexanone	55	13.248	13.248	0.000	92	29149	100.0	73.4	
101 4-Chlorotoluene	91	13.276	13.276	0.000	99	1661455	10.0	10.9	
102 tert-Butylbenzene	119	13.430	13.429	0.001	93	1945479	10.0	11.4	
103 1,2,4-Trimethylbenzene	105	13.485	13.485	0.000	97	2064228	10.0	11.2	
87 Pentachloroethane	167		13.558					ND	
104 sec-Butylbenzene	105	13.597	13.583	0.014	94	3045700	10.0	11.4	
105 4-Isopropyltoluene	119	13.709	13.709	0.000	97	2503057	10.0	11.8	
106 1,3-Dichlorobenzene	146	13.849	13.848	0.001	98	1014174	10.0	10.1	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	96	614732	10.0	10.0	
107 1,2,3-Trimethylbenzene	105	13.918	13.918	0.000	97	1845035	10.0	10.5	
109 1,4-Dichlorobenzene	146	13.932	13.932	0.000	95	989427	10.0	9.80	
111 n-Butylbenzene	134	14.128	14.128	0.000	96	665780	10.0	11.8	
110 Benzyl chloride	126	14.156	14.156	0.000	93	72779	10.0	10.1	
112 1,2-Dichlorobenzene	146	14.351	14.351	0.000	97	793581	10.0	9.92	
113 n-Nonyl Aldehyde	57	15.078	15.064	0.014	90	146766	10.0	11.4	
115 1,2-Dibromo-3-Chloropropan	157	15.147	15.147	0.000	83	32291	10.0	9.68	
114 1,3,5-Trichlorobenzene	180	15.161	15.161	0.000	98	846617	10.0	10.7	
116 Hexachlorobutadiene	225	15.748	15.748	0.000	98	523100	10.0	10.9	
117 1,2,4-Trichlorobenzene	180	15.804	15.804	0.000	94	609043	10.0	10.5	
118 Naphthalene	128	16.153	16.153	0.000	97	632413	10.0	8.95	
120 1,2,3-Trichlorobenzene	180	16.349	16.348	0.001	96	460453	10.0	9.93	
S 119 Xylenes, Total	106				0			22.3	
121 2-Pentanone	1		0.000					ND	
S 130 Trihalomethanes, Total	1				0			39.5	

QC Flag Legend

Processing Flags

ND - Not Detected or Marked ND

Reagents:

8260 NewWkMix_00207	Amount Added: 10.00	Units: uL	
I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

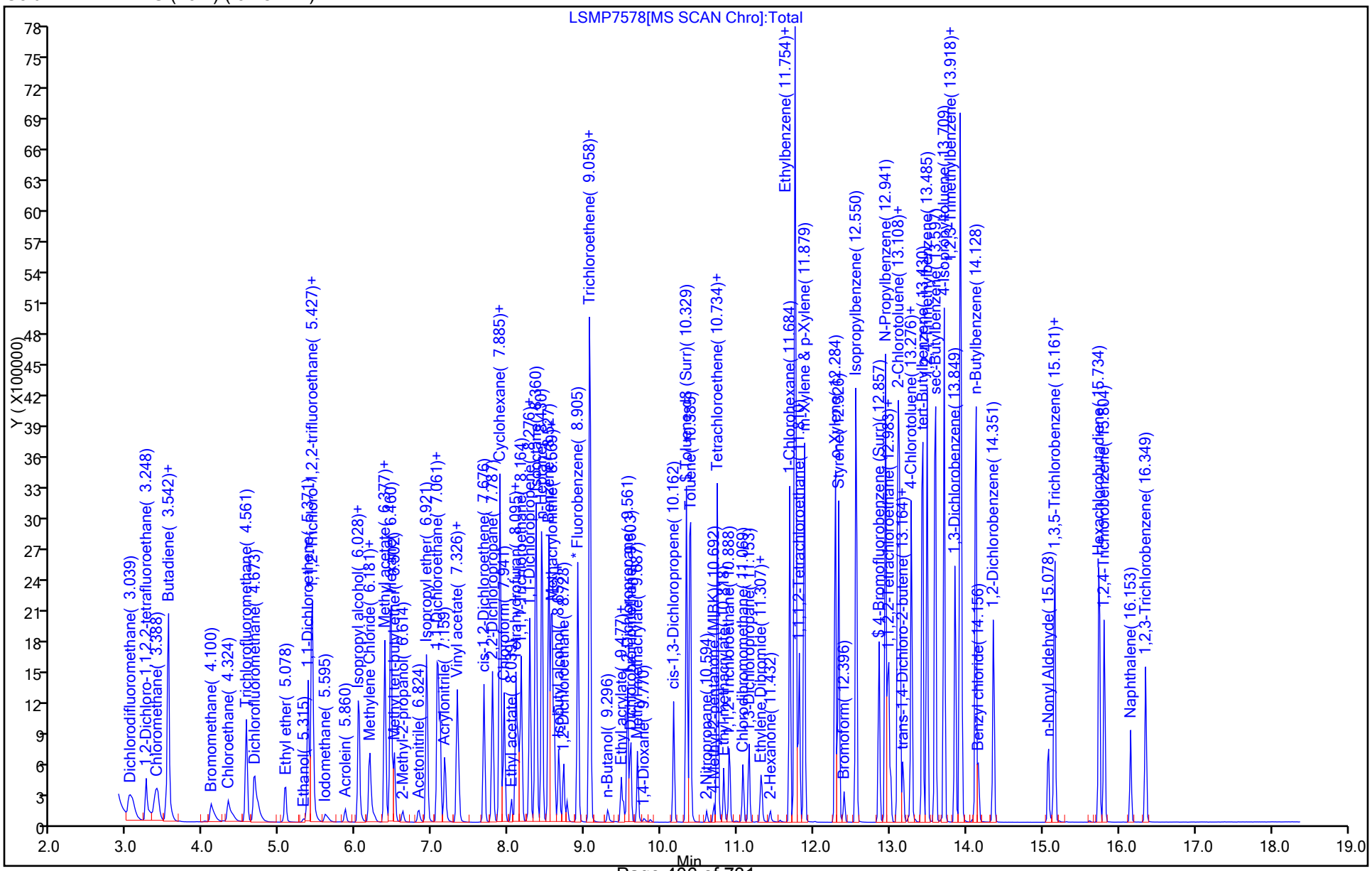
Report Date: 21-Feb-2017 08:24:45 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7578.D

Injection Date:	20-Feb-2017 12:38:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	160-21079-A-7 MS			Worklist Smp#:	10
Client ID:	GW-BR04RB-021517				
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	7
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7578.D
Lims ID: 160-21079-A-7 MS
Client ID: GW-BR04RB-021517
Sample Type: MS
Inject. Date: 20-Feb-2017 12:38:30 ALS Bottle#: 7 Worklist Smp#: 10
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-010
Misc. Info.: 160-21079-a-7 ms
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:31 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:15:21

Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	10.0	100.09
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	9.25	92.45
$ 68 Toluene-d8 (Surr)	10.0	10.5	105.03
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.4	103.79

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR04RB-021517 MSD | Lab Sample ID: 160-21079-7 MSD

Matrix: Water | Lab File ID: LSMP7579.D

Analysis Method: 8260C | Date Collected: 02/15/2017 13:45

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 13:04

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-55-6	1,1,1-Trichloroethane	10.2		1.0	0.17
79-34-5	1,1,2,2-Tetrachloroethane	9.47		1.0	0.10
79-00-5	1,1,2-Trichloroethane	9.22		1.0	0.13
75-35-4	1,1-Dichloroethene	10.2		1.0	0.10
75-34-3	1,1-Dichloroethane	9.79		1.0	0.070
120-82-1	1,2,4-Trichlorobenzene	10.4		1.0	0.10
96-12-8	1,2-Dibromo-3-Chloropropane	9.89		1.0	0.41
107-06-2	1,2-Dichloroethane	9.27		1.0	0.22
540-59-0	1,2-Dichloroethene, Total	20.3		2.0	0.14
78-87-5	1,2-Dichloropropane	9.88		1.0	0.10
78-93-3	2-Butanone	7.95		5.0	0.47
591-78-6	2-Hexanone	9.06		5.0	0.25
108-10-1	4-Methyl-2-pentanone	8.40		5.0	0.22
67-64-1	Acetone	8.85		2.0	0.55
71-43-2	Benzene	9.77		1.0	0.10
75-25-2	Bromoform	9.57		1.0	0.17
74-83-9	Methyl bromide	8.17		2.0	0.25
75-15-0	Carbon disulfide	10.0		1.0	0.10
56-23-5	Carbon tetrachloride	10.2		1.0	0.18
108-90-7	Chlorobenzene	9.72		1.0	0.11
124-48-1	Chlorodibromomethane	9.86		1.0	0.14
75-00-3	Chloroethane	9.39		2.0	0.16
67-66-3	Chloroform	9.58		1.0	0.10
74-87-3	Chloromethane	9.64		2.0	0.10
156-59-2	cis-1,2-Dichloroethene	10.1		1.0	0.10
10061-01-5	cis-1,3-Dichloropropene	10.7		1.0	0.16
75-27-4	Bromodichloromethane	9.89		1.0	0.14
100-41-4	Ethylbenzene	10.3		1.0	0.12
106-93-4	1,2-Dibromoethane	9.54		1.0	0.13
75-09-2	Methylene Chloride	9.47		1.0	0.27
71-36-3	n-Butanol	215		50	12
100-42-5	Styrene	11.3		1.0	0.13
127-18-4	Tetrachloroethene	10.3		1.0	0.18
108-88-3	Toluene	10.5		1.0	0.14
156-60-5	trans-1,2-Dichloroethene	10.2		1.0	0.10
10061-02-6	trans-1,3-Dichloropropene	10.7		1.0	0.10

FORM I
GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica St. Louis | Job No.: 160-21079-1

SDG No.:

Client Sample ID: GW-BR04RB-021517 MSD | Lab Sample ID: 160-21079-7 MSD

Matrix: Water | Lab File ID: LSMP7579.D

Analysis Method: 8260C | Date Collected: 02/15/2017 13:45

Sample wt/vol: 25(mL) | Date Analyzed: 02/20/2017 13:04

Soil Aliquot Vol: | Dilution Factor: 1

Soil Extract Vol.: | GC Column: RTX-VMS40 ID: 0.18(mm)

% Moisture: | Level: (low/med) Low

Analysis Batch No.: 293176 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	9.64		1.0	0.25
108-05-4	Vinyl acetate	13.1		2.0	0.18
75-01-4	Vinyl chloride	9.79		2.0	0.19
1330-20-7	Xylenes, Total	22.4		3.0	0.27

CAS NO.	SURROGATE	%REC	Q	LIMITS
17060-07-0	1,2-Dichloroethane-d4 (Surr)	92		75-129
460-00-4	4-Bromofluorobenzene (Surr)	105		81-130
1868-53-7	Dibromofluoromethane (Surr)	98		81-124
2037-26-5	Toluene-d8 (Surr)	106		87-128

TestAmerica St. Louis
Target Compound Quantitation Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7579.D
Lims ID: 160-21079-A-7 MSD
Client ID: GW-BR04RB-021517
Sample Type: MSD
Inject. Date: 20-Feb-2017 13:04:30 ALS Bottle#: 8 Worklist Smp#: 11
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-011
Misc. Info.: 160-21079-a-7 msd
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:31 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:15:58

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
1 Dichlorodifluoromethane	85	3.025	3.011	0.014	99	676335	10.0	9.95	
2 1,2-Dichloro-1,1,2,2-tetra	135	3.248	3.248	0.000	99	308384	10.0	9.09	
3 Chloromethane	50	3.374	3.346	0.028	100	698949	10.0	9.64	
4 Vinyl chloride	62	3.514	3.499	0.015	99	711939	10.0	9.79	
5 Butadiene	39	3.528	3.527	0.001	91	744529	10.0	9.54	
6 Bromomethane	94	4.100	4.100	0.000	91	269912	10.0	8.17	
7 Chloroethane	64	4.324	4.310	0.014	100	400238	10.0	9.39	
8 Trichlorofluoromethane	101	4.561	4.561	0.000	100	840470	10.0	9.40	
9 Dichlorofluoromethane	67	4.659	4.659	0.000	97	903734	10.0	9.47	
10 Ethyl ether	74	5.078	5.064	0.014	93	163191	10.0	10.1	
11 Ethanol	45	5.315	5.301	0.014	100	53106	400.0	362.6	
12 1,1-Dichloroethene	96	5.371	5.371	0.000	95	513119	10.0	10.2	
13 Carbon disulfide	76	5.413	5.413	0.000	99	1793550	10.0	10.0	
14 1,1,2-Trichloro-1,2,2-trif	151	5.427	5.427	0.000	60	470934	10.0	9.58	
16 Iodomethane	142	5.595	5.580	0.015	99	264454	10.0	6.90	
S 15 1,2-Dichloroethene, Total	96				0			20.3	
17 Acrolein	56	5.860	5.860	0.000	99	107926	50.0	52.7	
18 3-Chloro-1-propene	39	6.027	6.027	0.000	91	614526	10.0	10.4	
19 Isopropyl alcohol	45	6.069	6.069	0.000	97	66658	100.0	99.7	
20 Methylene Chloride	84	6.181	6.167	0.014	96	397201	10.0	9.47	
21 Acetone	43	6.251	6.237	0.014	100	41228	10.0	8.85	
22 trans-1,2-Dichloroethene	96	6.377	6.377	0.001	97	536894	10.0	10.2	
23 Methyl acetate	74	6.391	6.377	0.015	98	103723	50.0	48.7	
24 Hexane	86	6.460	6.446	0.014	91	198510	10.0	10.9	
25 Methyl tert-butyl ether	73	6.502	6.502	0.000	94	550033	10.0	9.95	
26 2-Methyl-2-propanol	59	6.614	6.600	0.014	88	77682	100.0	97.6	
27 Acetonitrile	41	6.824	6.809	0.015	99	155342	100.0	85.0	
28 Isopropyl ether	45	6.921	6.921	0.000	94	1309474	10.0	10.8	
29 2-Chloro-1,3-butadiene	53	7.061	7.061	0.000	94	1006076	10.0	11.1	
30 1,1-Dichloroethane	63	7.103	7.103	0.000	97	938904	10.0	9.79	
31 Acrylonitrile	53	7.159	7.159	0.000	99	523823	100.0	94.0	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
32 Tert-butyl ethyl ether	59	7.326	7.326	0.000	96	882055	10.0	10.6	
33 Vinyl acetate	43	7.340	7.340	0.000	97	510272	10.0	13.1	
34 cis-1,2-Dichloroethene	96	7.675	7.675	0.000	83	506251	10.0	10.1	
35 2,2-Dichloropropane	77	7.787	7.787	0.000	93	729782	10.0	11.2	
37 Chlorobromomethane	128	7.885	7.885	0.000	49	149130	10.0	9.32	
36 Cyclohexane	84	7.885	7.885	0.000	92	978708	10.0	10.7	
38 Chloroform	83	7.941	7.941	0.000	95	801027	10.0	9.58	
39 Ethyl acetate	45	8.039	8.038	0.001	99	36275	20.0	17.8	
40 Carbon tetrachloride	117	8.094	8.094	0.000	99	769255	10.0	10.2	
41 Tetrahydrofuran	71	8.122	8.122	0.000	44	26090	20.0	17.6	
$ 42 Dibromofluoromethane (Surr	113	8.122	8.122	0.000	95	350555	10.0	9.84	
43 1,1,1-Trichloroethane	97	8.164	8.164	0.000	98	876020	10.0	10.2	
45 2-Butanone (MEK)	43	8.248	8.248	0.000	99	57816	10.0	7.95	
47 1,1-Dichloropropene	75	8.276	8.276	0.000	96	790680	10.0	10.7	
44 Isooctane	57	8.360	8.360	0.000	96	2773216	10.0	10.9	
46 n-Heptane	43	8.430	8.430	0.000	95	1150475	10.0	10.7	
48 Benzene	78	8.527	8.527	0.000	97	2044365	10.0	9.77	
49 Propionitrile	54	8.555	8.541	0.014	39	196685	100.0	92.6	
50 Methacrylonitrile	41	8.569	8.555	0.014	92	1076432	100.0	94.0	
51 Tert-amyl methyl ether	73	8.597	8.597	0.000	91	559078	10.0	10.3	
$ 53 1,2-Dichloroethane-d4 (Sur	65	8.653	8.653	0.000	92	322794	10.0	9.19	
52 Isobutyl alcohol	42	8.667	8.653	0.014	92	73234	250.0	252.1	
54 1,2-Dichloroethane	62	8.723	8.723	0.000	97	390335	10.0	9.27	
* 55 Fluorobenzene	96	8.905	8.904	0.001	99	1925255	10.0	10.0	
58 Methylcyclohexane	55	9.058	9.058	0.000	93	970977	10.0	10.3	
57 Trichloroethene	95	9.058	9.058	0.000	95	557822	10.0	9.64	
56 1,4-Difluorobenzene	114		9.256					ND	
59 n-Butanol	56	9.296	9.295	0.001	91	68758	250.0	215.2	
61 Dibromomethane	93	9.477	9.477	0.000	93	139488	10.0	9.28	
60 Ethyl acrylate	55	9.505	9.505	0.000	99	179074	10.0	8.89	
62 1,2-Dichloropropane	63	9.561	9.561	0.000	93	424444	10.0	9.88	
63 Dichlorobromomethane	83	9.603	9.589	0.014	99	466973	10.0	9.89	
64 Methyl methacrylate	69	9.687	9.687	0.001	93	218465	20.0	17.9	
65 1,4-Dioxane	88	9.784	9.770	0.014	96	25939	200.0	189.4	
66 2-Chloroethyl vinyl ether	63		10.064				ND	ND	
67 cis-1,3-Dichloropropene	75	10.161	10.161	0.000	94	539545	10.0	10.7	
$ 68 Toluene-d8 (Surr)	98	10.329	10.329	0.000	93	1827579	10.0	10.6	
69 Toluene	92	10.385	10.371	0.014	99	1334410	10.0	10.5	
70 2-Nitropropane	43	10.594	10.594	0.000	98	63447	20.0	16.6	
71 4-Methyl-2-pentanone (MIBK	43	10.692	10.692	0.000	97	107783	10.0	8.40	
72 trans-1,3-Dichloropropene	75	10.734	10.734	0.000	78	402619	10.0	10.7	
73 Tetrachloroethene	164	10.734	10.734	0.000	98	501990	10.0	10.3	
74 Ethyl methacrylate	69	10.818	10.818	0.000	91	222862	10.0	8.63	
75 1,1,2-Trichloroethane	83	10.888	10.888	0.000	93	174674	10.0	9.22	
76 Chlorodibromomethane	129	11.069	11.069	0.000	91	252489	10.0	9.86	
77 1,3-Dichloropropane	76	11.153	11.153	0.000	93	389246	10.0	9.51	
78 n-Butyl acetate	43	11.307	11.293	0.014	97	196715	10.0	8.88	
79 Ethylene Dibromide	107	11.321	11.321	0.000	99	183662	10.0	9.54	
80 2-Hexanone	43	11.432	11.418	0.014	96	88687	10.0	9.06	
81 1-Chlorohexane	91	11.684	11.684	0.000	96	838632	10.0	12.0	
* 83 Chlorobenzene-d5	117	11.754	11.754	0.000	95	1283066	10.0	10.0	
82 Ethylbenzene	91	11.754	11.754	0.000	98	2593630	10.0	10.3	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	Cal Amt ug/l	OnCol Amt ug/l	Flags
84 Chlorobenzene	112	11.768	11.767	0.001	96	1273458	10.0	9.72	
85 1,1,1,2-Tetrachloroethane	131	11.809	11.809	0.000	95	395217	10.0	10.0	
86 m-Xylene & p-Xylene	106	11.879	11.879	0.000	98	1022621	10.0	11.0	
88 o-Xylene	106	12.284	12.284	0.000	96	898823	10.0	11.4	
89 Styrene	104	12.326	12.326	0.000	95	1325388	10.0	11.3	
90 Bromoform	173	12.396	12.396	0.000	97	122604	10.0	9.57	
91 Isopropylbenzene	105	12.550	12.550	0.000	96	2697590	10.0	11.3	
$ 92 4-Bromofluorobenzene (Surr	95	12.857	12.857	0.000	93	556213	10.0	10.5	
93 N-Propylbenzene	91	12.941	12.941	0.000	98	3105421	10.0	11.5	
94 Bromobenzene	156	12.983	12.983	0.000	95	476125	10.0	9.87	
95 1,1,2,2-Tetrachloroethane	83	13.011	13.010	0.001	96	201345	10.0	9.47	
96 1,3,5-Trimethylbenzene	105	13.108	13.094	0.014	95	2141957	10.0	11.7	
97 2-Chlorotoluene	91	13.122	13.122	0.000	96	1901670	10.0	10.4	
99 1,2,3-Trichloropropane	110	13.164	13.164	0.000	89	62505	10.0	8.82	
98 trans-1,4-Dichloro-2-buten	53	13.178	13.178	0.000	93	59439	10.0	9.45	
100 Cyclohexanone	55	13.248	13.248	0.000	93	32550	100.0	79.8	
101 4-Chlorotoluene	91	13.276	13.276	0.000	99	1681952	10.0	10.8	
102 tert-Butylbenzene	119	13.430	13.429	0.001	93	1961792	10.0	11.4	
103 1,2,4-Trimethylbenzene	105	13.485	13.485	0.000	97	2104633	10.0	11.2	
87 Pentachloroethane	167		13.558					ND	
104 sec-Butylbenzene	105	13.597	13.583	0.014	94	3063805	10.0	11.3	
105 4-Isopropyltoluene	119	13.709	13.709	0.000	97	2537695	10.0	11.7	
106 1,3-Dichlorobenzene	146	13.849	13.848	0.001	98	1032388	10.0	10.1	
* 108 1,4-Dichlorobenzene-d4	152	13.918	13.918	0.000	72	624440	10.0	10.0	
107 1,2,3-Trimethylbenzene	105	13.918	13.918	0.000	97	1871316	10.0	10.5	
109 1,4-Dichlorobenzene	146	13.932	13.932	0.000	93	999851	10.0	9.75	
111 n-Butylbenzene	134	14.128	14.128	0.000	96	675810	10.0	11.8	
110 Benzyl chloride	126	14.156	14.156	0.000	98	73001	10.0	10.0	
112 1,2-Dichlorobenzene	146	14.351	14.351	0.000	97	804581	10.0	9.90	
113 n-Nonyl Aldehyde	57	15.078	15.064	0.014	91	158463	10.0	11.9	
115 1,2-Dibromo-3-Chloropropan	157	15.147	15.147	0.000	83	33500	10.0	9.89	
114 1,3,5-Trichlorobenzene	180	15.161	15.161	0.000	98	864012	10.0	10.7	
116 Hexachlorobutadiene	225	15.748	15.748	0.000	98	526945	10.0	10.8	
117 1,2,4-Trichlorobenzene	180	15.804	15.804	0.000	94	614778	10.0	10.4	
118 Naphthalene	128	16.153	16.153	0.000	97	649369	10.0	9.04	
120 1,2,3-Trichlorobenzene	180	16.349	16.348	0.001	96	466278	10.0	9.90	
S 119 Xylenes, Total	106				0			22.3	
121 2-Pentanone	1		0.000					ND	
S 130 Trihalomethanes, Total	1				0			38.9	

QC Flag Legend

Processing Flags

ND - Not Detected or Marked ND

Reagents:

8260 NewWkMix_00207	Amount Added: 10.00	Units: uL	
I.S. Working_00144	Amount Added: 10.00	Units: uL	Run Reagent
8260 Surr 25_00071	Amount Added: 10.00	Units: uL	Run Reagent

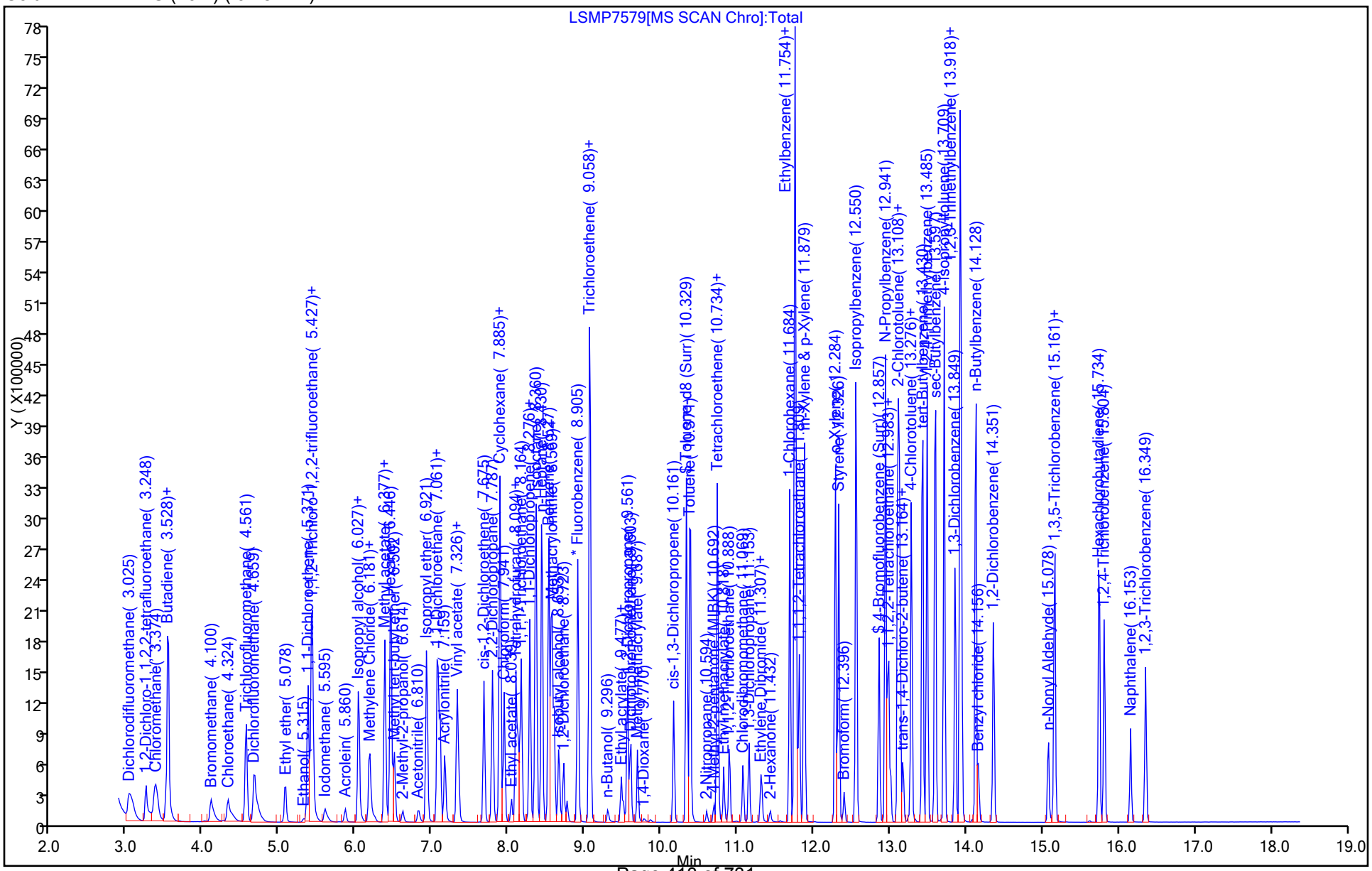
Report Date: 21-Feb-2017 08:24:43 Chrom Revision: 2.2 10-Jan-2017 11:26:10

TestAmerica St. Louis

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7579.D

Injection Date:	20-Feb-2017 13:04:30	Instrument ID:	VMSL	Operator ID:	ADB
Lims ID:	160-21079-A-7 MSD			Worklist Smp#:	11
Client ID:	GW-BR04RB-021517				
Purge Vol:	25.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	8
Method:	25mL-8260-MSL	Limit Group:	MSV-8260		

Column: RTX-VMS (40m) (0.18 mm)



TestAmerica St. Louis
Recovery Report

Data File: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\LSMP7579.D
Lims ID: 160-21079-A-7 MSD
Client ID: GW-BR04RB-021517
Sample Type: MSD
Inject. Date: 20-Feb-2017 13:04:30 ALS Bottle#: 8 Worklist Smp#: 11
Purge Vol: 25.000 mL Dil. Factor: 1.0000
Sample Info: 160-0009801-011
Misc. Info.: 160-21079-a-7 msd
Operator ID: ADB Instrument ID: VMSL

Method: \\ChromNA\StLouis\ChromData\VMSL\20170220-9801.b\25mL-8260-MSL.m
Limit Group: MSV-8260
Last Update: 21-Feb-2017 08:24:31 Calib Date: 14-Feb-2017 14:56:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\StLouis\ChromData\VMSL\20170214-9758.b\LICL7564.D

Column 1 : RTX-VMS (40m) (0.18 mm) Det: MS SCAN
Process Host: XAWRK036

First Level Reviewer: buettnera Date: 21-Feb-2017 08:15:58

Compound	Amount Added	Amount Recovered	% Rec.
$ 42 Dibromofluoromethane (Surr)	10.0	9.84	98.41
$ 53 1,2-Dichloroethane-d4 (Surr)	10.0	9.19	91.94
$ 68 Toluene-d8 (Surr)	10.0	10.6	105.74
$ 92 4-Bromofluorobenzene (Surr)	10.0	10.5	104.67

GC/MS VOA ANALYSIS RUN LOG

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Instrument ID: VMSL Start Date: 02/14/2017 11:34

Analysis Batch Number: 292232 End Date: 02/14/2017 15:47

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
BFB 160-292232/1		02/14/2017 11:34	1	LBFB7556.D	RTX-VMS40 0.18(mm)
IC 160-292232/6		02/14/2017 12:23	1	LICL7558.D	RTX-VMS40 0.18(mm)
IC 160-292232/7		02/14/2017 12:49	1	LICL7559.D	RTX-VMS40 0.18(mm)
IC 160-292232/8		02/14/2017 13:14	1	LICL7560.D	RTX-VMS40 0.18(mm)
IC 160-292232/9		02/14/2017 13:39	1	LICL7561.D	RTX-VMS40 0.18(mm)
ICIS 160-292232/10		02/14/2017 14:05	1	LICL7562.D	RTX-VMS40 0.18(mm)
IC 160-292232/11		02/14/2017 14:30	1	LICL7563.D	RTX-VMS40 0.18(mm)
IC 160-292232/12		02/14/2017 14:56	1	LICL7564.D	RTX-VMS40 0.18(mm)
ICV 160-292232/14		02/14/2017 15:47	1	LICV7566.D	RTX-VMS40 0.18(mm)

GC/MS VOA ANALYSIS RUN LOG

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Instrument ID: VMSL Start Date: 02/20/2017 09:43

Analysis Batch Number: 293176 End Date: 02/20/2017 21:04

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
BFB 160-293176/1		02/20/2017 09:43	1	LBFB7571.D	RTX-VMS40 0.18(mm)
CCVIS 160-293176/4		02/20/2017 10:07	1	LCCV7572.D	RTX-VMS40 0.18(mm)
LCS 160-293176/5		02/20/2017 10:32	1	LLCS7573.D	RTX-VMS40 0.18(mm)
LCSD 160-293176/6		02/20/2017 10:57	1	LLCS7574.D	RTX-VMS40 0.18(mm)
ZZZZZ		02/20/2017 11:23	1		RTX-VMS40 0.18(mm)
MB 160-293176/8		02/20/2017 11:47	1	LBLK7576.D	RTX-VMS40 0.18(mm)
160-21079-7		02/20/2017 12:13	1	LSMP7577.D	RTX-VMS40 0.18(mm)
160-21079-7 MS		02/20/2017 12:38	1	LSMP7578.D	RTX-VMS40 0.18(mm)
160-21079-7 MSD		02/20/2017 13:04	1	LSMP7579.D	RTX-VMS40 0.18(mm)
ZZZZZ		02/20/2017 13:54	1		RTX-VMS40 0.18(mm)
ZZZZZ		02/20/2017 14:20	1		RTX-VMS40 0.18(mm)
ZZZZZ		02/20/2017 14:45	10		RTX-VMS40 0.18(mm)
160-21079-1		02/20/2017 15:10	1	LSMP7584.D	RTX-VMS40 0.18(mm)
160-21079-2		02/20/2017 15:35	1	LSMP7585.D	RTX-VMS40 0.18(mm)
160-21079-3		02/20/2017 16:01	1	LSMP7586.D	RTX-VMS40 0.18(mm)
160-21079-4		02/20/2017 16:26	1	LSMP7587.D	RTX-VMS40 0.18(mm)
160-21079-5		02/20/2017 16:51	1	LSMP7588.D	RTX-VMS40 0.18(mm)
160-21079-6		02/20/2017 17:17	1	LSMP7589.D	RTX-VMS40 0.18(mm)
160-21079-8		02/20/2017 17:42	1	LSMP7590.D	RTX-VMS40 0.18(mm)
160-21079-9		02/20/2017 18:07	1	LSMP7591.D	RTX-VMS40 0.18(mm)
160-21079-10		02/20/2017 18:32	1	LSMP7592.D	RTX-VMS40 0.18(mm)
160-21079-11		02/20/2017 18:57	1	LSMP7593.D	RTX-VMS40 0.18(mm)
ZZZZZ		02/20/2017 19:23	1		RTX-VMS40 0.18(mm)
ZZZZZ		02/20/2017 19:48	1		RTX-VMS40 0.18(mm)
ZZZZZ		02/20/2017 20:13	1		RTX-VMS40 0.18(mm)
ZZZZZ		02/20/2017 20:38	1		RTX-VMS40 0.18(mm)
ZZZZZ		02/20/2017 21:04	1		RTX-VMS40 0.18(mm)

ALPHA SPECTROSCOPY

Method A-01-R U

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

Prep Batch: 293762

Preparation, Extraction Chromatography Resin Actinide Separation

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 293762

Lab ID: MB 160-293762/1-A
Client ID:
Sigma: 2
Analyzed: 02/27/17 15:42
Detector: AV207
Dil Fac: 1
Decay Corrected: No
Yield Truncated: Yes
Ts: 600

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium 238	0.01239	0.0175	0.0176	U	pCi/L	0.100	0.0186	294919
Uranium 234	-0.003879	0.00776	0.00777	U	pCi/L	0.100	0.0392	294919
Uranium-235/236	0.002896	0.0182	0.0182	U	pCi/L	0.100	0.0488	294919

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium 232	6.796	0.405	0.700		pCi/L	0.0705	7.41	96.8	30 - 110

Lab ID: LCS 160-293762/2-A
Client ID:
Sigma: 2
Analyzed: 02/27/17 15:42
Detector: AV208
Dil Fac: 1
Decay Corrected: No
Yield Truncated: Yes
Ts: 600

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium 238	6.666	0.400	0.688		pCi/L	0.100	0.0180	294920
Uranium 234	6.228	0.388	0.651		pCi/L	0.100	0.0527	294920

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium 232	6.833	0.401	0.700		pCi/L	0.0756	7.41	97.3	30 - 110

Lab ID: 160-21079-6
Client ID: GW-NB71-021517
Sigma: 2
Analyzed: 02/27/17 15:42
Detector: AV209
Dil Fac: 1
Decay Corrected: No
Yield Truncated: Yes
Ts: 600

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium 238	0.00644	0.0129	0.0129	U	pCi/L	0.100	0.0193	294921
Uranium 234	0.0581	0.0387	0.0390		pCi/L	0.100	0.0194	294921
Uranium-235/236	0.00301	0.0189	0.0189	U	pCi/L	0.100	0.0507	294921

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium 232	7.38	0.438	0.759		pCi/L	0.0797	7.41	105	30 - 110

Lab ID: 160-21079-7
Client ID: GW-BR04RB-021517
Sigma: 2
Analyzed: 02/28/17 18:28
Detector: AV154
Dil Fac: 1
Decay Corrected: No
Yield Truncated: Yes
Ts: 600

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium 238	0.241	0.0830	0.0854		pCi/L	0.100	0.0519	295175
Uranium 234	2.43	0.258	0.329		pCi/L	0.100	0.0652	295175
Uranium-235/236	0.0168	0.0238	0.0239	U	pCi/L	0.100	0.0253	295175

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 293762

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium 232	6.26	0.389	0.654		pCi/L	0.0744	7.41	89.1	30 - 110

Lab ID: 160-21079-7 MS
Client ID: GW-BR04RB-021517
Sigma: 2
Analyzed: 02/27/17 15:42
Detector: AV214
Dil Fac: 1
Decay Corrected: No
Yield Truncated: Yes
Ts: 600

Analyte	MS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium 238	7.086	0.425	0.731		pCi/L	0.100	0.0191	294923
Uranium 234	9.028	0.480	0.898		pCi/L	0.100	0.0192	294923

Tracer	MS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium 232	7.280	0.431	0.748		pCi/L	0.0613	7.40	104	30 - 110

Lab ID: 160-21079-7 MSD
Client ID: GW-BR04RB-021517
Sigma: 2
Analyzed: 02/27/17 15:42
Detector: AV215
Dil Fac: 1
Decay Corrected: No
Yield Truncated: Yes
Ts: 600

Analyte	MSD Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium 238	6.641	0.401	0.687		pCi/L	0.100	0.0382	294924
Uranium 234	8.404	0.451	0.838		pCi/L	0.100	0.0182	294924

Tracer	MSD Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium 232	6.581	0.387	0.675		pCi/L	0.0496	7.41	93.7	30 - 110

Lab ID: 160-21079-8
Client ID: GW-BR04RB-021517-FD
Sigma: 2
Analyzed: 02/27/17 15:42
Detector: AV216
Dil Fac: 1
Decay Corrected: No
Yield Truncated: Yes
Ts: 600

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium 238	0.195	0.0696	0.0715		pCi/L	0.100	0.0380	294925
Uranium 234	2.40	0.241	0.314		pCi/L	0.100	0.0464	294925
Uranium-235/236	0.000	0.00938	0.00938	U	pCi/L	0.100	0.0225	294925

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium 232	6.45	0.379	0.661		pCi/L	0.0575	7.41	91.9	30 - 110

Lab ID: 160-21079-9
Client ID: GW-NB80-021517
Sigma: 2
Analyzed: 02/27/17 15:42
Detector: AV217
Dil Fac: 1
Decay Corrected: No
Yield Truncated: Yes
Ts: 600

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium 238	0.0269	0.0269	0.0270		pCi/L	0.100	0.0201	294926
Uranium 234	0.0269	0.0269	0.0270		pCi/L	0.100	0.0202	294926

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 293762

Lab ID: 160-21079-9
Client ID: GW-NB80-021517
Sigma: 2

Analyzed: 02/27/17 15:42
Detector: AV217
Dil Fac: 1

Decay Corrected: No
Yield Truncated: Yes
Ts: 600

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-235/236	0.00837	0.0167	0.0168	U	pCi/L	0.100	0.0251	294926

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium 232	6.88	0.427	0.718		pCi/L	0.0774	7.41	97.9	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 160-293762/1-A	Uranium 238			0.01239	U	pCi/L							1.41172547
MB 160-293762/1-A	Uranium 234			-0.003879	U	pCi/L							-.99911917
MB 160-293762/1-A	Uranium-235/236			0.002896	U	pCi/L							.31797101

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-293762/2-A	Uranium 238		6.51	6.666		pCi/L	102	83 - 121					.322936701
LCS 160-293762/2-A	Uranium 234		6.37	6.228		pCi/L	98	84 - 120					-.30121323

Matrix Spike ID:	Analyte	Parent Result	Spike Added	MS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-21079-7	Uranium 238	0.241	6.51	7.086		pCi/L	105	68 - 143	6				
160-21079-7	Uranium 234	2.43	6.36	9.028		pCi/L	104	65 - 146	7				

Matrix Spike Duplicate ID:	Analyte	Parent Result	Spike Added	MSD Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-21079-7	Uranium 238	0.241	6.51	6.641		pCi/L	98	68 - 143	6	0.31	0.89	1	
160-21079-7	Uranium 234	2.43	6.37	8.404		pCi/L	94	65 - 146	7	0.36	1.02	1	

Glossary:
Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Batch Number: 293762 Batch Start Date: 02/21/17 16:28 Batch Analyst: Mallinckrodt, Paul J

Batch Method: ExtChrom Batch End Date: 02/27/17 11:07

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00035	UNAT 00012			
MB 160-293762/1		ExtChrom, A-01-R		500 mL	0.1 mL				
LCS 160-293762/2		ExtChrom, A-01-R		500 mL	0.1 mL	0.1 mL			
160-21079-D-6	GW-NB71-021517	ExtChrom, A-01-R	T	500.01 mL	0.1 mL				
160-21079-D-7	GW-BR04RB-021517	ExtChrom, A-01-R	T	499.98 mL	0.1 mL				
160-21079-C-7 MS	GW-BR04RB-021517	ExtChrom, A-01-R	T	500.39 mL	0.1 mL	0.1 mL			
160-21079-D-7 MSD	GW-BR04RB-021517	ExtChrom, A-01-R	T	500.13 mL	0.1 mL	0.1 mL			
160-21079-D-8	GW-BR04RB-021517 -FD	ExtChrom, A-01-R	T	499.98 mL	0.1 mL				
160-21079-C-9	GW-NB80-021517	ExtChrom, A-01-R	T	499.94 mL	0.1 mL				

Batch Notes	
Balance ID	1125353055
Batch Comment	Rad Prep Batch U Waters
Analyst ID - Column	nmn per scb
Column Date	2/24/17
Analyst ID - CoPrecipitation	scb
CoPrecipitation Date	2/27/17
Pipette ID	CR001
Analyst ID - Reagent Drop Witness	nmn per scb
Analyst ID - Reagent Drop	scb
SOP Number	ST-RC-0100, ST-RC-0238

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
1:44:16AM 2/28/2017

Sample

Sample Name: MB 160-293762/1-A Type: Blank
Spectrum #1 Analysis #1
: MB 160-293762/1-A
Sample Collection Date: 2/27/2017 11:15:00AM
Comment:

Sample Volume : 0.50 Sample Units: L
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 293762
AnalysisResultsID: 186152
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

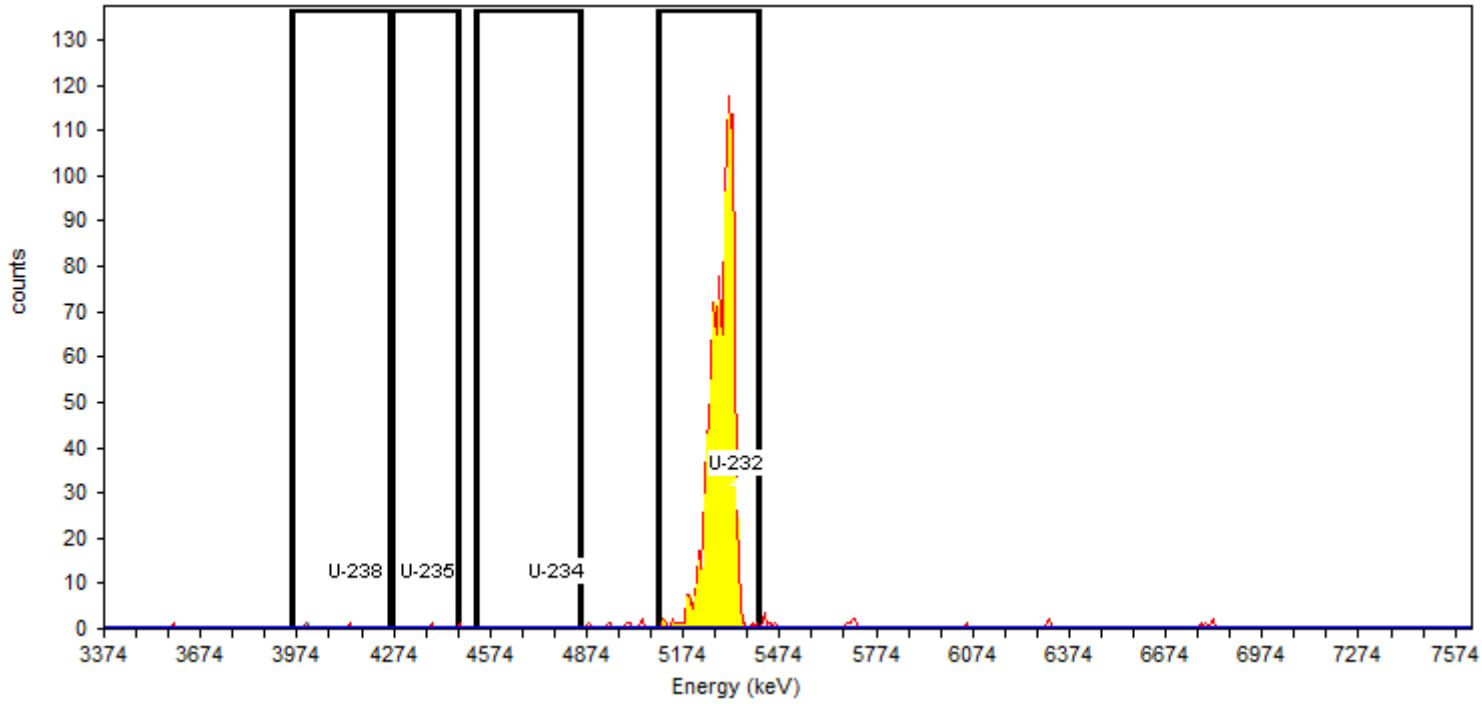
Tracer Name: U-232_00035
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/5/2011 2:39:38PM

Tracer Nuclide: U-232
Tracer Recovery: 96.77%

Acquisition

Detector: AV207 SN: 50-117H6
Acquisition Start Date: 2/27/2017 3:42:51PM
Live Time: 600.00 min.
Real Time: 600.00 min.
Background Date: 2/17/2017 3:50:36PM
Bkgd Info: Sample: ICB;AV207; Det: AV207; Spectrum #1; 2/17/2017 3:50:36 PM

Energy Calibration: IC-9792;AV207-20161201a
Efficiency Calibration:IC-9792;AV207-20161201a
Calibration Date: 12/1/2016 2:11:39PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.05% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:2/27/2017 3:41:00PM
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	61.6	100.0	2	0.0000	2.00	1.239E-002	pCi/L
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.6250	0.38	2.897E-003	pCi/L
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	.0	99.8	0	0.6250	-0.63	-3.879E-003	pCi/L
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	84.1	100.1	1139	4.3750	1134.63	7.170E+000	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:44:29AM 2/28/2017

Sample

Sample Name: LCS 160-293762/2-A Type: Control
Spectrum #1 Analysis #1
: LCS 160-293762/2-A
Sample Collection Date: 2/27/2017 11:15:00AM
Comment:

Sample Volume : 0.50 Sample Units: L
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 293762
AnalysisResultsID: 186155
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

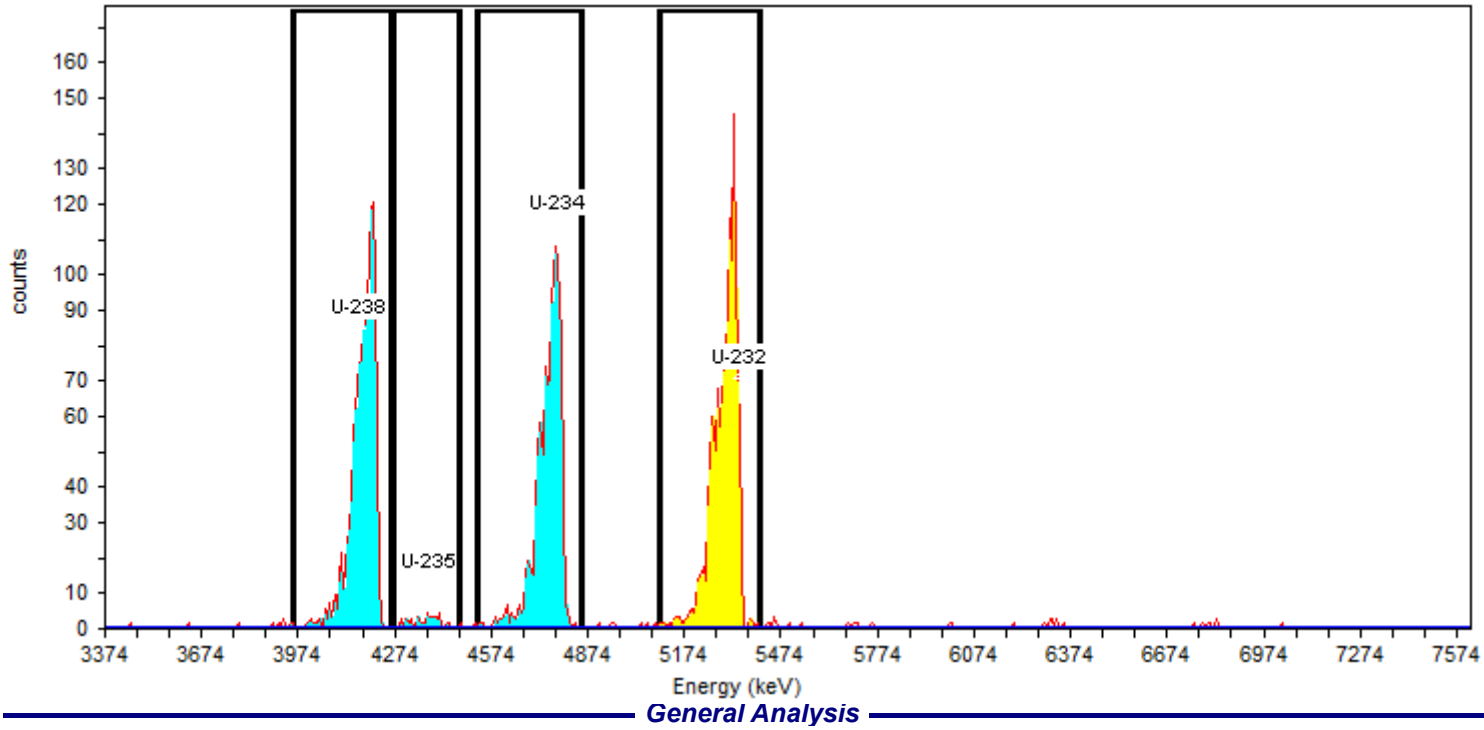
Tracer Name: U-232_00035
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/5/2011 2:39:38PM

Tracer Nuclide: U-232
Tracer Recovery: 97.29%

Acquisition

Detector: AV208 SN: 50-112Z6
Acquisition Start Date: 2/27/2017 3:42:51PM
Live Time: 600.00 min.
Real Time: 600.07 min.
Background Date: 2/17/2017 3:50:36PM
Bkgd Info: Sample: ICB;AV208; Det: AV208; Spectrum #1; 2/17/2017 3:50:36 PM

Energy Calibration: IC-9793;AV208-20161201a
Efficiency Calibration:IC-9793;AV208-20161201a
Calibration Date: 12/1/2016 2:11:34PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.68% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:2/27/2017 3:40:59PM
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	78.8	100.0	1109	0.0000	1109.00	6.666E+000	pCi/L
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	102.0	80.2	34	0.6250	33.38	2.501E-001	pCi/L
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	72.6	99.8	1036	1.8750	1034.13	6.228E+000	pCi/L
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	73.9	100.1	1175	5.6250	1169.38	7.209E+000	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:44:34AM 2/28/2017

Sample

Sample Name: 160-21079-D-6-A Type: Sample
Spectrum #1 Analysis #1
: 160-21079-D-6-A
Sample Collection Date: 2/15/2017 12:40:00PM
Comment:

Sample Volume : 0.50 Sample Units: L
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 293762
AnalysisResultsID: 186156
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

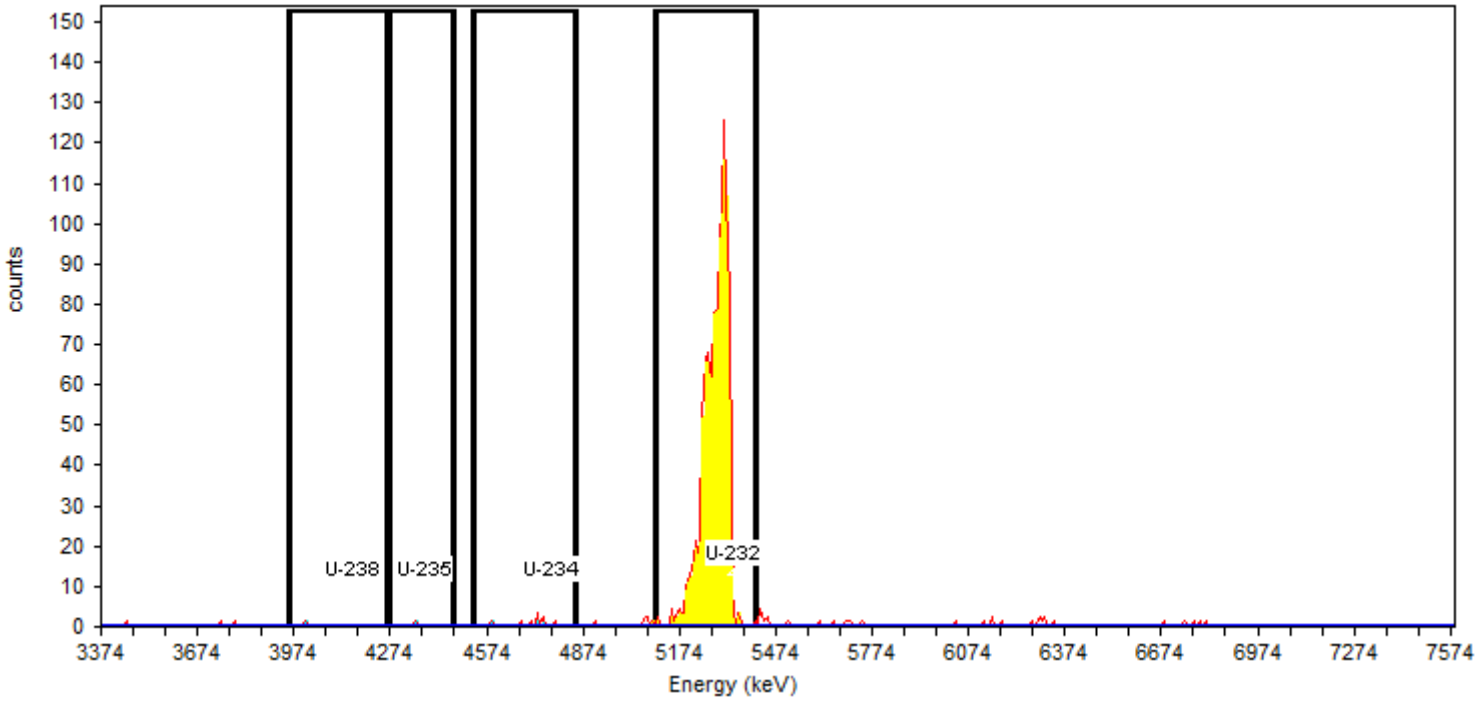
Tracer Name: U-232_00035
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/5/2011 2:39:38PM

Tracer Nuclide: U-232
Tracer Recovery: 105.12%

Acquisition

Detector: AV209 SN: 50-117H7
Acquisition Start Date: 2/27/2017 3:42:51PM
Live Time: 600.00 min.
Real Time: 600.00 min.
Background Date: 2/17/2017 3:50:37PM
Bkgd Info: Sample: ICB;AV209; Det: AV209; Spectrum #1; 2/17/2017 3:50:37 PM

Energy Calibration: IC-9794;AV209-20161201a
Efficiency Calibration:IC-9794;AV209-20161201a
Calibration Date: 12/1/2016 2:11:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 23.31% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:2/27/2017 3:40:59PM
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	42.4	100.0	1	0.0000	1.00	6.128E-003	pCi/L
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.6250	0.38	2.865E-003	pCi/L
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	46.2	99.8	9	0.0000	9.00	5.526E-002	pCi/L
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	79.4	100.1	1152	5.0000	1147.00	7.789E+000	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:28:15AM 3/1/2017

Sample

Sample Name: 160-21079-D-7-A Type: Sample
Spectrum #2 Analysis #1
: 160-21079-D-7-A
Sample Collection Date: 2/15/2017 1:45:00PM
Comment:

Sample Volume : 0.50 Sample Units: L
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 293762
AnalysisResultsID: 186274
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

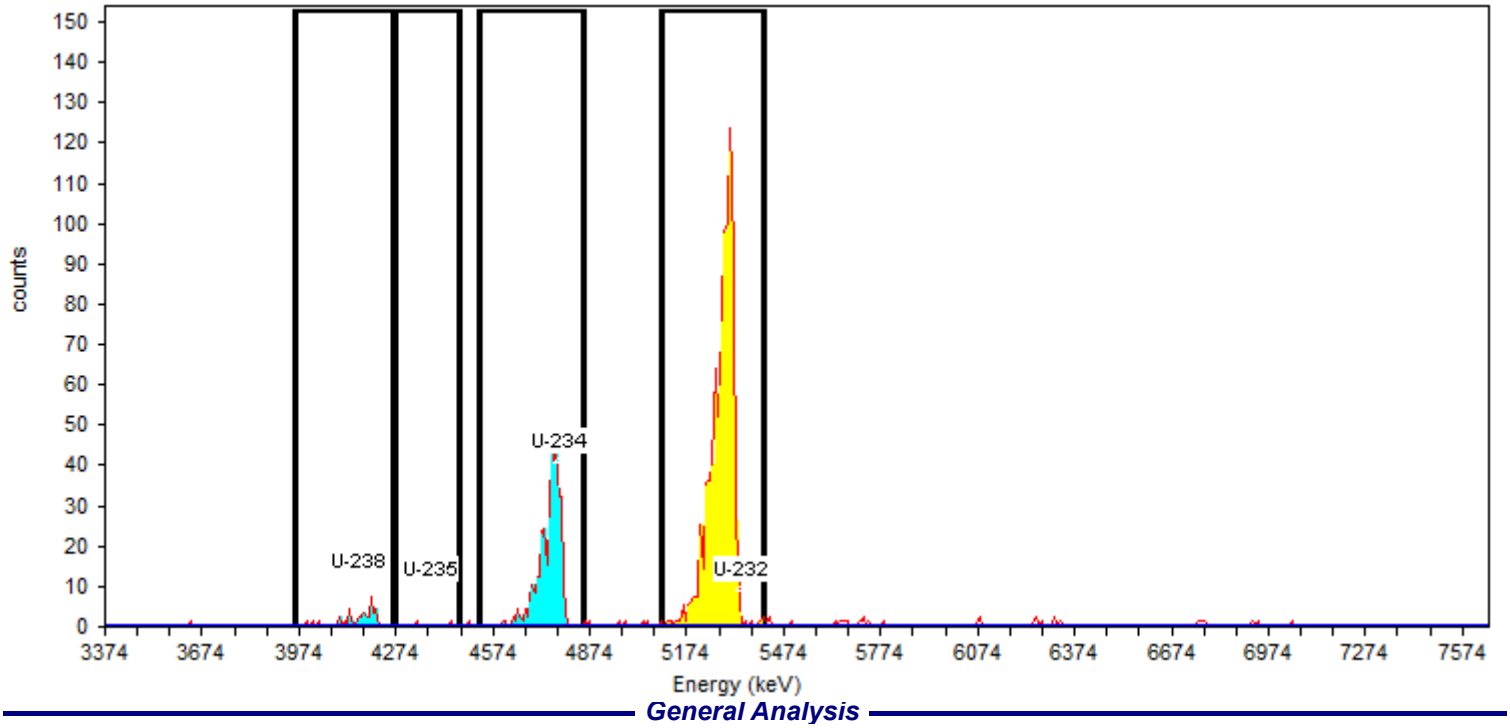
Tracer Name: U-232_00035
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/5/2011 2:39:38PM

Tracer Nuclide: U-232
Tracer Recovery: 89.12%

Acquisition

Detector: AV154 SN: 50-05/JJ7
Acquisition Start Date: 2/28/2017 6:28:16PM
Live Time: 600.00 min.
Real Time: 600.00 min.
Background Date: 2/20/2017 7:48:25AM
Bkgd Info: Sample: ICB;AV154; Det: AV154; Spectrum #1; 2/20/2017 7:48:25 AM

Energy Calibration: IC-9792;AV154-20161110
Efficiency Calibration:IC-9792;AV154-20161110
Calibration Date: 11/11/2016 2:37:23PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 24.95% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:2/27/2017 3:40:59PM
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	50.2	100.0	37	1.2500	35.75	2.414E-001	pCi/L
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	2	0.0000	2.00	1.684E-002	pCi/L
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	59.7	99.8	362	2.5000	359.50	2.432E+000	pCi/L
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	63.4	100.1	1046	5.0000	1041.00	6.604E+000	pCi/L

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:44:39AM 2/28/2017

Sample

Sample Name: 160-21079-C-7-A MS Type: Sample
Spectrum #1 Analysis #1
: 160-21079-C-7-A MS
Sample Collection Date: 2/15/2017 1:45:00PM
Comment:

Sample Volume : 0.50 Sample Units: L
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 293762
AnalysisResultsID: 186157
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

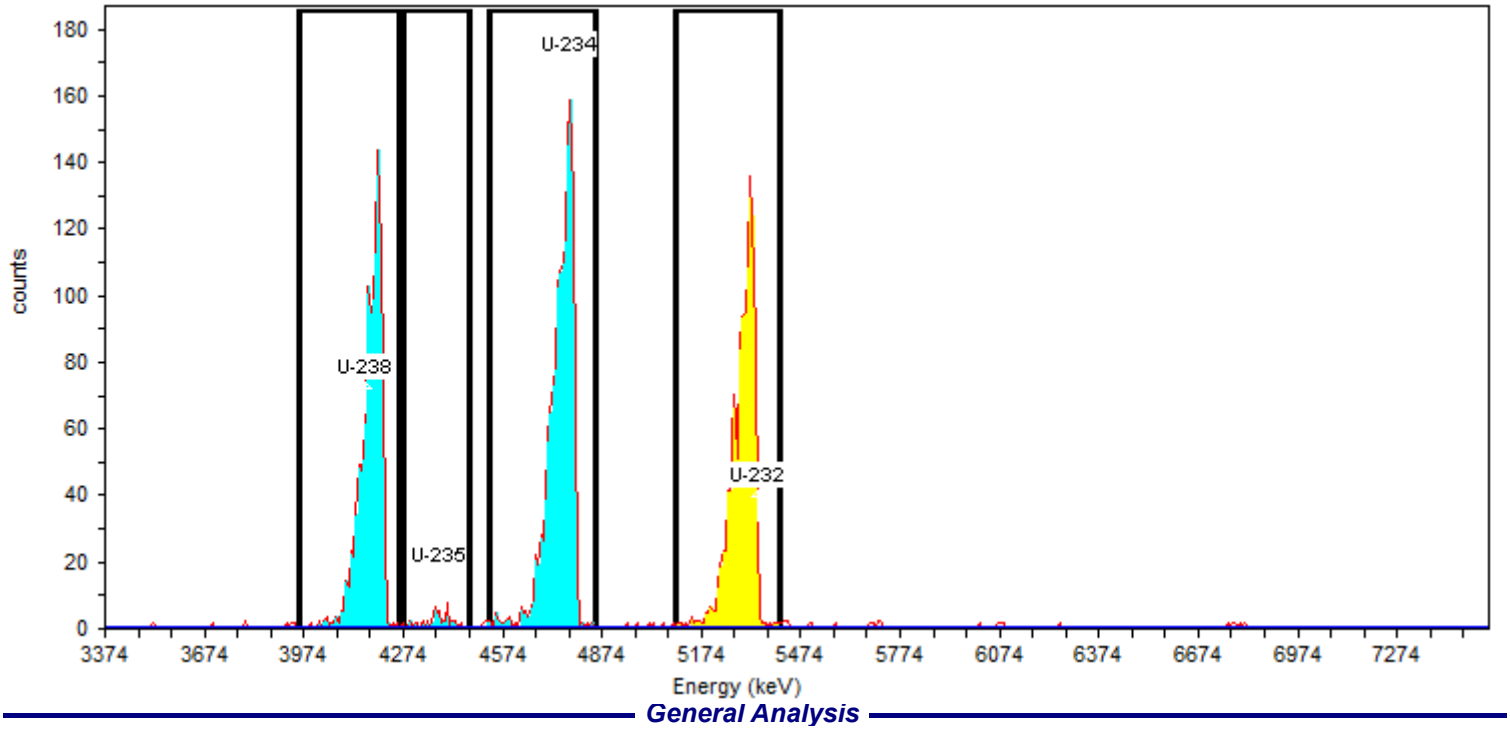
Tracer Name: U-232_00035
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/5/2011 2:39:38PM

Tracer Nuclide: U-232
Tracer Recovery: 103.75%

Acquisition

Detector: AV214 SN: 50-112Z7
Acquisition Start Date: 2/27/2017 3:42:52PM
Live Time: 600.00 min.
Real Time: 600.08 min.
Background Date: 2/17/2017 3:50:37PM
Bkgd Info: Sample: ICB;AV214; Det: AV214; Spectrum #1; 2/17/2017 3:50:37 PM

Energy Calibration: IC-9886;AV214-20161006a
Efficiency Calibration:IC-9886;AV214-20161006a
Calibration Date: 10/7/2016 10:38:08AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 23.55% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:2/27/2017 3:40:59PM
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	63.8	100.0	1112	0.0000	1112.00	6.830E+000	pCi/L
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	21.9	80.2	40	2.5000	37.50	2.872E-001	pCi/L
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	72.4	99.8	1414	0.0000	1414.00	8.702E+000	pCi/L
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	68.4	100.1	1146	2.5000	1143.50	7.681E+000	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:43:03AM 2/28/2017

Sample

Sample Name: 160-21079-D-7-B MSD Type: Sample
Spectrum #1 Analysis #1
: 160-21079-D-7-B MSD
Sample Collection Date: 2/15/2017 1:45:00PM
Comment:

Sample Volume : 0.50 Sample Units: L
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 293762
AnalysisResultsID: 186143
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

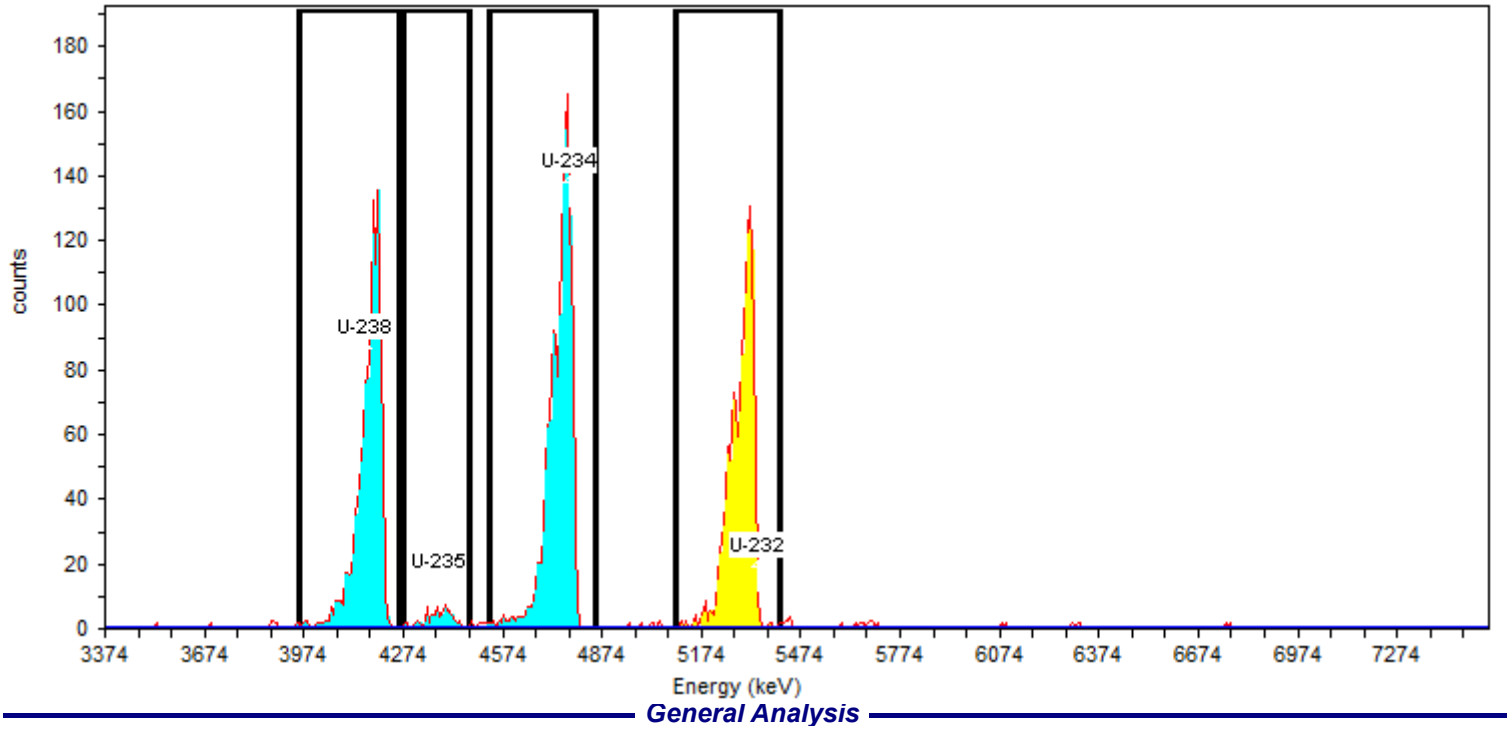
Tracer Name: U-232_00035
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/5/2011 2:39:38PM

Tracer Nuclide: U-232
Tracer Recovery: 93.73%

Acquisition

Detector: AV215 SN: 50-119J4
Acquisition Start Date: 2/27/2017 3:42:52PM
Live Time: 600.00 min.
Real Time: 600.00 min.
Background Date: 2/17/2017 3:50:37PM
Bkgd Info: Sample: ICB;AV215; Det: AV215; Spectrum #1; 2/17/2017 3:50:37 PM

Energy Calibration: IC-7107;AV215-20161006a
Efficiency Calibration:IC-7107;AV215-20161006a
Calibration Date: 10/7/2016 10:38:03AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.46% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:2/27/2017 3:40:59PM
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	61.9	100.0	1098	0.6250	1097.38	6.641E+000	pCi/L
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	84.7	80.2	62	0.0000	62.00	4.678E-001	pCi/L
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	68.1	99.8	1386	0.0000	1386.00	8.404E+000	pCi/L
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	78.0	100.1	1163	1.8750	1161.13	6.943E+000	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:43:21AM 2/28/2017

Sample

Sample Name: 160-21079-D-8-A Type: Sample
Spectrum #1 Analysis #1
: 160-21079-D-8-A
Sample Collection Date: 2/15/2017 1:45:00PM
Comment:

Sample Volume : 0.50 Sample Units: L
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 293762
AnalysisResultsID: 186145
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

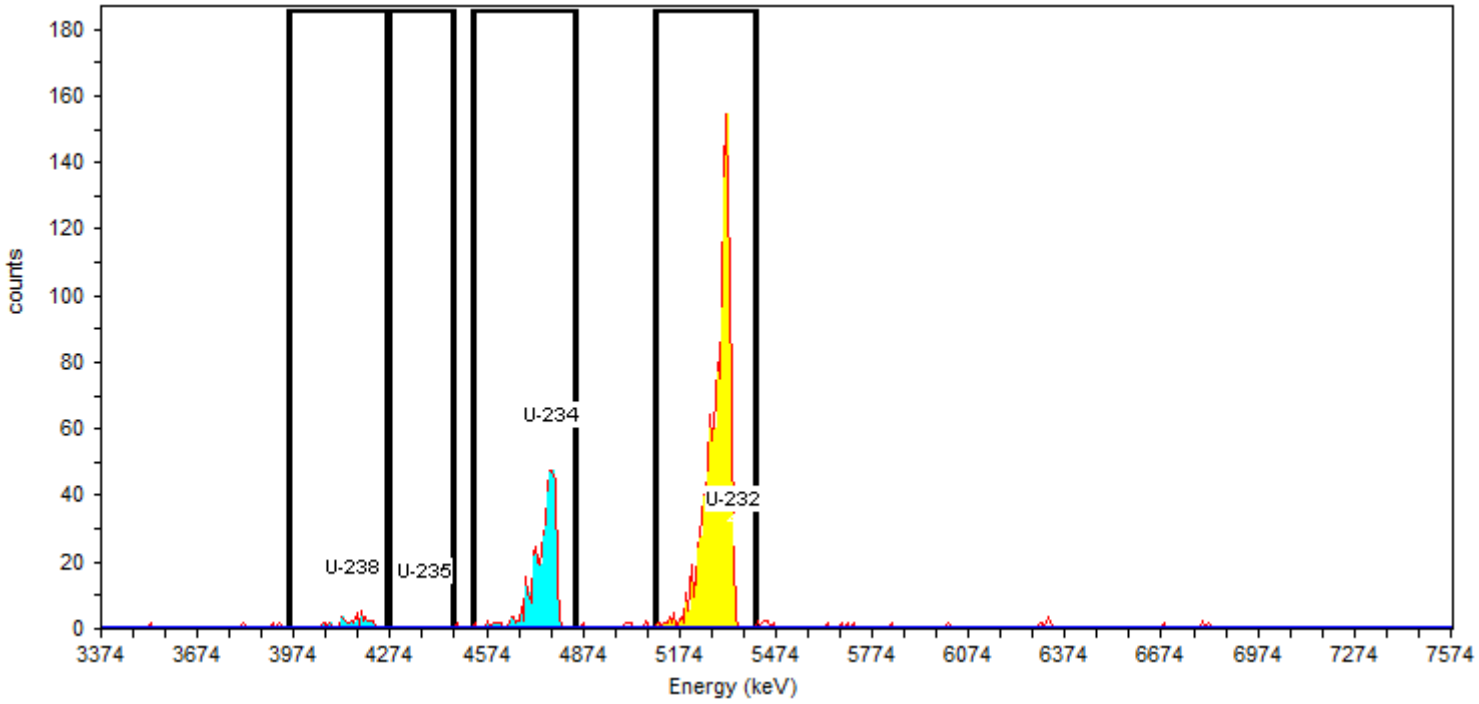
Tracer Name: U-232_00035
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/5/2011 2:39:38PM

Tracer Nuclide: U-232
Tracer Recovery: 91.89%

Acquisition

Detector: AV216 SN: 50-117J5
Acquisition Start Date: 2/27/2017 3:42:52PM
Live Time: 600.00 min.
Real Time: 600.00 min.
Background Date: 2/20/2017 7:48:27AM
Bkgd Info: Sample: ICB;AV216; Det: AV216; Spectrum #1; 2/20/2017 7:48:27 AM

Energy Calibration: IC-8874;AV216-20161006a
Efficiency Calibration:IC-8874;AV216-20161006a
Calibration Date: 10/7/2016 10:38:13AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.15% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:2/27/2017 3:40:59PM
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	84.3	100.0	33	0.6250	32.38	1.948E-001	pCi/L
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	.0	80.2	0	0.0000	0.00	0.000E+000	pCi/L
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	59.4	99.8	399	1.2500	397.75	2.399E+000	pCi/L
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	60.3	100.1	1171	3.1250	1167.88	6.809E+000	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:43:13AM 2/28/2017

Sample

Sample Name: 160-21079-C-9-A Type: Sample
Spectrum #1 Analysis #1
: 160-21079-C-9-A
Sample Collection Date: 2/15/2017 2:30:00PM
Comment:

Sample Volume : 0.50 Sample Units: L
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 293762
AnalysisResultsID: 186144
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

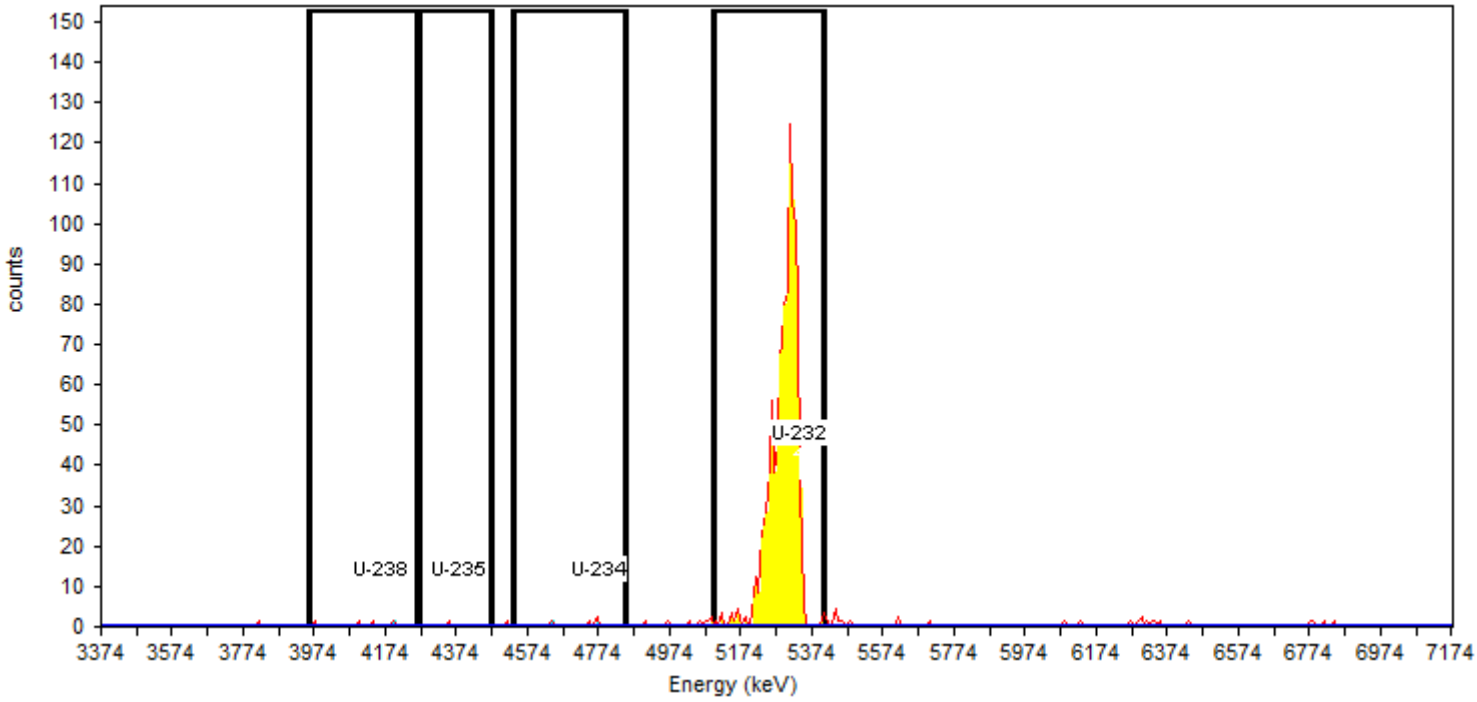
Tracer Name: U-232_00035
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/5/2011 2:39:38PM

Tracer Nuclide: U-232
Tracer Recovery: 97.95%

Acquisition

Detector: AV217 SN: 50-117I2
Acquisition Start Date: 2/27/2017 3:42:52PM
Live Time: 600.00 min.
Real Time: 600.00 min.
Background Date: 2/17/2017 3:50:38PM
Bkgd Info: Sample: ICB;AV217; Det: AV217; Spectrum #1; 2/17/2017 3:50:38 PM

Energy Calibration: IC-8875;AV217-20161006a
Efficiency Calibration:IC-8875;AV217-20161006a
Calibration Date: 10/7/2016 10:38:18AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 22.83% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:2/27/2017 3:40:59PM
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	23.6	100.0	4	0.0000	4.00	2.687E-002	pCi/L
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.0000	1.00	8.374E-003	pCi/L
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	41.5	99.8	4	0.0000	4.00	2.692E-002	pCi/L
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	64.8	100.1	1051	4.3750	1046.63	7.258E+000	pCi/L

Daily Checks

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 02/27/17

		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**
AV207	02/27/17 09:18	5947	5510.0 - 6090.0	Pass	17.5	10 - 20	Pass	222.9	219.1 - 229.1	Pass	5029	4998.0 - 5078.0	Pass
AV208	02/27/17 09:18	5636	5607.3 - 6197.5	Pass	13.6	10 - 20	Pass	225.1	220.1 - 230.1	Pass	5046	5005.3 - 5085.3	Pass
AV209	02/27/17 09:18	6027	5724.2 - 6326.8	Pass	14.4	10 - 20	Pass	220.9	215.9 - 225.9	Pass	5014	4974.7 - 5054.7	Pass
AV214	02/27/17 09:31	5882	5603.5 - 6193.3	Pass	12.7	10 - 20	Pass	224.0	219.1 - 229.1	Pass	5037	4997.8 - 5077.8	Pass
AV215	02/27/17 10:09	6021	5718.4 - 6320.4	Pass	13.6	10 - 20	Pass	225.1	219.0 - 229.0	Pass	5046	4997.7 - 5077.7	Pass
AV216	02/27/17 09:31	6027	5711.6 - 6312.8	Pass	13.4	10 - 20	Pass	225.0	219.0 - 229.0	Pass	5045	4997.3 - 5077.3	Pass
AV217	02/27/17 09:31	5800	5592.6 - 6181.2	Pass	13.1	10 - 20	Pass	218.0	212.0 - 222.0	Pass	4993	4945.4 - 5025.4	Pass

Analysis Date: 02/28/17

		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**
AV154	02/28/17 13:51	5734	5437.2 - 6009.6	Pass	13.0	10 - 20	Pass	222.1	217.1 - 227.1	Pass	5023	4983.3 - 5063.3	Pass

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:54:51PM 2/28/2017

Sample

Sample Name: Pulser;AV154 Spectrum #4 Analysis #1
Comment:

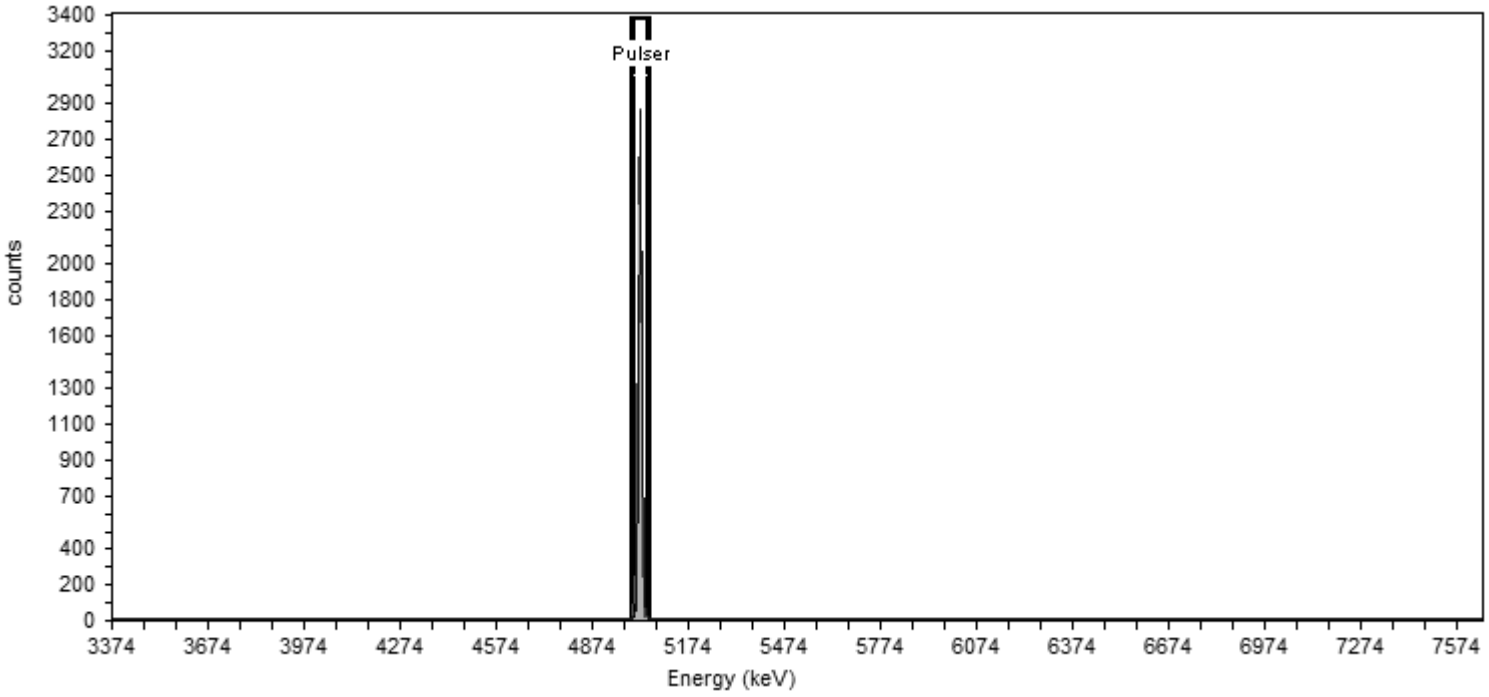
Batch

Batch Name: February2017a
Description:

Acquisition

Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 2/28/2017 1:51:59PM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9792;AV154-20161110
Calibration Date: 11/11/2016 2:37:23PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



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	5023.010	5000.937	5045.084	12.97	5,333.77	5,734.08

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:37AM 2/27/2017

Sample

Sample Name: Pulser;AV207 Spectrum #2 Analysis #1
Comment:

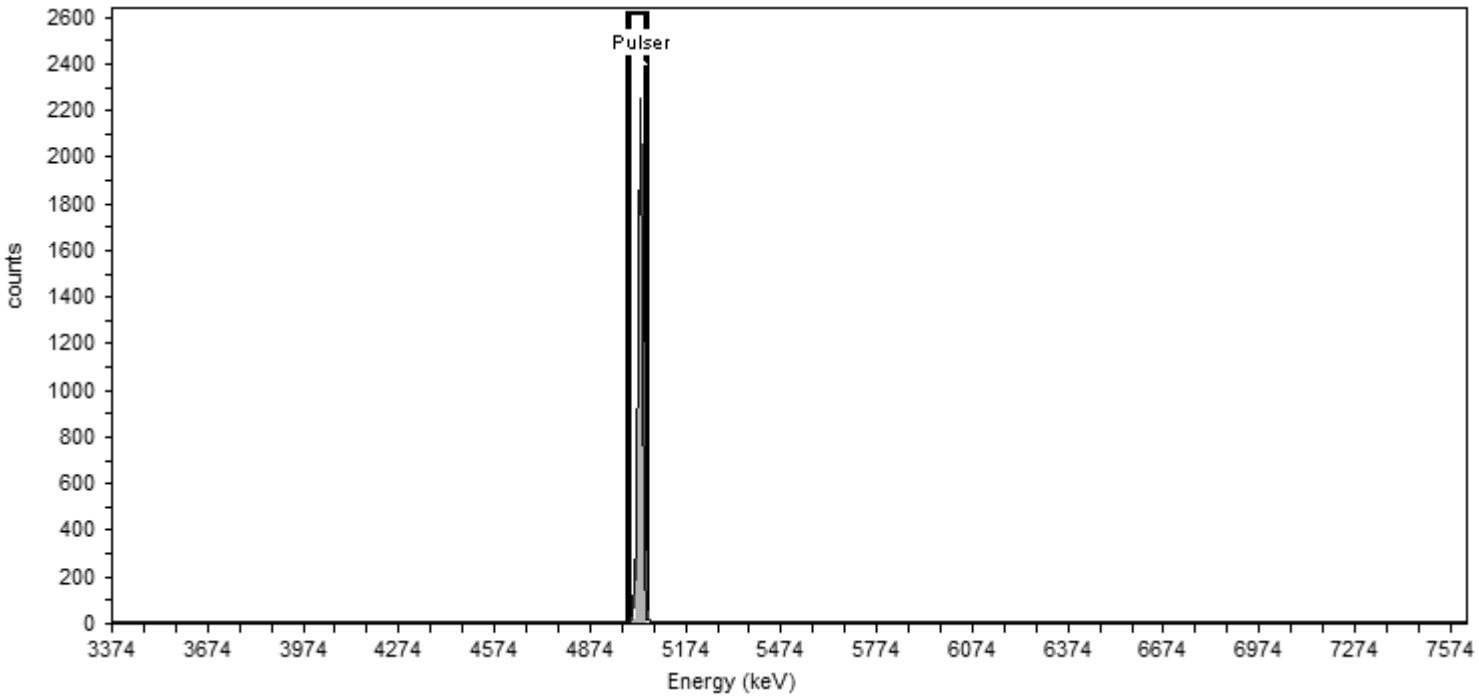
Batch

Batch Name: February2017b
Description:

Acquisition

Detector: AV207 , SN: 50-117H6
Acquisition Start Date: 2/27/2017 9:18:52AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9792;AV207-20161201a
Calibration Date: 12/1/2016 2:11:39PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



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	5029.387	4999.605	5059.168	17.50	5,652.40	5,947.47

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:35AM 2/27/2017

Sample

Sample Name: Pulser;AV208 Spectrum #3 Analysis #1
Comment:

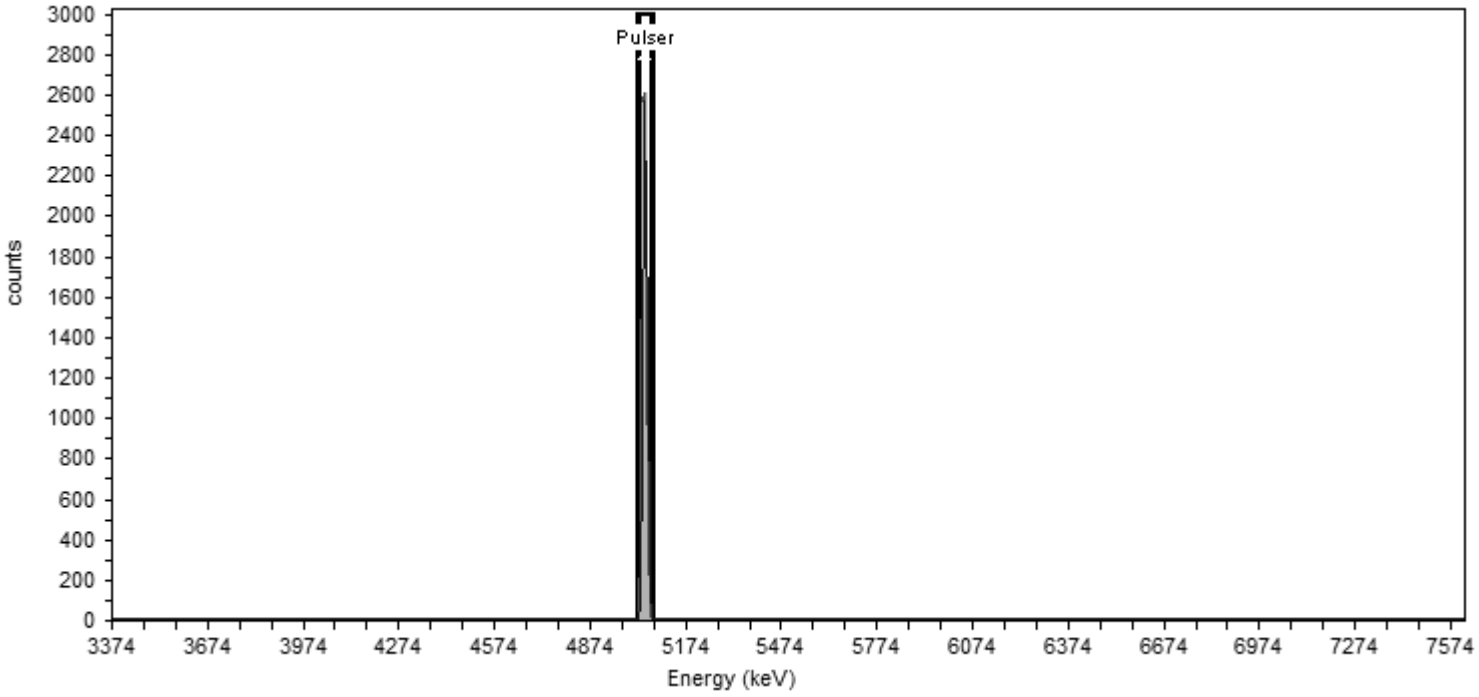
Batch

Batch Name: February2017b
Description:

Acquisition

Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 2/27/2017 9:18:51AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9793;AV208-20161201a
Calibration Date: 12/1/2016 2:11:34PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



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	5045.939	5022.733	5069.146	13.63	5,094.60	5,635.74

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:17AM 2/27/2017

Sample

Sample Name: Pulser;AV209 Spectrum #2 Analysis #1
Comment:

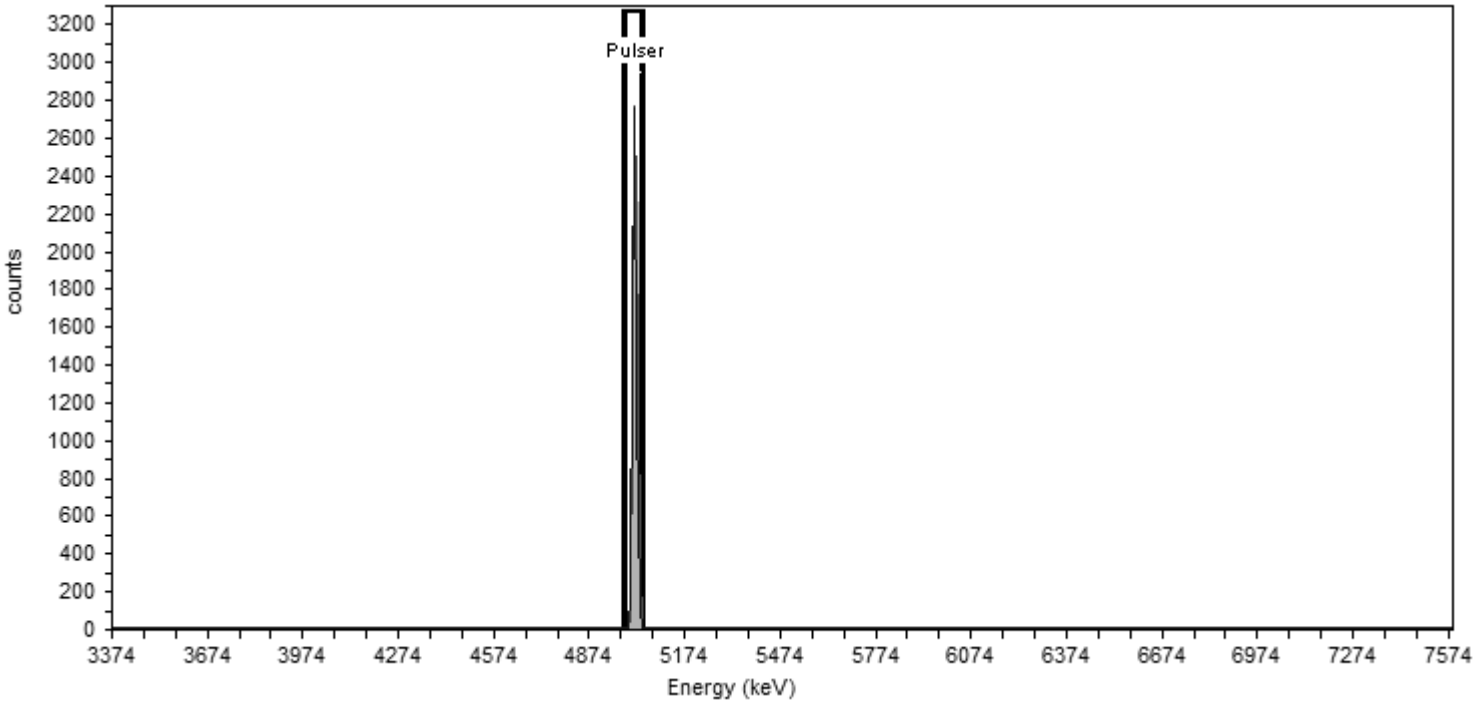
Batch

Batch Name: February2017b
Description:

Acquisition

Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 2/27/2017 9:18:53AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9794;AV209-20161201a
Calibration Date: 12/1/2016 2:11:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



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	5014.393	4989.894	5038.891	14.39	5,720.02	6,027.46

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:34:24AM 2/27/2017

Sample

Sample Name: Pulser;AV214
Comment:

Spectrum #2 Analysis #1

Batch

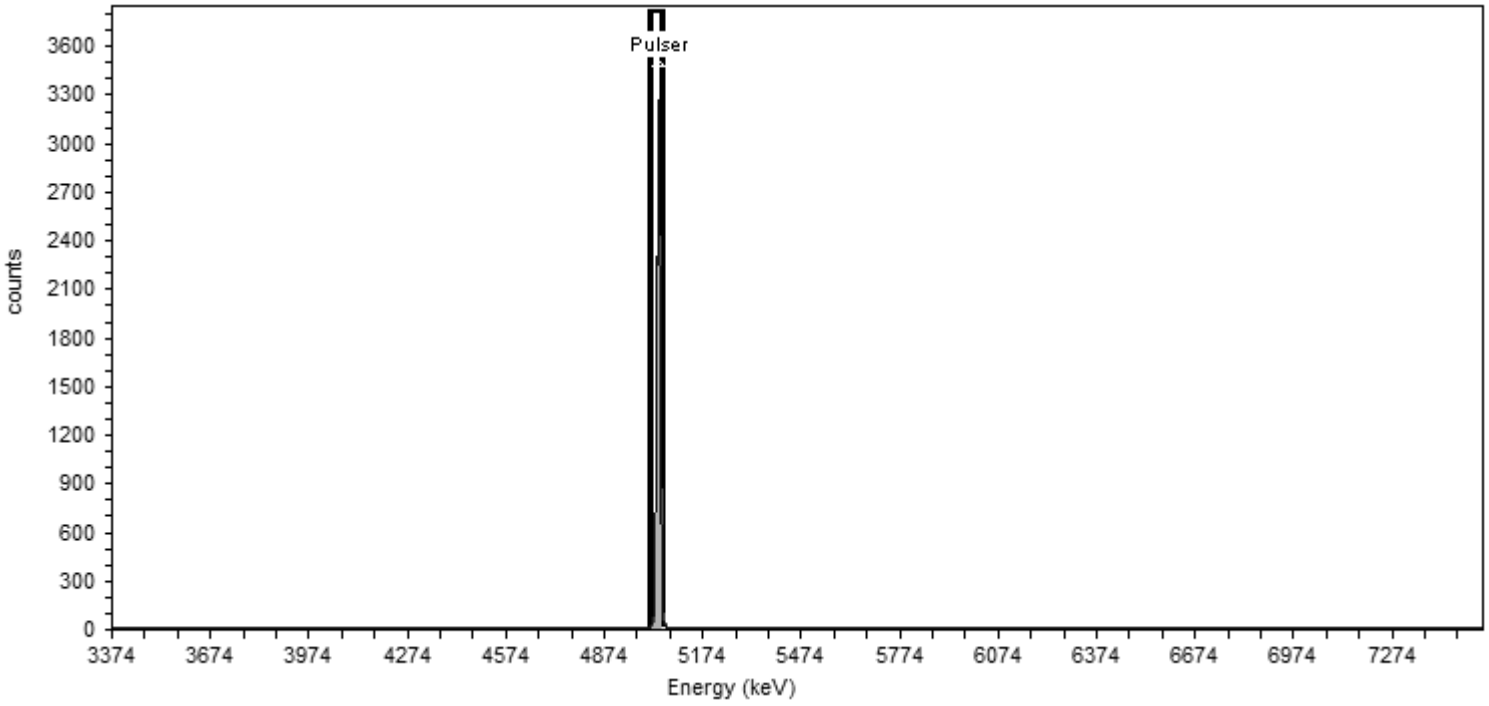
Batch Name: February2017c
Description:

Acquisition

Detector: AV214 , SN: 50-112Z7
Acquisition Start Date: 2/27/2017 9:31:41AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9886;AV214-20161006a
Calibration Date: 10/7/2016 10:38:08AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



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	5037.278	5015.589	5058.966	12.74	5,980.37	5,881.94

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:10:48AM 2/27/2017

Sample

Sample Name: Pulser;AV215
Comment:

Spectrum #3 Analysis #1

Batch

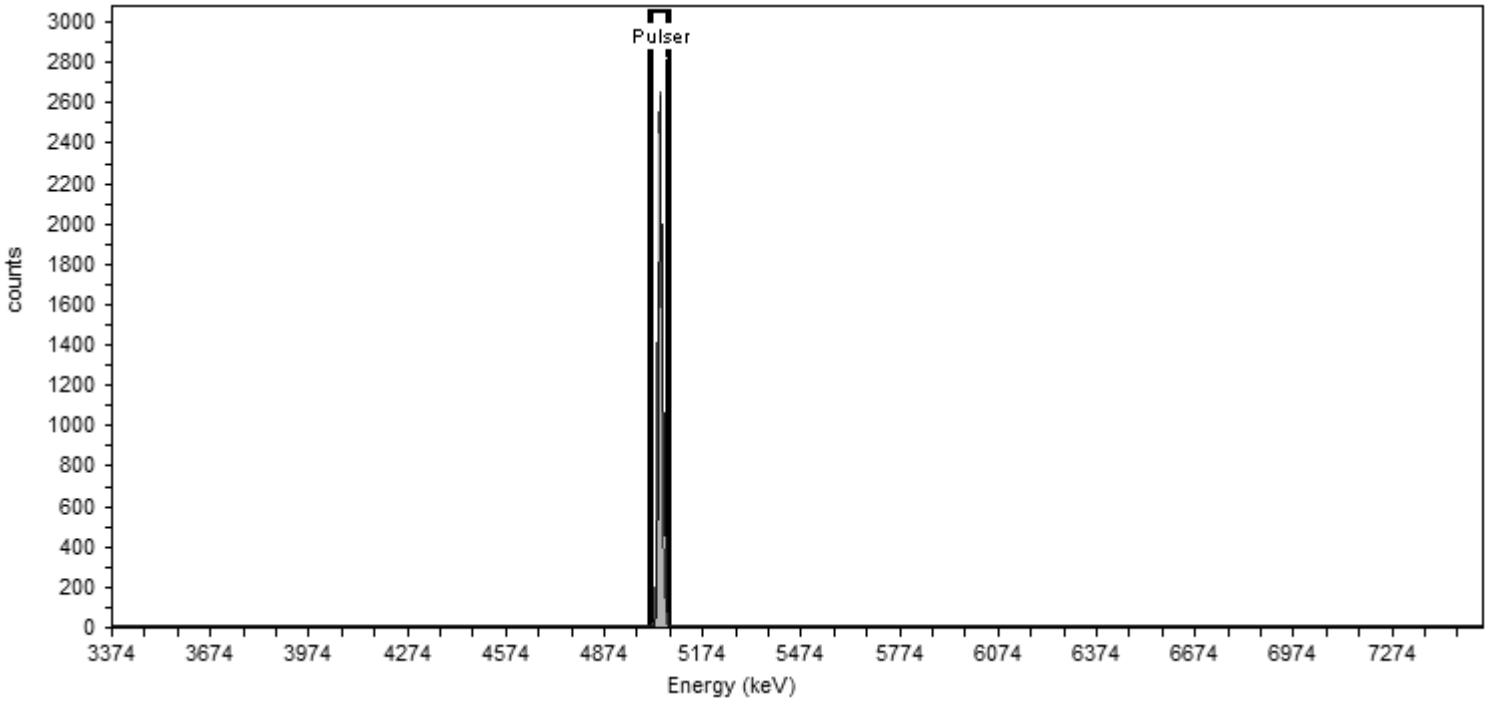
Batch Name: February2017c
Description:

Acquisition

Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 2/27/2017 10:09:28AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-7107;AV215-20161006a
Calibration Date: 10/7/2016 10:38:03AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



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	5045.645	5022.415	5068.875	13.65	5,199.39	6,020.85

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:34:27AM 2/27/2017

Sample

Sample Name: Pulser;AV216 Spectrum #2 Analysis #1
Comment:

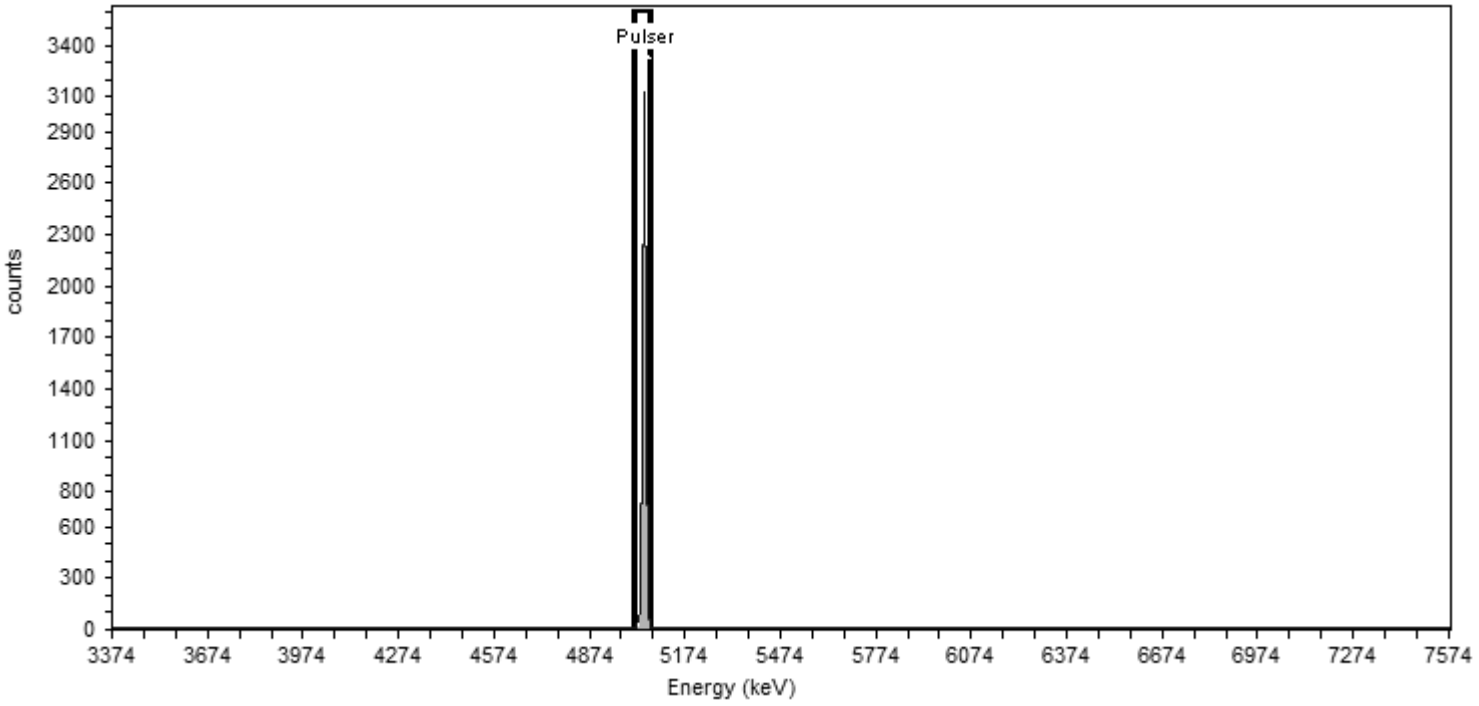
Batch

Batch Name: February2017c
Description:

Acquisition

Detector: AV216 , SN: 50-117J5
Acquisition Start Date: 2/27/2017 9:31:37AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8874;AV216-20161006a
Calibration Date: 10/7/2016 10:38:13AM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



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	5044.901	5022.096	5067.707	13.40	6,018.23	6,026.77

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:34:10AM 2/27/2017

Sample

Sample Name: Pulser;AV217 Spectrum #2 Analysis #1
Comment:

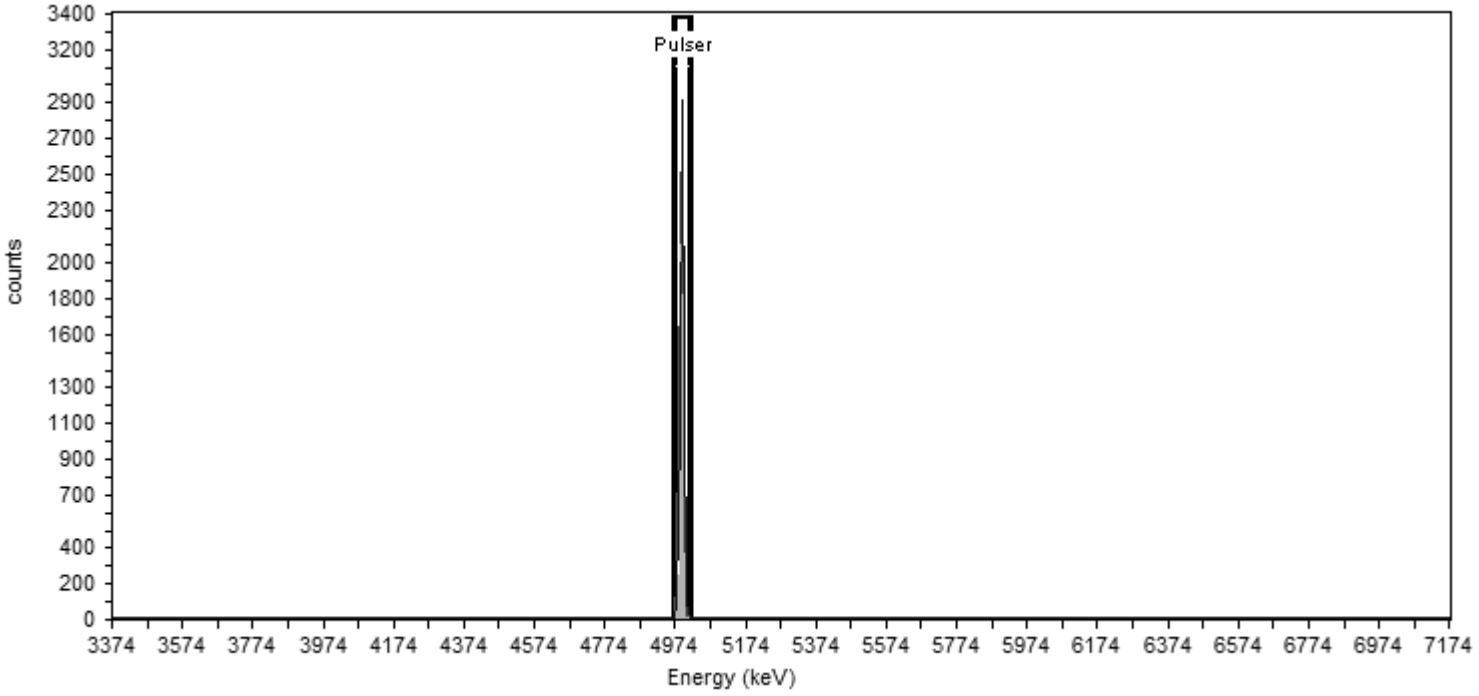
Batch

Batch Name: February2017c
Description:

Acquisition

Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 2/27/2017 9:31:37AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8875;AV217-20161006a
Calibration Date: 10/7/2016 10:38:18AM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



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	4993.052	4970.825	5015.280	13.06	5,460.45	5,799.61

Initial Calibrations

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:39:53PM 11/11/2016

Calibration

Sample Name: IC-9792;AV154-20161110
Description:
Detector: AV154

Analyst: 60040
Analysis Date: 11/11/2016 2:37:23PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

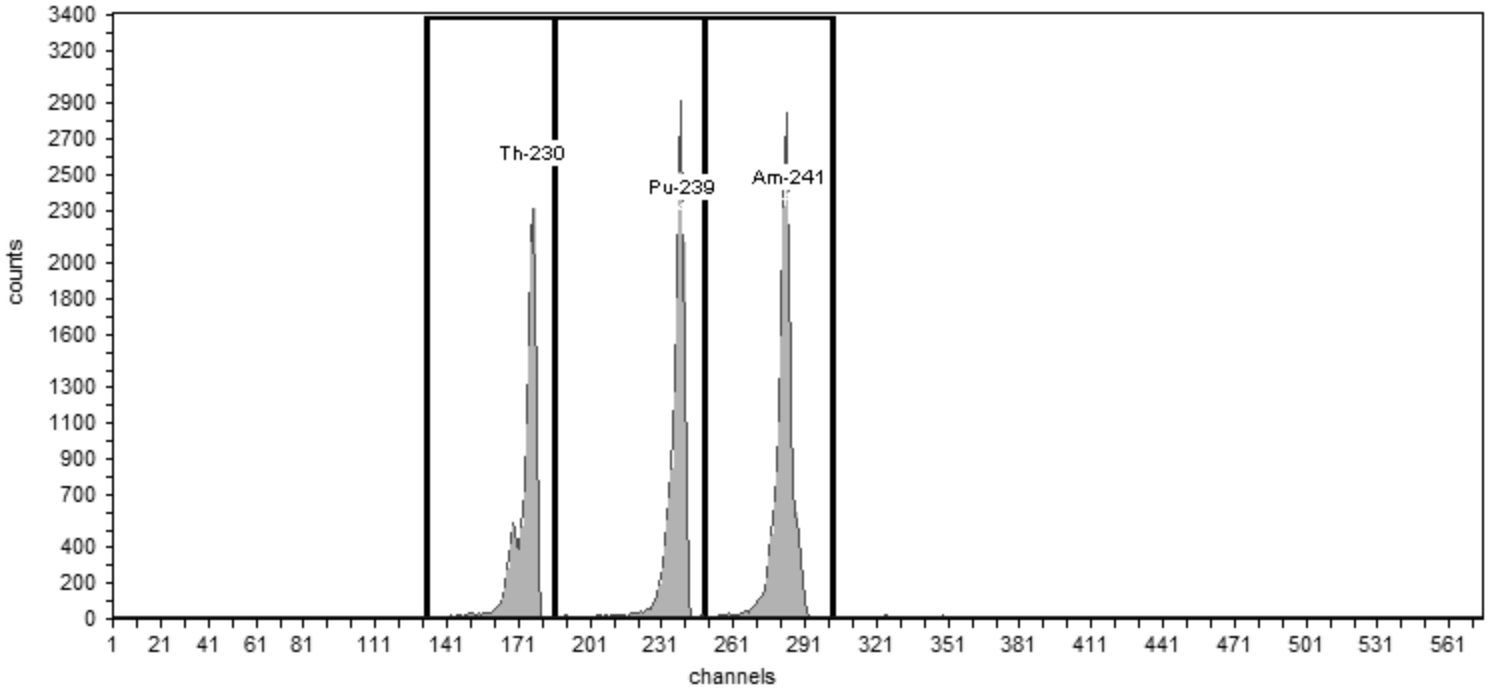
Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 11/10/2016 12:21:44PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9792;AV154-20161110

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.95% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.72	13,155.00	93.96
Pu-239	240	5,155.40	186	249	30.98	15,234.00	108.81
Am-241	284	5,485.70	249	303	30.55	17,074.00	121.96

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:11:40PM 12/1/2016

Calibration

Sample Name: IC-9792;AV207-20161201a
Description:
Detector: AV207

Analyst: 60040
Analysis Date: 12/1/2016 2:11:39PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

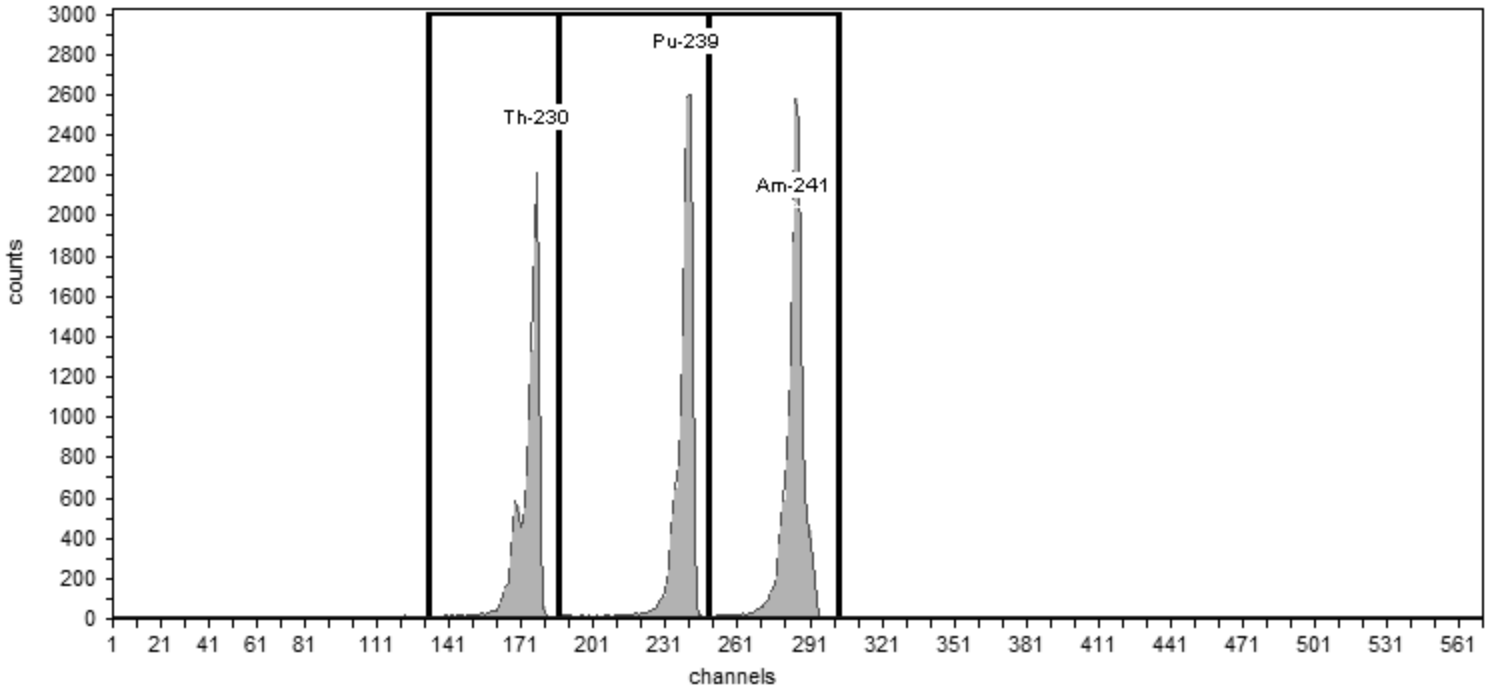
Detector: AV207 , SN: 50-117H6
Acquisition Start Date: 12/1/2016 11:41:46AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9792;AV207-20161201a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.05% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.12	13,360.00	95.43
Pu-239	240	5,155.40	186	249	33.34	15,179.00	108.42
Am-241	284	5,485.70	249	303	32.71	17,107.00	122.19

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:11:35PM 12/1/2016

Calibration

Sample Name: IC-9793;AV208-20161201a
Description:
Detector: AV208

Analyst: 60040
Analysis Date: 12/1/2016 2:11:34PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

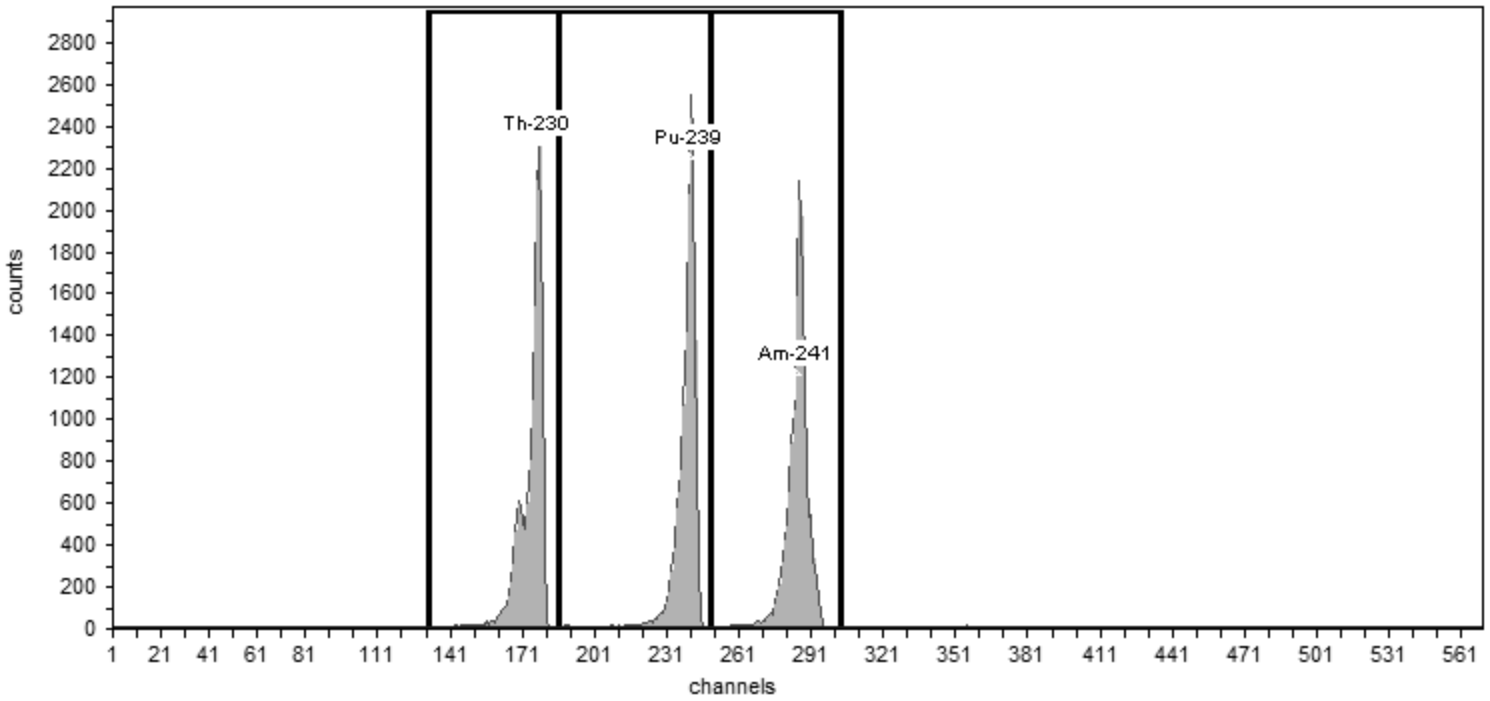
Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 12/1/2016 11:41:24AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency Calibration Name: IC-9793;AV208-20161201a

Efficiency: 25.68% +/- 0.32% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.86	14,250.00	101.79
Pu-239	240	5,155.40	186	249	33.57	14,693.00	104.95
Am-241	284	5,485.70	249	303	31.52	14,198.00	101.41

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:11:29PM 12/1/2016

Calibration

Sample Name: IC-9794;AV209-20161201a
Description:
Detector: AV209

Analyst: 60040
Analysis Date: 12/1/2016 2:11:28PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

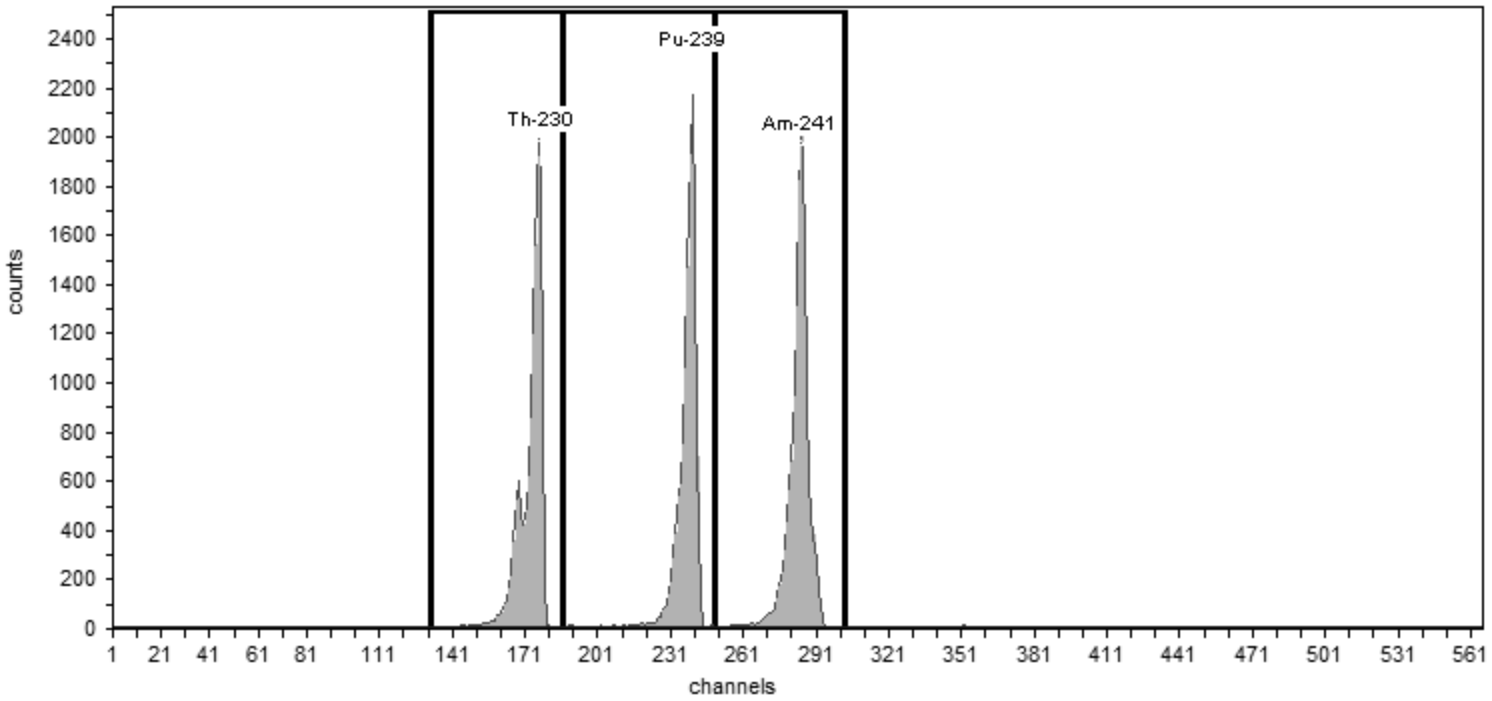
Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 12/1/2016 11:41:04AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9794;AV209-20161201a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.31% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.33	13,017.00	92.98
Pu-239	240	5,155.40	186	249	33.69	12,534.00	89.53
Am-241	284	5,485.70	249	303	33.99	13,759.00	98.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:38:09AM 10/7/2016

Calibration

Sample Name: IC-9886;AV214-20161006a
Description:
Detector: AV214

Analyst: 60040
Analysis Date: 10/7/2016 10:38:08AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82247-334
Prepared by: Analytics
Description:

Certification Date: 6/10/2010 12:00:00PM

Acquisition

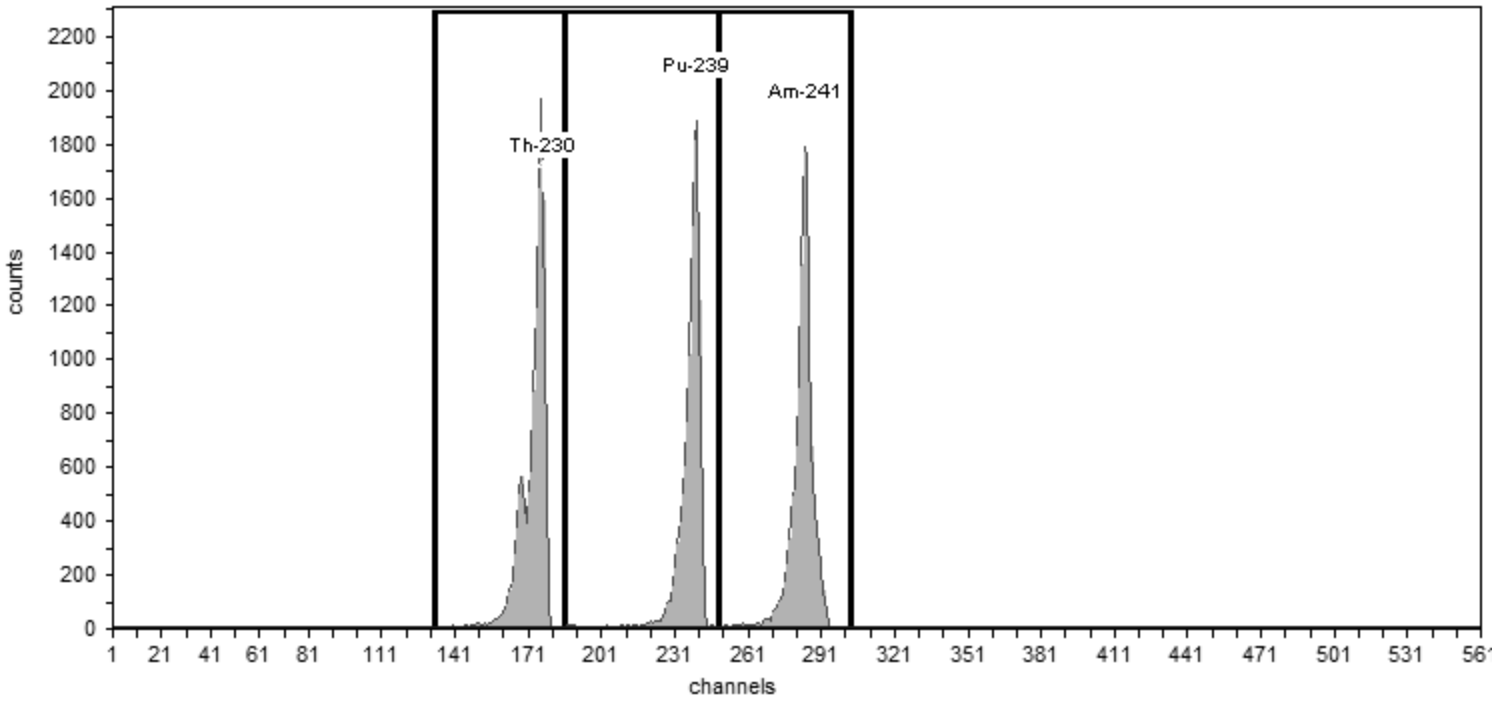
Detector: AV214 , SN: 50-112Z7
Acquisition Start Date: 10/6/2016 3:54:12PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency Calibration Name: IC-9886;AV214-20161006a

Efficiency: 23.55% +/- 0.32% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.83	12,359.00	88.28
Pu-239	240	5,155.40	186	249	34.43	11,437.00	81.69
Am-241	284	5,485.70	249	303	33.81	12,265.00	87.61

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:38:04AM 10/7/2016

Calibration

Sample Name: IC-7107;AV215-20161006a
Description:
Detector: AV215

Analyst: 60040
Analysis Date: 10/7/2016 10:38:03AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

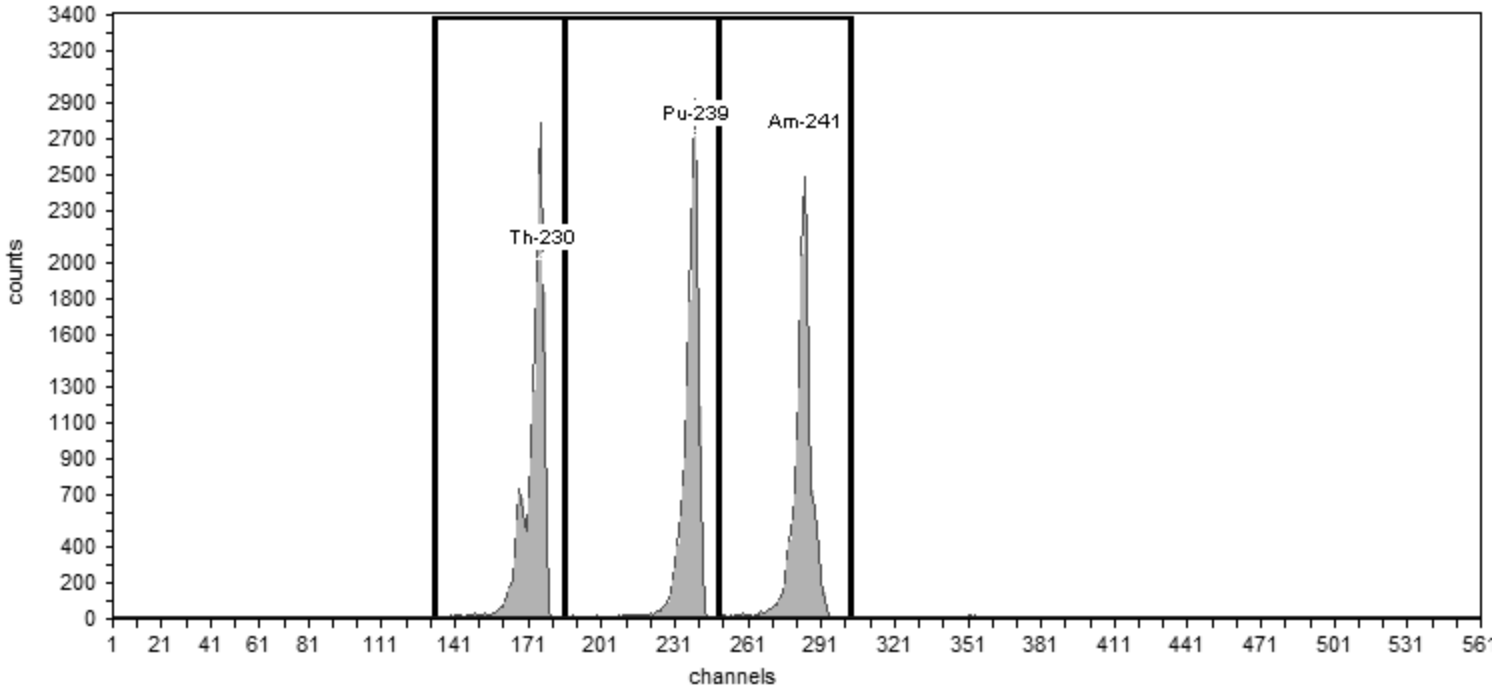
Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 10/6/2016 3:54:33PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-7107;AV215-20161006a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.46% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.97	16,737.00	119.55
Pu-239	240	5,155.40	186	249	33.47	16,425.00	117.32
Am-241	284	5,485.70	249	303	31.26	15,750.00	112.50

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:38:14AM 10/7/2016

Calibration

Sample Name: IC-8874;AV216-20161006a
Description:
Detector: AV216

Analyst: 60040
Analysis Date: 10/7/2016 10:38:13AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

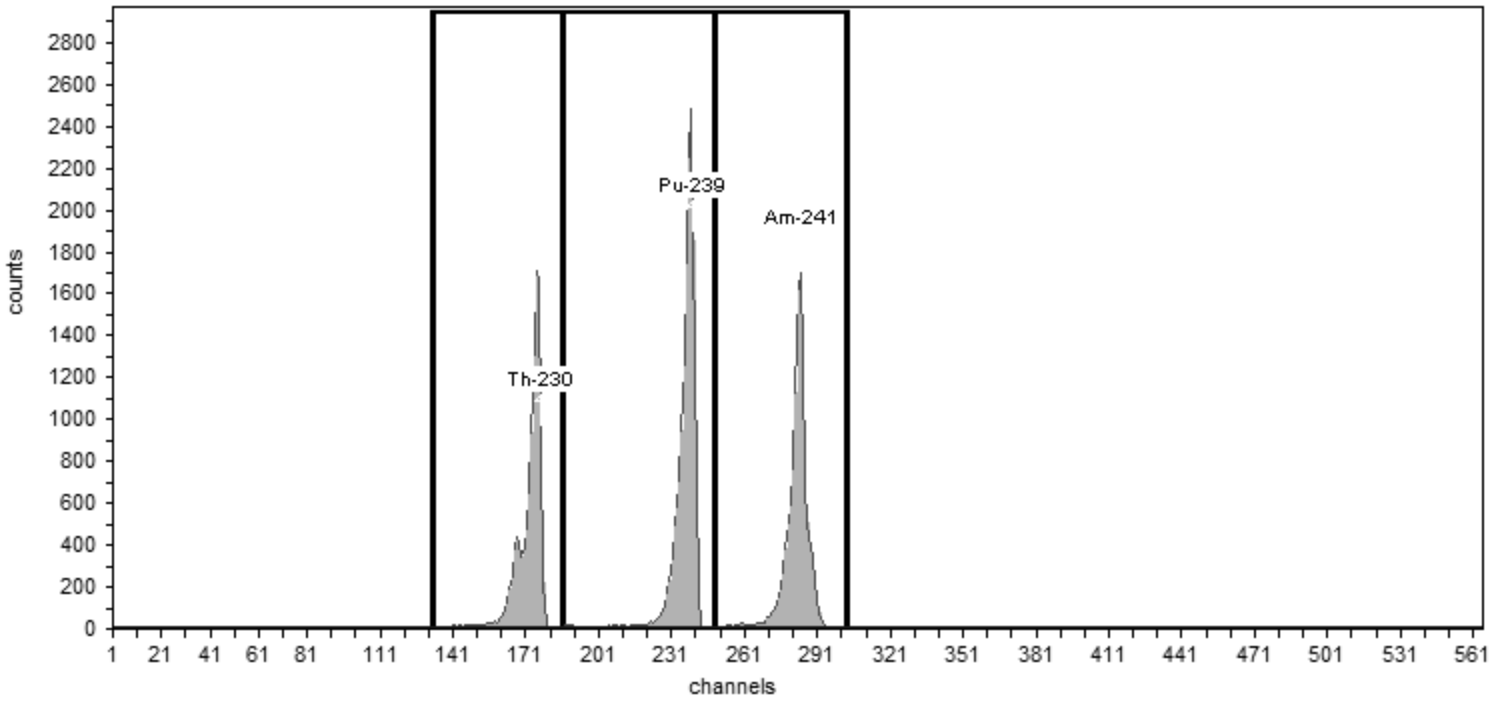
Detector: AV216 , SN: 50-117J5
Acquisition Start Date: 10/6/2016 3:54:52PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency Calibration Name: IC-8874;AV216-20161006a

Efficiency: 27.15% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.57	10,761.00	76.86
Pu-239	240	5,155.40	186	249	34.25	14,440.00	103.14
Am-241	284	5,485.70	249	303	33.50	11,477.00	81.98

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:38:20AM 10/7/2016

Calibration

Sample Name: IC-8875;AV217-20161006a
Description:
Detector: AV217

Analyst: 60040
Analysis Date: 10/7/2016 10:38:18AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

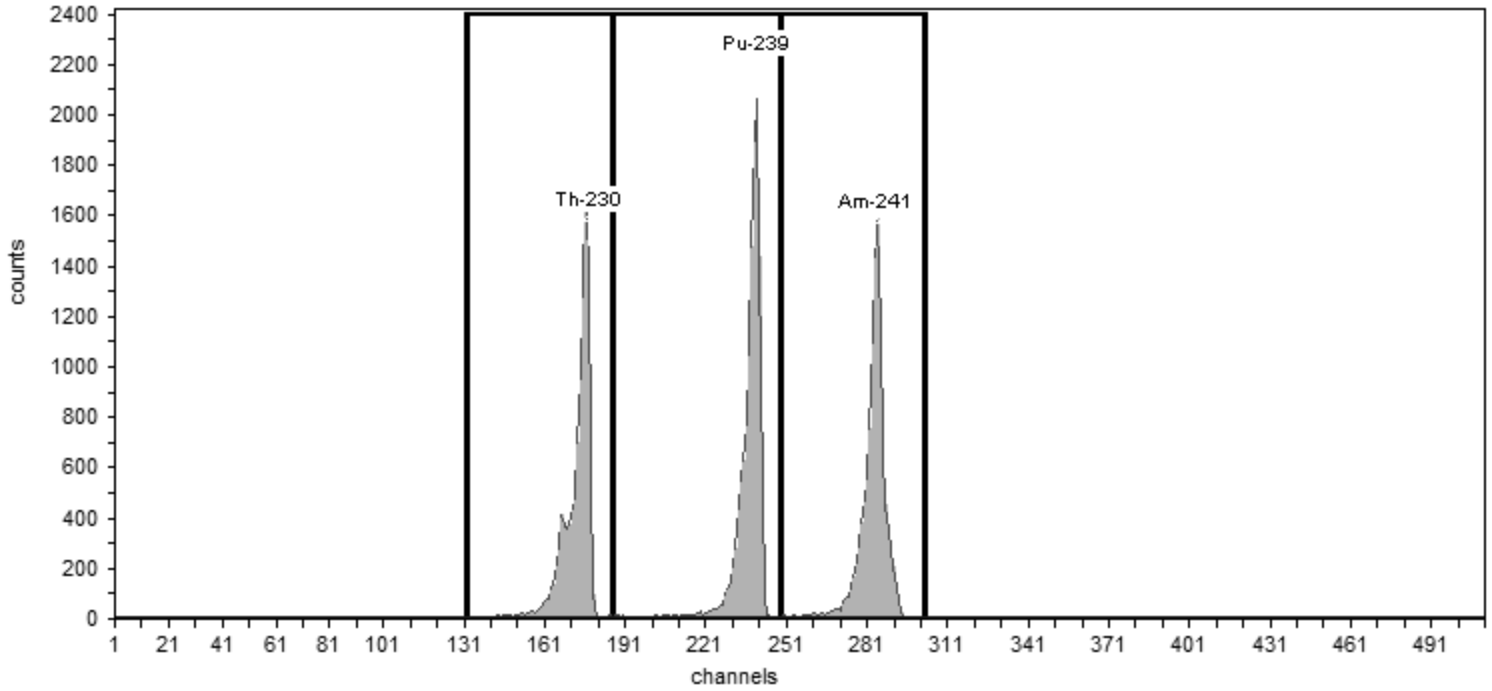
Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 10/6/2016 3:55:09PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8875;AV217-20161006a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.83% +/- 0.33% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.44	10,263.00	73.31
Pu-239	240	5,155.40	186	249	33.27	12,063.00	86.16
Am-241	284	5,485.70	249	303	34.41	10,797.00	77.12

Initial Calibration Verifications

Alpha Spectroscopy Calibration Summary

Detector: AV154

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-279042/1	11/10/16 12:21	82240-334_00001	0.2495	0.20-0.32		
ICV 160-284329/1	12/16/16 08:41	82232-334_00001	0.2545	0.20-0.32	102.0	95-105
CCV 160-293975/1	02/21/17 08:25	82240-334_00001	0.2492	0.20-0.32	99.9	95-105

Detector: AV207

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-281977/1	12/01/16 11:41	82240-334_00001	0.2505	0.20-0.32		
ICV 160-284128/1	12/06/16 14:58	82232-334_00001	0.2596	0.20-0.32	103.6	95-105
CCV 160-294017/1	02/21/17 13:07	82240-334_00001	0.2516	0.20-0.32	100.4	95-105

Detector: AV208

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-281978/1	12/01/16 11:41	82241-334_00001	0.2568	0.20-0.32		
ICV 160-284129/1	12/06/16 14:57	82246-334_00001	0.2583	0.20-0.32	100.6	95-105
CCV 160-294018/1	02/21/17 13:07	82241-334_00001	0.2530	0.20-0.32	98.5	95-105

Detector: AV209

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-281979/1	12/01/16 11:41	82242-334_00001	0.2331	0.20-0.32		
ICV 160-284130/1	12/06/16 14:58	82237-334_00003	0.2402	0.20-0.32	103.1	95-105
CCV 160-294019/1	02/21/17 13:13	82242-334_00001	0.2283	0.20-0.32	98.0	95-105

Detector: AV214

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-273881/1	10/06/16 15:54	82247-334_00001	0.2355	0.20-0.32		
ICV 160-274599/1	10/12/16 16:02	82235-334_00001	0.2358	0.20-0.32	100.2	95-105
CCV 160-294021/1	02/21/17 13:08	82247-334_00001	0.2310	0.20-0.32	98.1	95-105

Detector: AV215

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-273882/1	10/06/16 15:54	82232-334_00001	0.2646	0.20-0.32		
ICV 160-274588/1	10/11/16 15:45	82240-334_00001	0.2553	0.20-0.32	96.5	95-105
CCV 160-294022/1	02/21/17 14:23	82232-334_00001	0.2617	0.20-0.32	98.9	95-105

Detector: AV216

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-273883/1	10/06/16 15:54	82233-334_00001	0.2715	0.20-0.32		
ICV 160-274589/1	10/11/16 15:43	82243-334_00001	0.2670	0.20-0.32	98.3	95-105
CCV 160-294023/1	02/21/17 14:23	82233-334_00001	0.2679	0.20-0.32	98.7	95-105

Detector: AV217

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-273884/1	10/06/16 15:55	82234-334_00001	0.2283	0.20-0.32		
ICV 160-274590/1	10/11/16 15:44	82247-334_00001	0.2302	0.20-0.32	100.8	95-105
CCV 160-294024/1	02/21/17 14:24	82234-334_00001	0.2232	0.20-0.32	97.8	95-105

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:49:20AM 12/16/2016

Calibration

Sample Name: ICV-7107;AV154-20161216
Description:
Detector: AV154

Analyst: 60040
Analysis Date: 12/16/2016 9:49:19AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

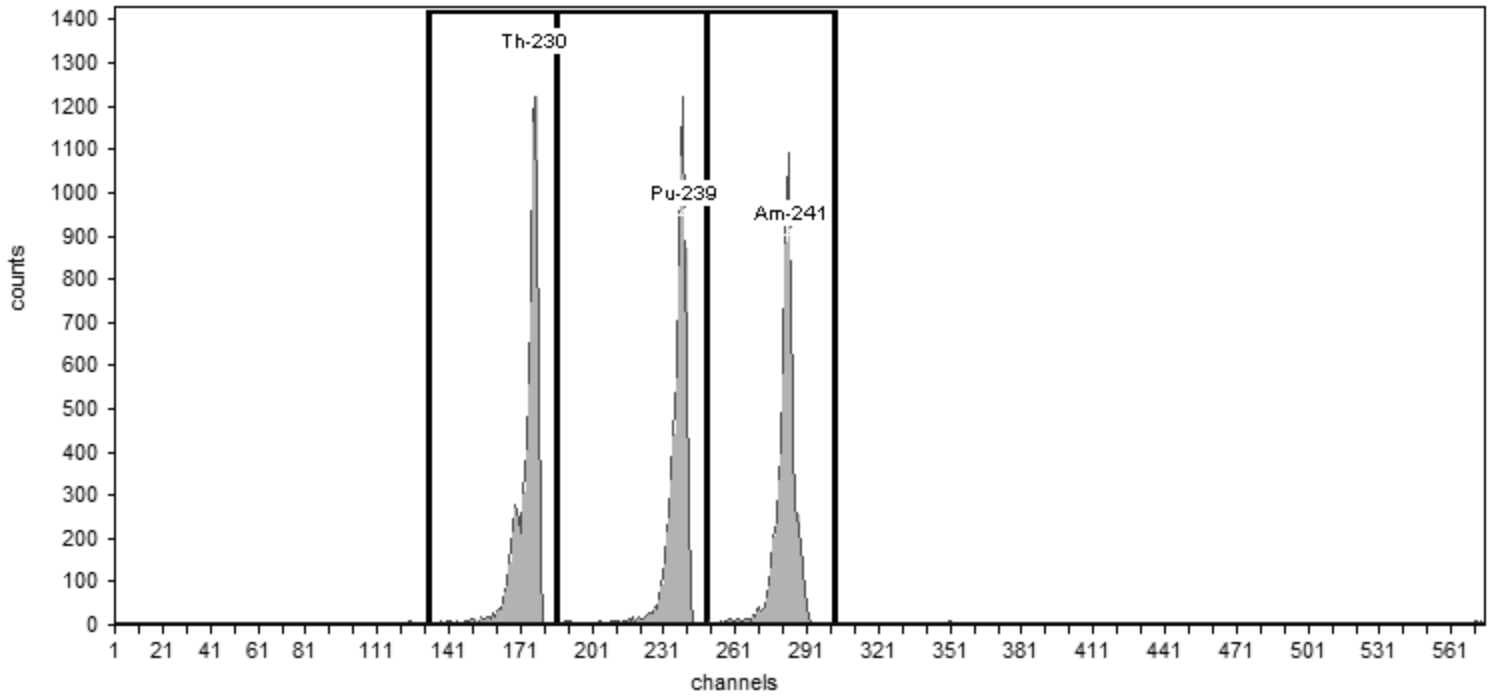
Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 12/16/2016 8:41:13AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency Calibration Name: ICV-7107;AV154-2016121

Efficiency: 25.45% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.08	6,941.00	115.68
Pu-239	240	5,155.40	186	249	31.97	6,742.00	112.37
Am-241	284	5,485.70	249	303	28.93	6,470.00	107.83

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:28:10PM 12/15/2016

Calibration

Sample Name: ICV-7107;AV207-20161206
Description:
Detector: AV207

Analyst: 60040
Analysis Date: 12/15/2016 2:19:42PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

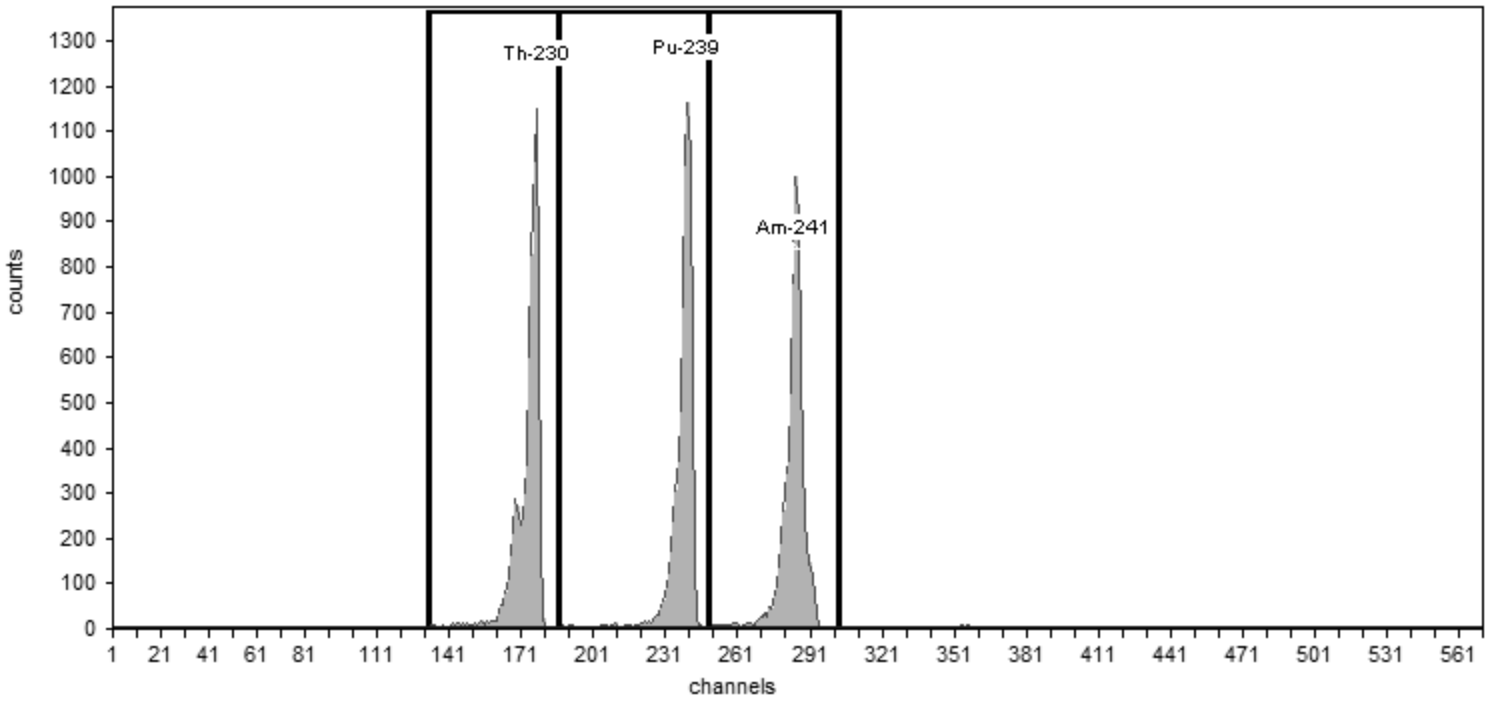
Detector: AV207 , SN: 50-117H6
Acquisition Start Date: 12/6/2016 2:58:44PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-7107;AV207-2016120

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.96% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.71	7,080.00	118.00
Pu-239	240	5,155.40	186	249	33.58	6,765.00	112.75
Am-241	284	5,485.70	249	303	34.03	6,697.00	111.62

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:28:13PM 12/15/2016

Calibration

Sample Name: ICV-9885;AV208-20161206
Description:
Detector: AV208

Analyst: 60040
Analysis Date: 12/15/2016 2:19:53PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

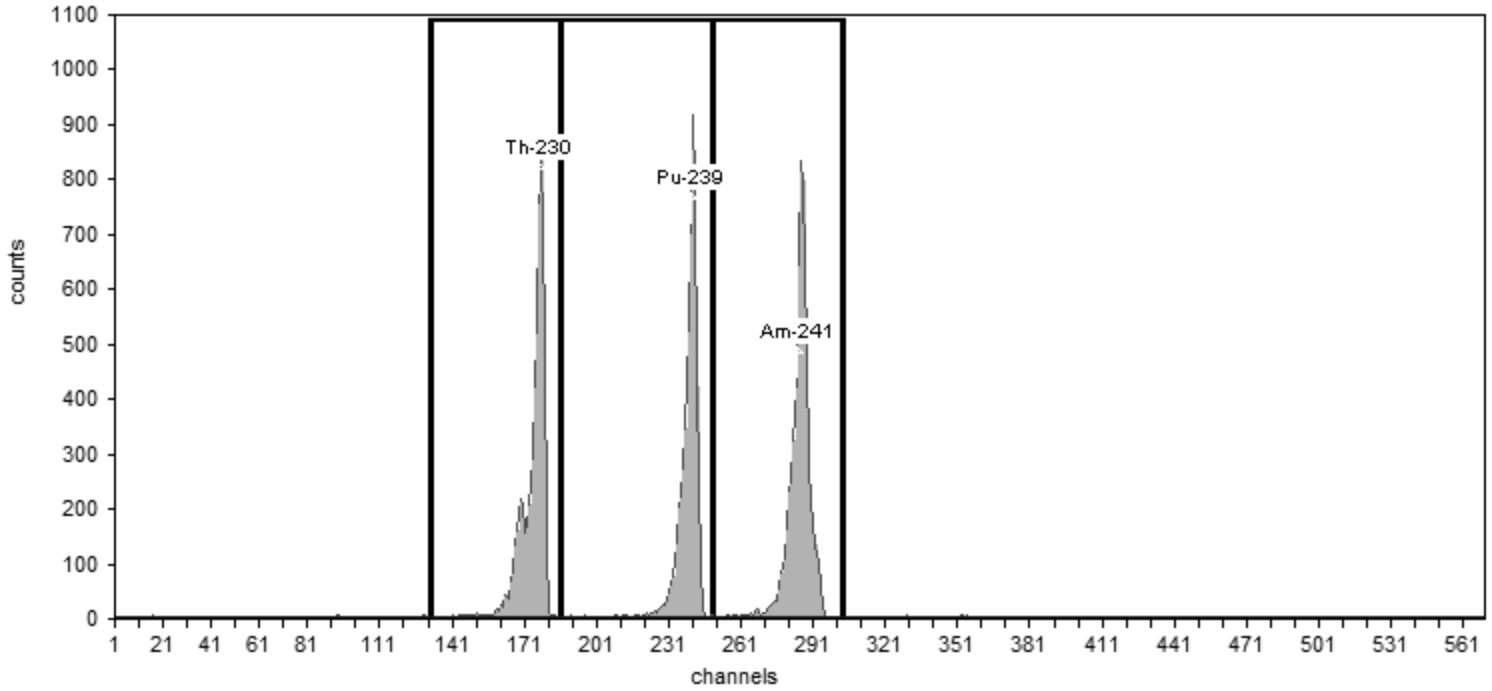
Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 12/6/2016 2:57:20PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9885;AV208-2016120

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.83% +/- 0.49% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.67	5,119.00	85.32
Pu-239	240	5,155.40	186	249	31.75	4,991.00	83.18
Am-241	284	5,485.70	249	303	32.76	5,576.00	92.93

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:28:16PM 12/15/2016

Calibration

Sample Name: ICV-9520;AV209-20161206
Description:
Detector: AV209

Analyst: 60040
Analysis Date: 12/15/2016 2:20:03PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

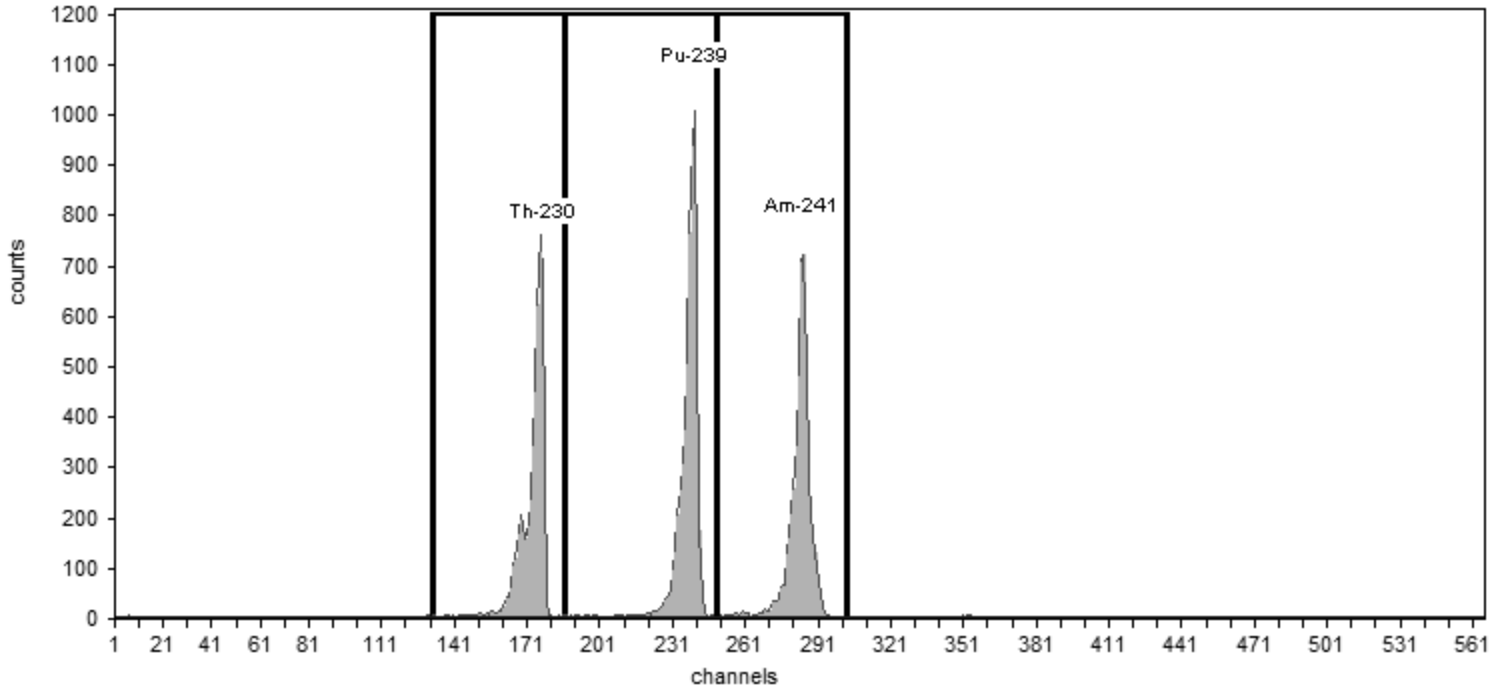
Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 12/6/2016 2:58:59PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9520;AV209-2016120

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.02% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.15	4,844.00	80.73
Pu-239	240	5,155.40	186	249	32.05	5,755.00	95.92
Am-241	284	5,485.70	249	303	33.66	4,837.00	80.62

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:08:43AM 10/13/2016

Calibration

Sample Name: ICV-8876;AV214-20161012
Description:
Detector: AV214

Analyst: 60040
Analysis Date: 10/13/2016 9:08:41AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

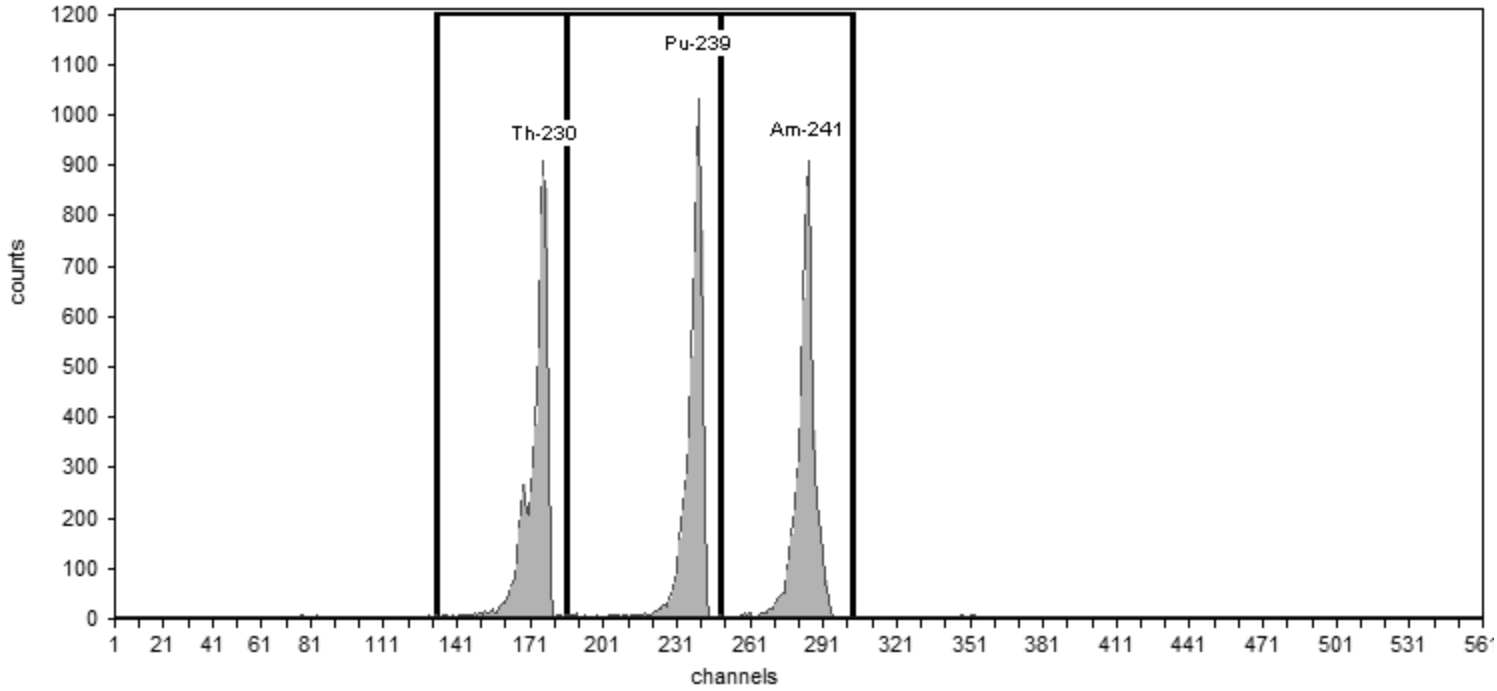
Detector: AV214 , SN: 50-112Z7
Acquisition Start Date: 10/12/2016 4:02:21PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8876;AV214-2016101

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.58% +/- 0.39% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.70	6,061.00	101.02
Pu-239	240	5,155.40	186	249	33.55	5,990.00	99.83
Am-241	284	5,485.70	249	303	34.56	6,177.00	102.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:39:18AM 10/12/2016

Calibration

Sample Name: ICV-9792;AV215-20161011
Description:
Detector: AV215

Analyst: 60040
Analysis Date: 10/12/2016 10:39:17AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

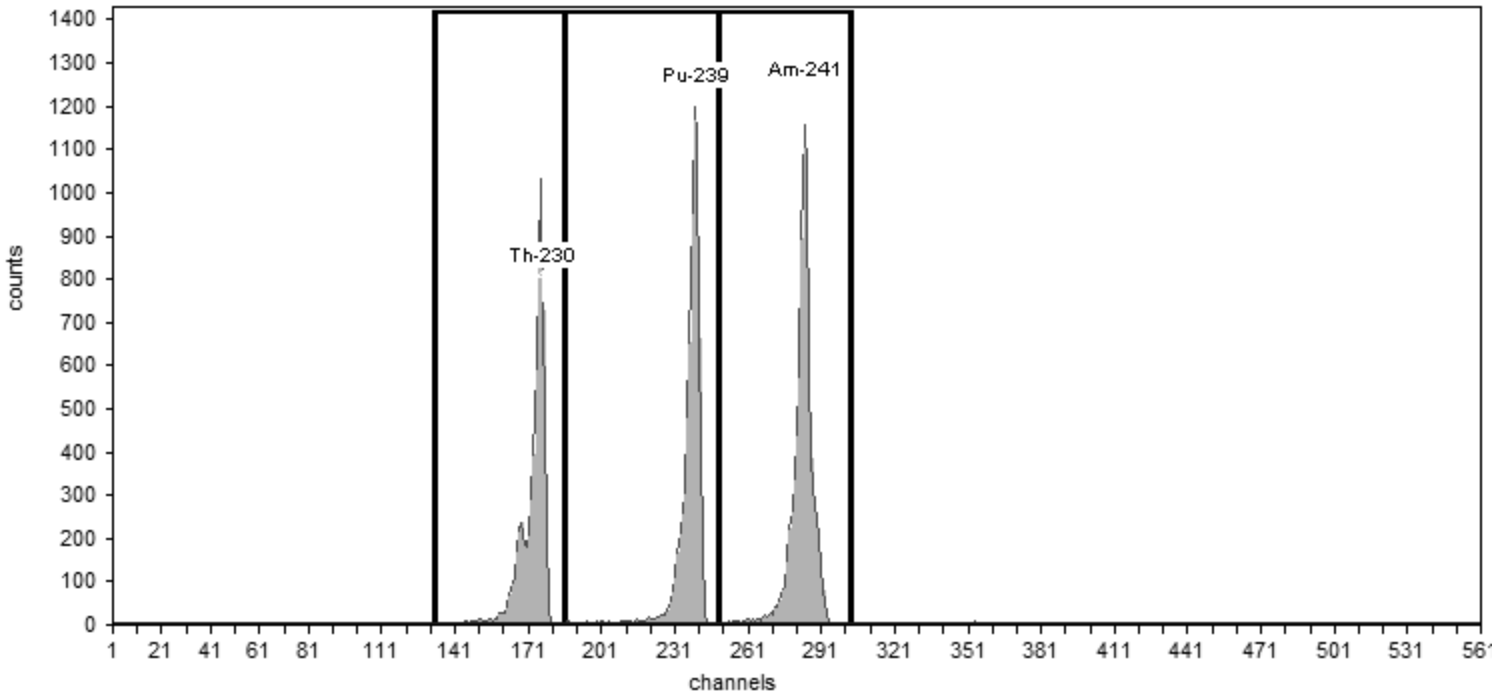
Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 10/11/2016 3:45:47PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency Calibration Name: ICV-9792;AV215-2016101

Efficiency: 25.53% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.24	5,771.00	96.18
Pu-239	240	5,155.40	186	249	32.91	6,684.00	111.40
Am-241	284	5,485.70	249	303	30.52	7,481.00	124.68

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:38:48AM 10/12/2016

Calibration

Sample Name: ICV-9795;AV216-20161011
Description:
Detector: AV216

Analyst: 60040
Analysis Date: 10/12/2016 10:38:47AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

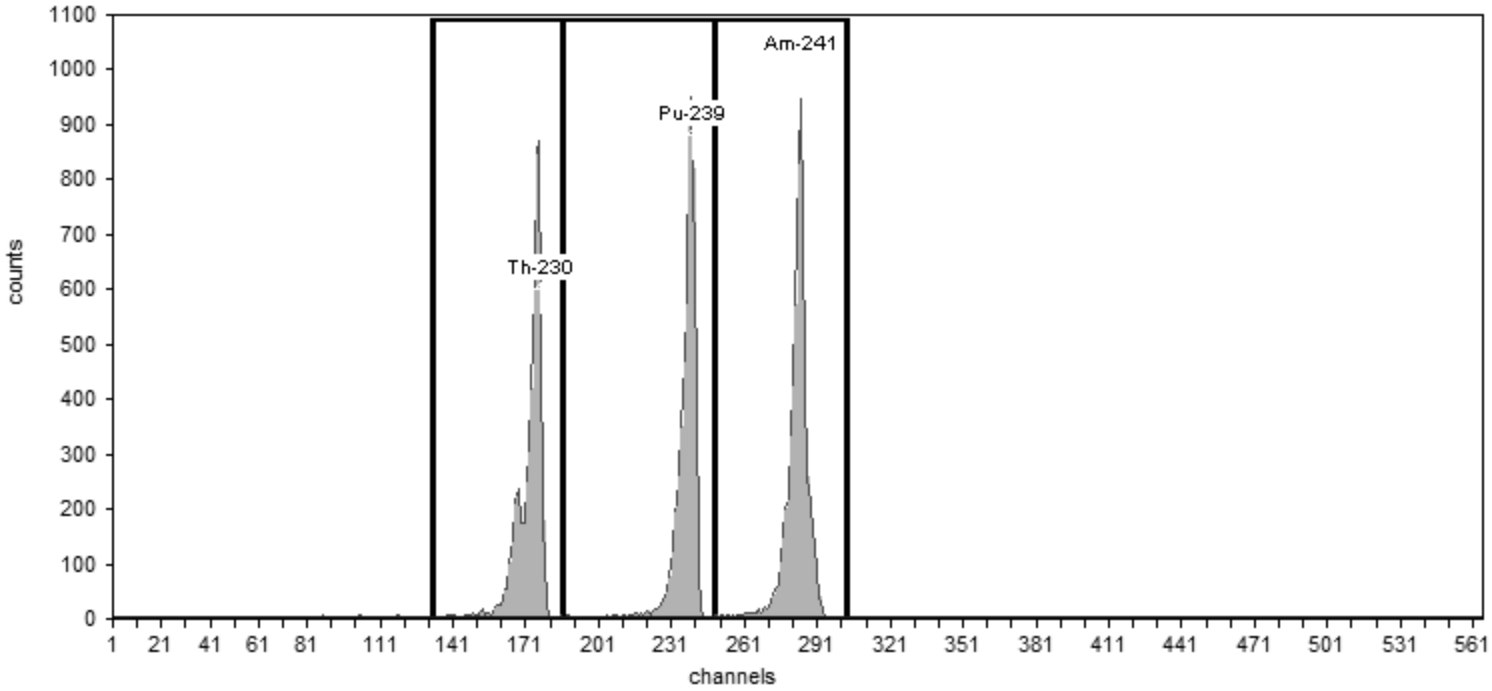
Detector: AV216 , SN: 50-117J5
Acquisition Start Date: 10/11/2016 3:43:55PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9795;AV216-2016101

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.70% +/- 0.46% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.18	5,586.00	93.10
Pu-239	240	5,155.40	186	249	36.01	5,723.00	95.38
Am-241	284	5,485.70	249	303	33.78	6,154.00	102.57

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:38:55AM 10/12/2016

Calibration

Sample Name: ICV-9886;AV217-20161011
Description:
Detector: AV217

Analyst: 60040
Analysis Date: 10/12/2016 10:38:54AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82247-334
Prepared by: Analytics
Description:

Certification Date: 6/10/2010 12:00:00PM

Acquisition

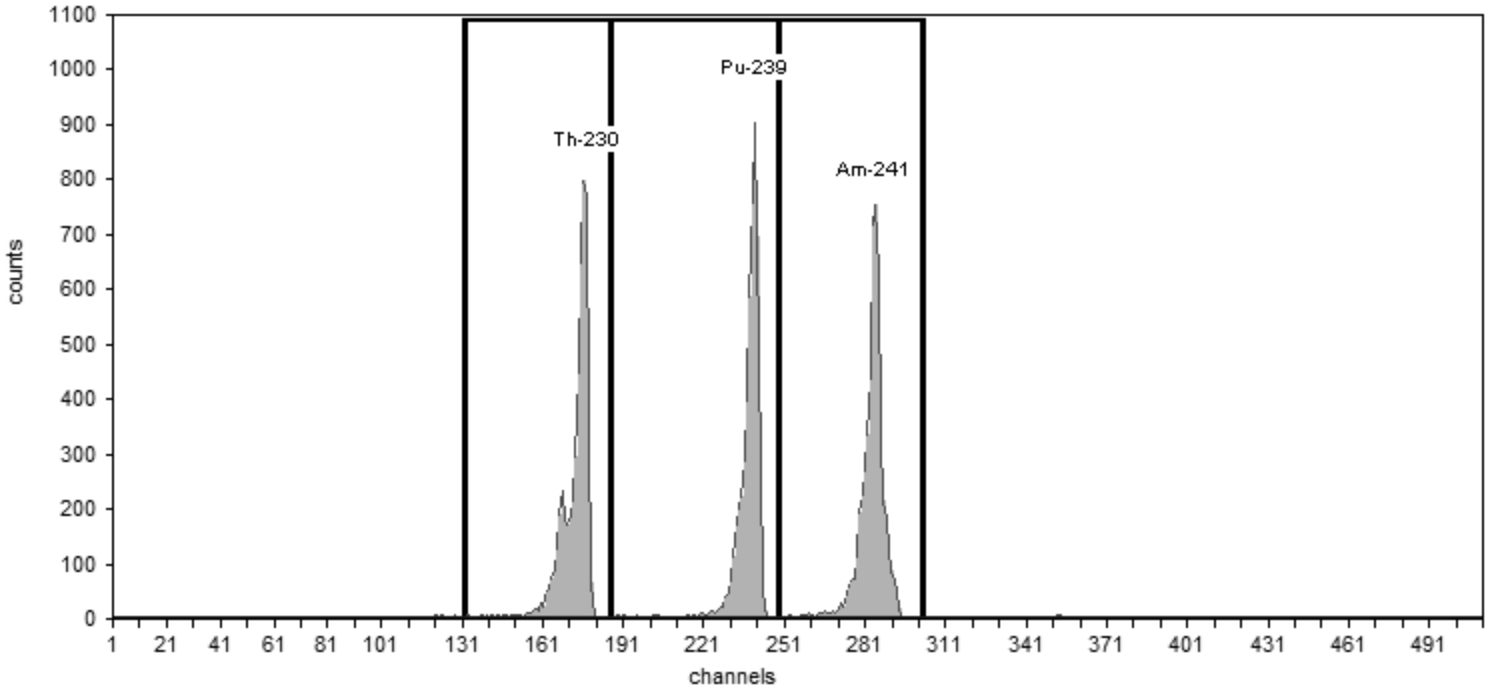
Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 10/11/2016 3:44:15PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9886;AV217-2016101

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.02% +/- 0.43% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.43	5,069.00	84.48
Pu-239	240	5,155.40	186	249	31.88	4,952.00	82.53
Am-241	284	5,485.70	249	303	33.02	5,101.00	85.02

Monthly Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:15:07AM 2/21/2017

Calibration

Sample Name: CCV-9792;AV154-20170221
Description:
Detector: AV154

Analyst: 60040
Analysis Date: 2/21/2017 10:15:06AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

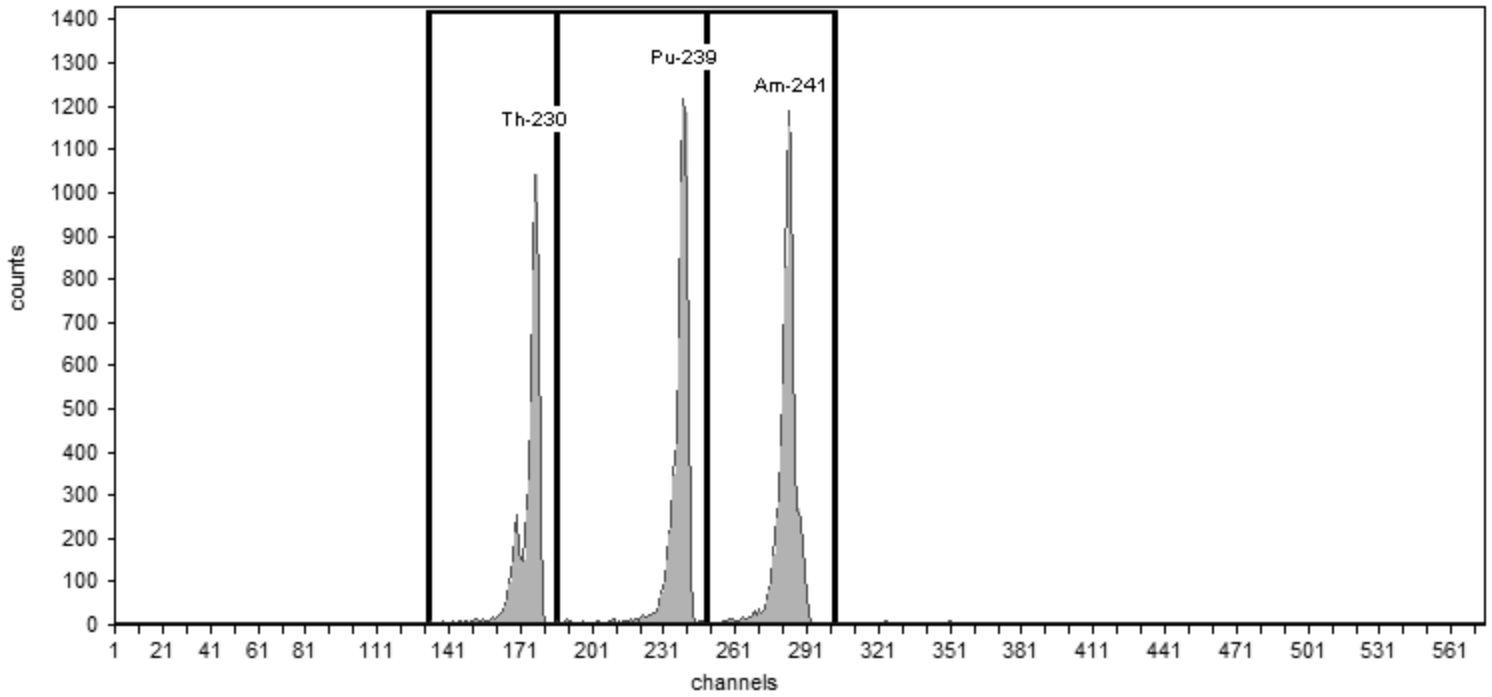
Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 2/21/2017 8:25:49AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency Calibration Name: CCV-9792;AV154-201702

Efficiency: 24.92% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	26.03	5,512.00	91.87
Pu-239	240	5,155.40	186	249	31.55	6,679.00	111.32
Am-241	284	5,485.70	249	303	31.07	7,274.00	121.23

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:12:51PM 2/21/2017

Calibration

Sample Name: CCV-9792;AV207-20170221
Description:
Detector: AV207

Analyst: 60040
Analysis Date: 2/21/2017 2:12:50PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

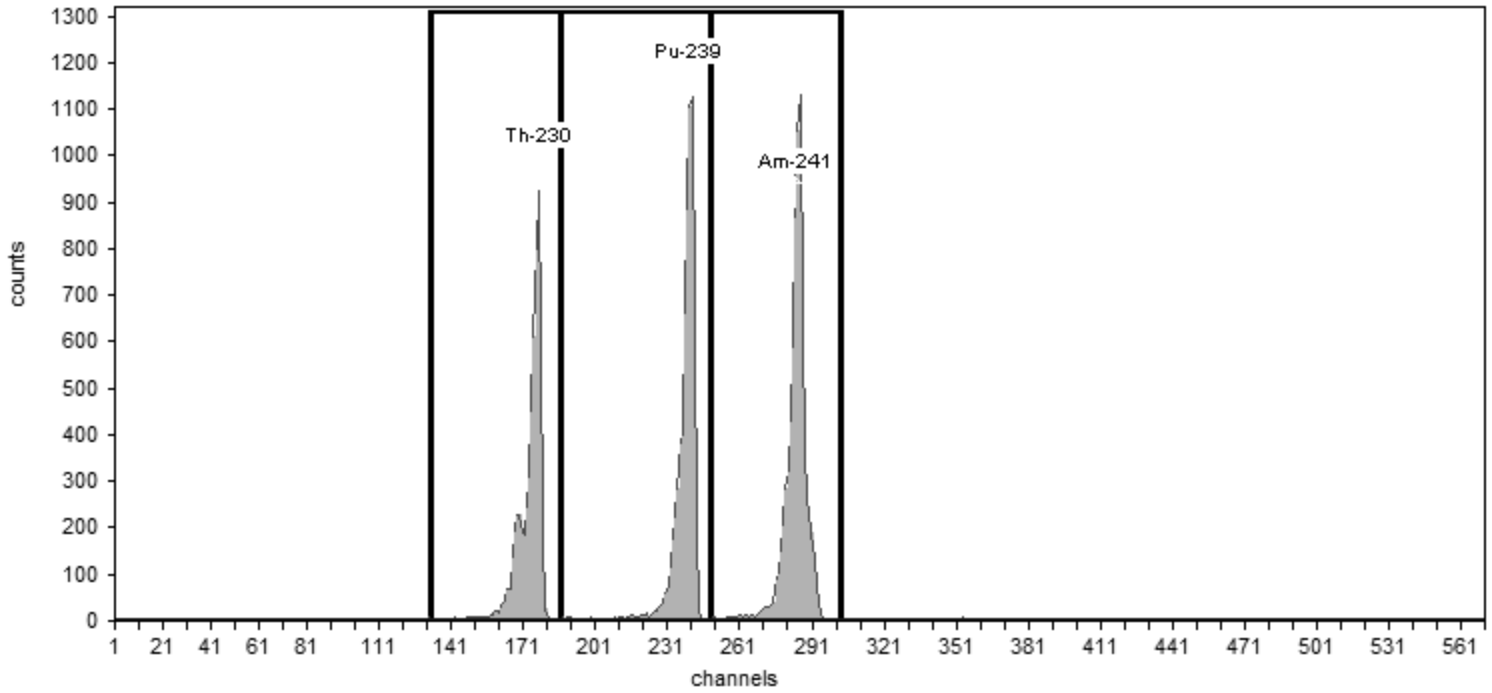
Detector: AV207 , SN: 50-117H6
Acquisition Start Date: 2/21/2017 1:07:26PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9792;AV207-201702

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.16% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.89	5,645.00	94.08
Pu-239	240	5,155.40	186	249	33.84	6,579.00	109.65
Am-241	284	5,485.70	249	303	32.60	7,412.00	123.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:12:57PM 2/21/2017

Calibration

Sample Name: CCV-9793;AV208-20170221
Description:
Detector: AV208

Analyst: 60040
Analysis Date: 2/21/2017 2:12:56PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

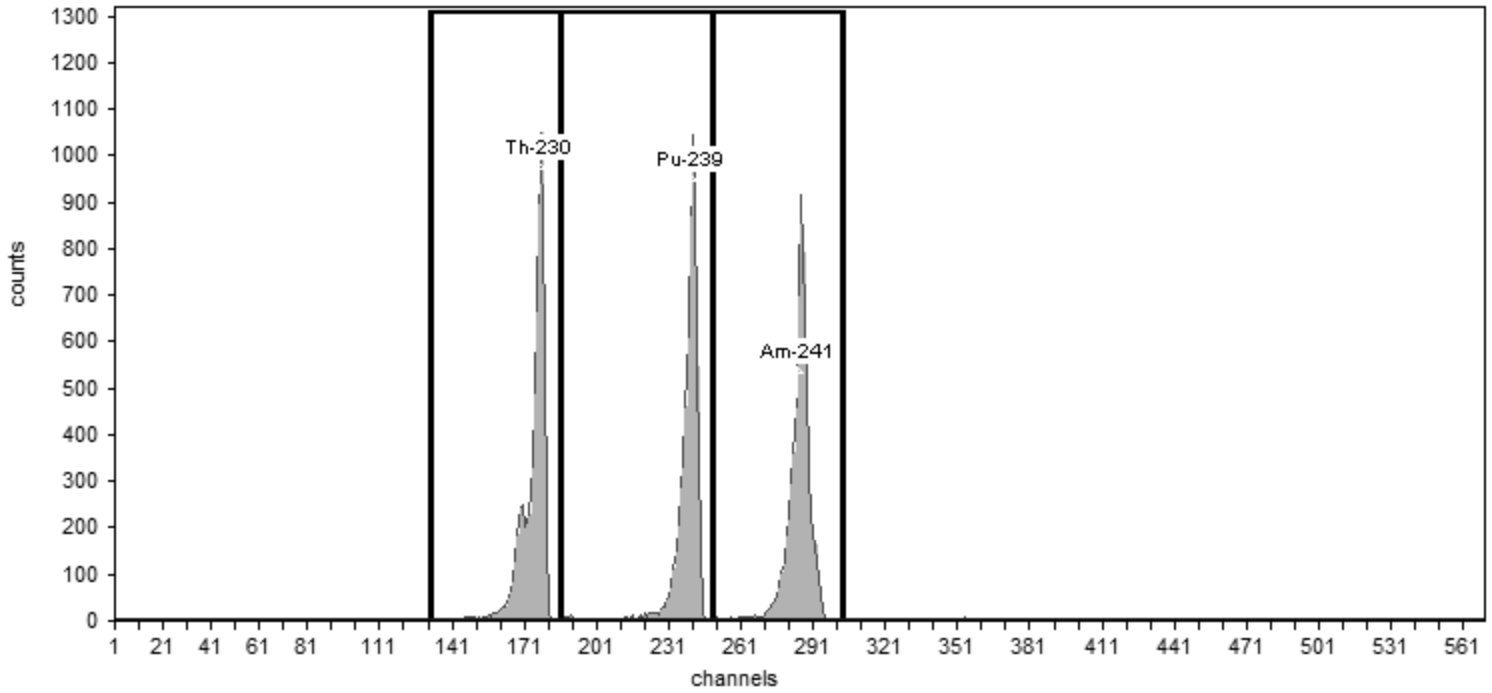
Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 2/21/2017 1:07:50PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9793;AV208-201702

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.30% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.87	6,061.00	101.02
Pu-239	240	5,155.40	186	249	34.50	6,123.00	102.05
Am-241	284	5,485.70	249	303	32.21	6,031.00	100.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:13:27PM 2/21/2017

Calibration

Sample Name: CCV-9794;AV209-20170221a
Description:
Detector: AV209

Analyst: 60040
Analysis Date: 2/21/2017 2:13:26PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

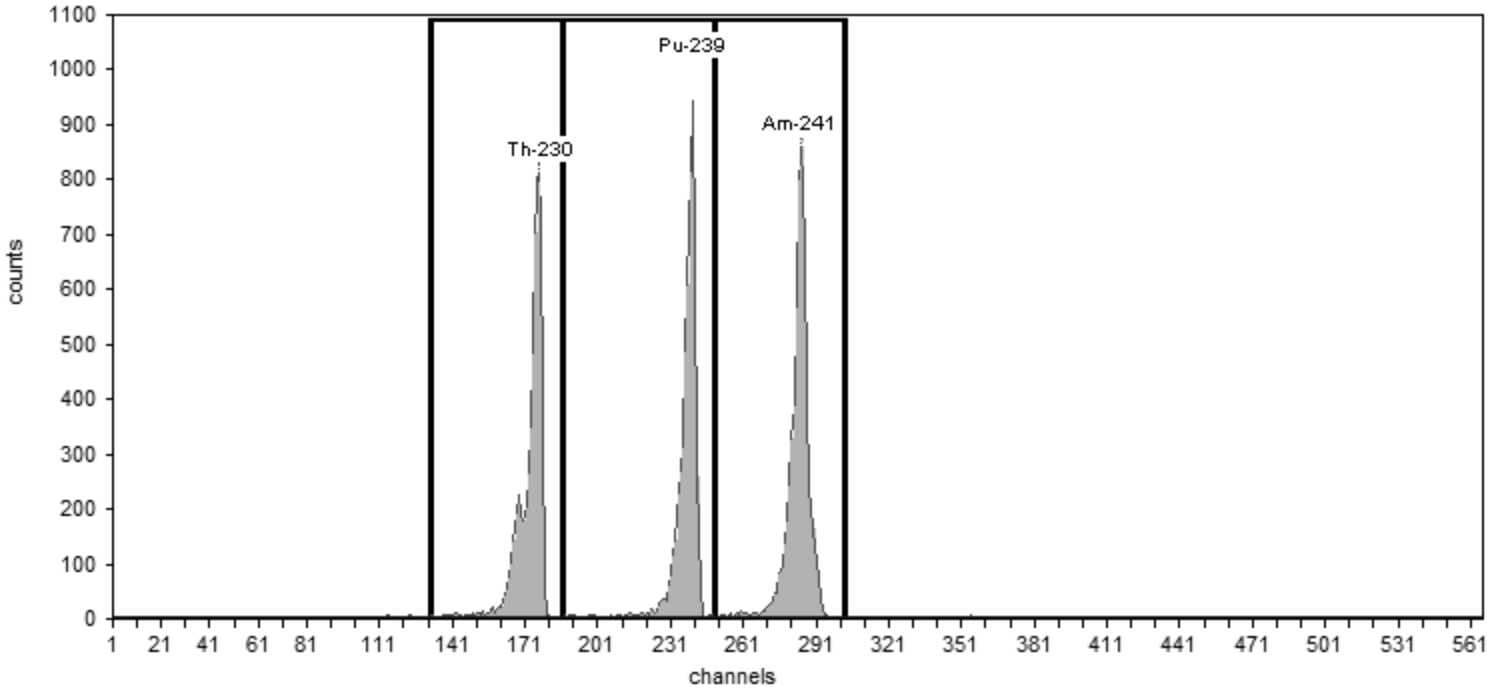
Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 2/21/2017 1:13:20PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9794;AV209-201702

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 22.83% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.82	5,371.00	89.52
Pu-239	240	5,155.40	186	249	33.87	5,271.00	87.85
Am-241	284	5,485.70	249	303	34.20	5,857.00	97.62

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:13:15PM 2/21/2017

Calibration

Sample Name: CCV-9886;AV214-20170221
Description:
Detector: AV214

Analyst: 60040
Analysis Date: 2/21/2017 2:13:14PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82247-334
Prepared by: Analytics
Description:

Certification Date: 6/10/2010 12:00:00PM

Acquisition

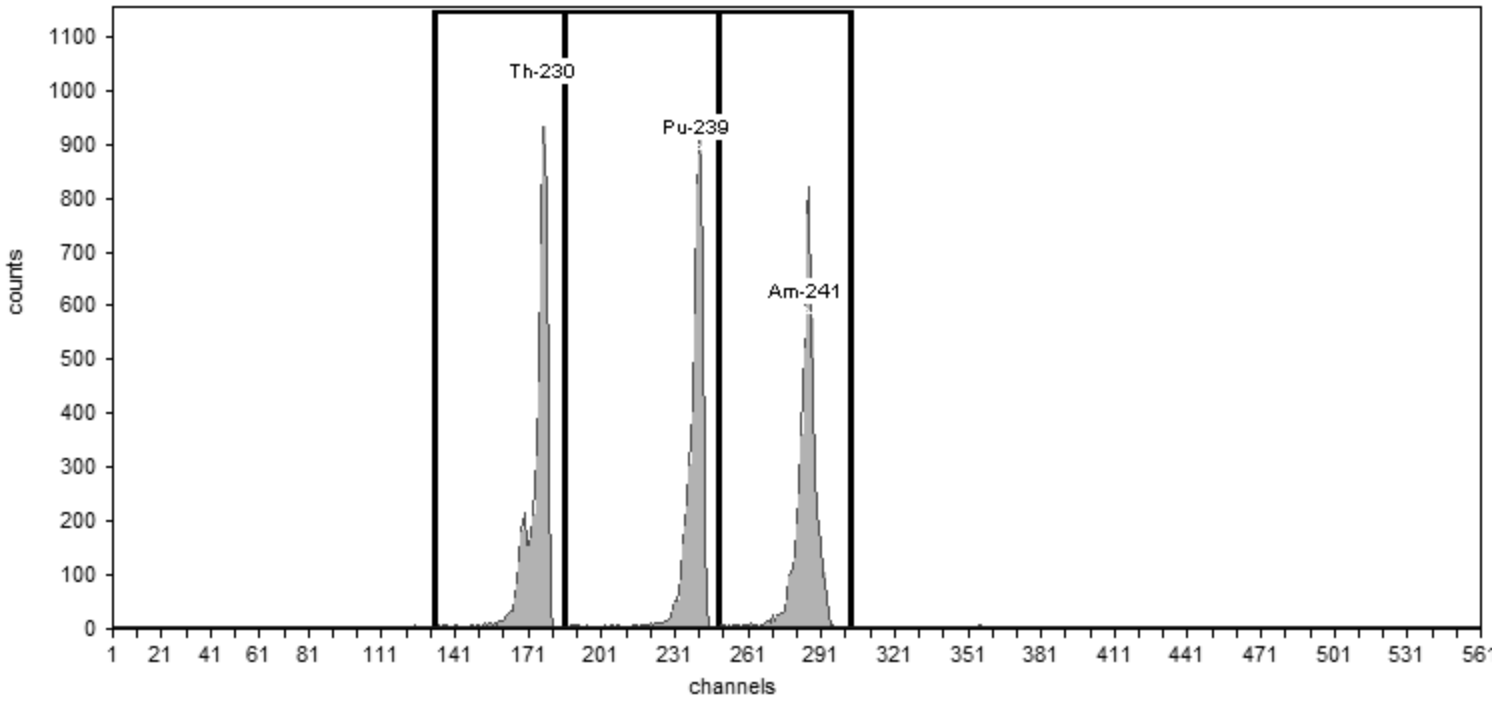
Detector: AV214 , SN: 50-112Z7
Acquisition Start Date: 2/21/2017 1:08:58PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9886;AV214-201702

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 23.10% +/- 0.43% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	27.30	5,105.00	85.08
Pu-239	240	5,155.40	186	249	29.89	4,906.00	81.77
Am-241	284	5,485.70	249	303	31.79	5,155.00	85.92

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:38:05AM 2/22/2017

Calibration

Sample Name: CCV-7107;AV215-20170221
Description:
Detector: AV215

Analyst: 60040
Analysis Date: 2/22/2017 7:38:04AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

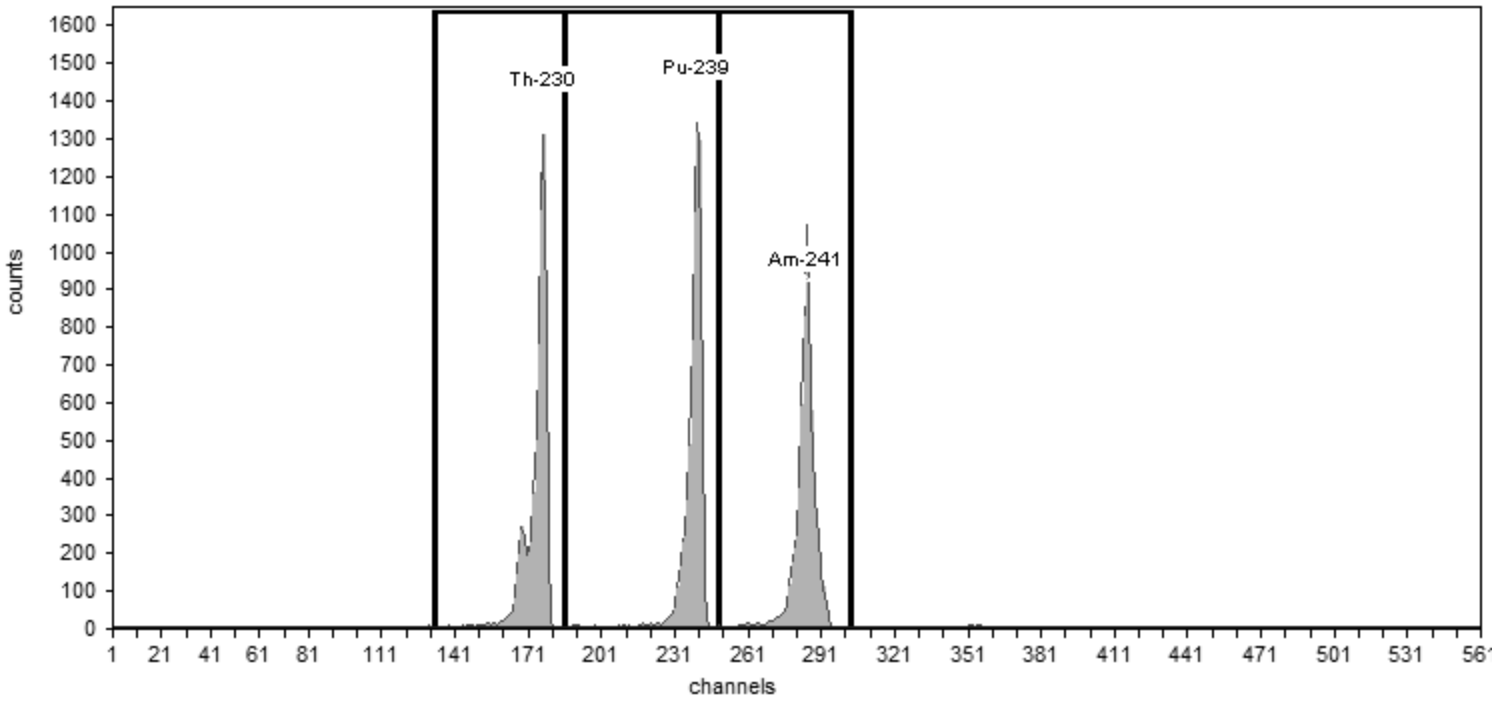
Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 2/21/2017 2:23:22PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-7107;AV215-201702

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.17% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	27.54	6,919.00	115.32
Pu-239	240	5,155.40	186	249	31.53	7,114.00	118.57
Am-241	284	5,485.70	249	303	33.20	6,715.00	111.92

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:38:21AM 2/22/2017

Calibration

Sample Name: CCV-8874;AV216-20170221
Description:
Detector: AV216

Analyst: 60040
Analysis Date: 2/22/2017 7:38:10AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

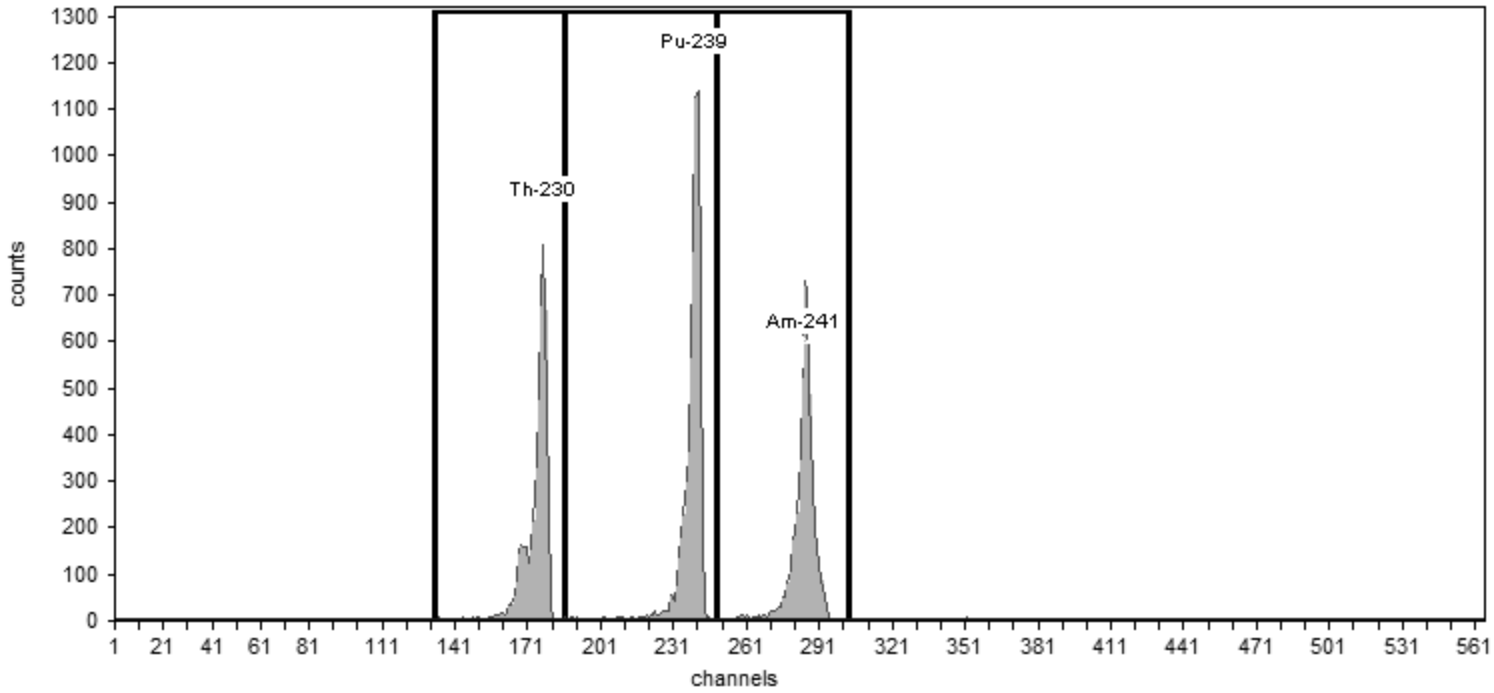
Detector: AV216 , SN: 50-117J5
Acquisition Start Date: 2/21/2017 2:23:41PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8874;AV216-201702

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 26.79% +/- 0.50% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.64	4,663.00	77.72
Pu-239	240	5,155.40	186	249	30.97	6,052.00	100.87
Am-241	284	5,485.70	249	303	33.84	4,792.00	79.87

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:38:27AM 2/22/2017

Calibration

Sample Name: CCV-8875;AV217-20170221
Description:
Detector: AV217

Analyst: 60040
Analysis Date: 2/22/2017 7:38:25AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

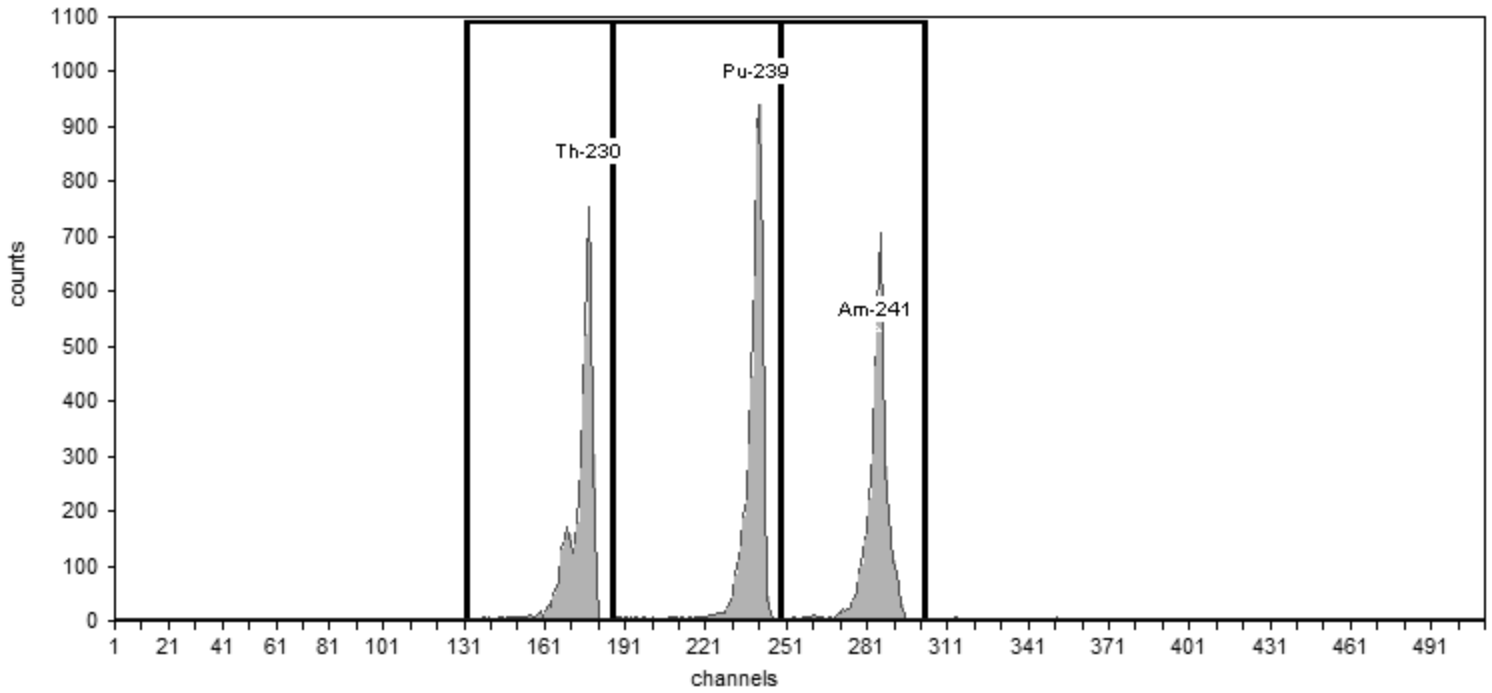
Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 2/21/2017 2:24:00PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8875;AV217-201702

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 22.32% +/- 0.43% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.07	4,312.00	71.87
Pu-239	240	5,155.40	186	249	32.31	5,175.00	86.25
Am-241	284	5,485.70	249	303	32.60	4,406.00	73.43

Monthly Backgrounds

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:48:38PM 2/20/2017

Sample

Sample Name: ICB;AV154
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

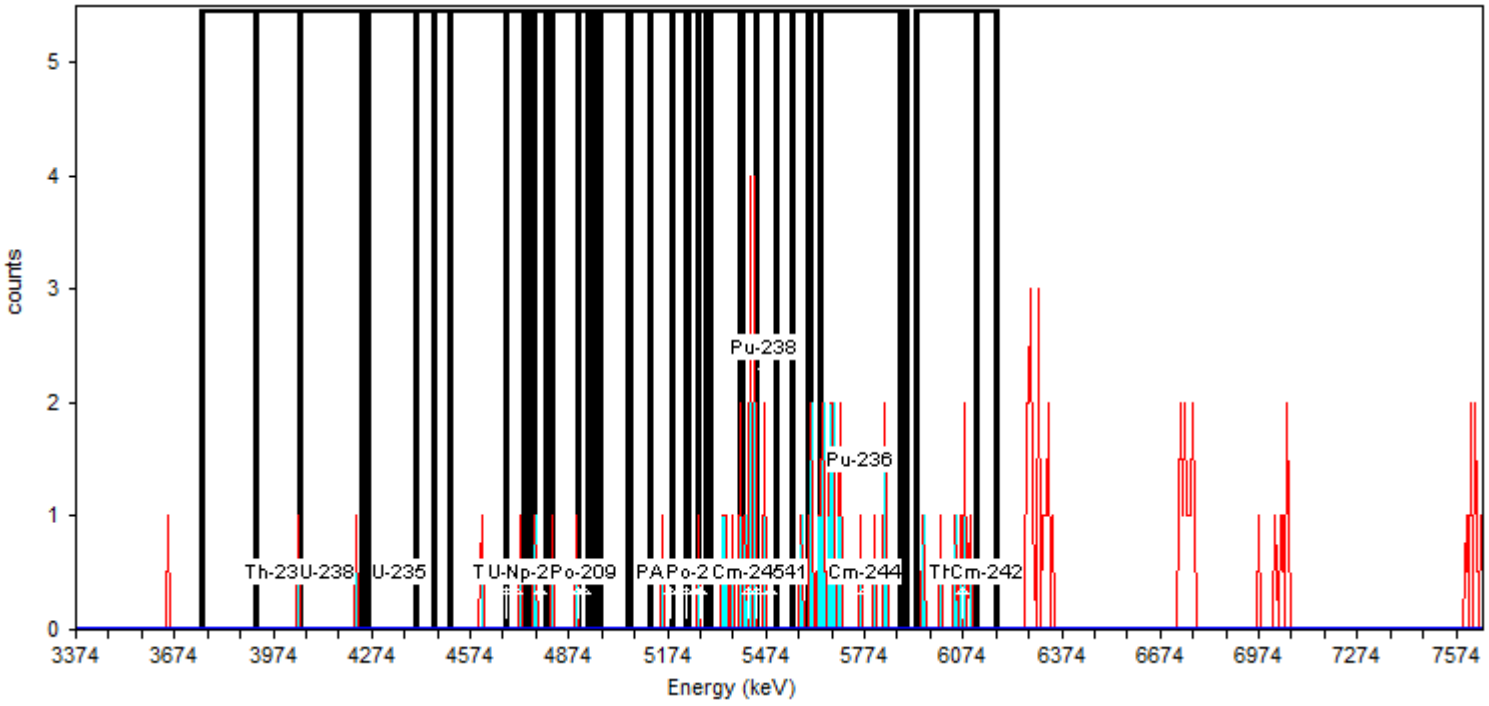
Batch

Batch Name: February2017a
Description:

Acquisition

Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 2/20/2017 7:48:25AM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9792;AV154-20161110
Calibration Date: 11/11/2016 2:37:23PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 91.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	4.00	4.167E-003	2.329E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	17.00	1.771E-002	4.419E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	17.00	1.771E-002	4.419E-003
Am-241	5,484.90	5,298.46	5,604.22	17.00	1.771E-002	4.419E-003
Cm-245	5,417.78	5,395.41	5,447.61	11.00	1.146E-002	3.608E-003
Pu-236	5,760.83	5,611.67	5,887.60	19.00	1.979E-002	4.658E-003
Cm-244	5,775.74	5,641.51	5,902.52	16.00	1.667E-002	4.295E-003
Th-227	6,074.04	5,932.35	6,178.45	7.00	7.292E-003	2.946E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

Sample

Sample Name: ICB;AV207
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

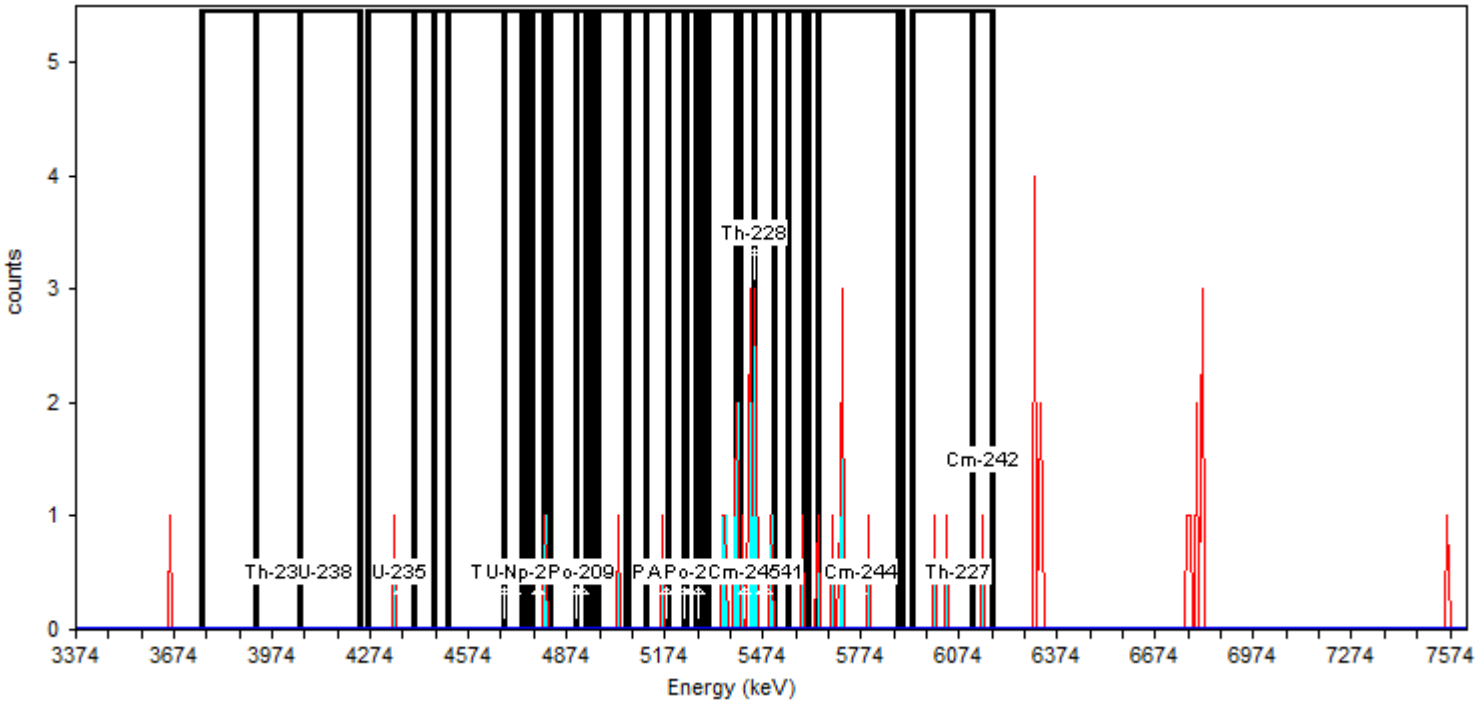
Batch

Batch Name: February2017
Description:

Acquisition

Detector: AV207 , SN: 50-117H6
Acquisition Start Date: 2/17/2017 3:50:36PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9792;AV207-20161201a
Calibration Date: 12/1/2016 2:11:39PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 47.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	16.00	1.667E-002	4.295E-003
Am-241	5,484.90	5,298.46	5,604.22	17.00	1.771E-002	4.419E-003
Cm-245	5,417.78	5,395.41	5,447.61	10.00	1.042E-002	3.455E-003
Pu-236	5,760.83	5,611.67	5,887.60	7.00	7.292E-003	2.946E-003
Cm-244	5,775.74	5,641.51	5,902.52	7.00	7.292E-003	2.946E-003
Th-227	6,074.04	5,932.35	6,178.45	3.00	3.125E-003	2.083E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

Sample

Sample Name: ICB;AV208
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

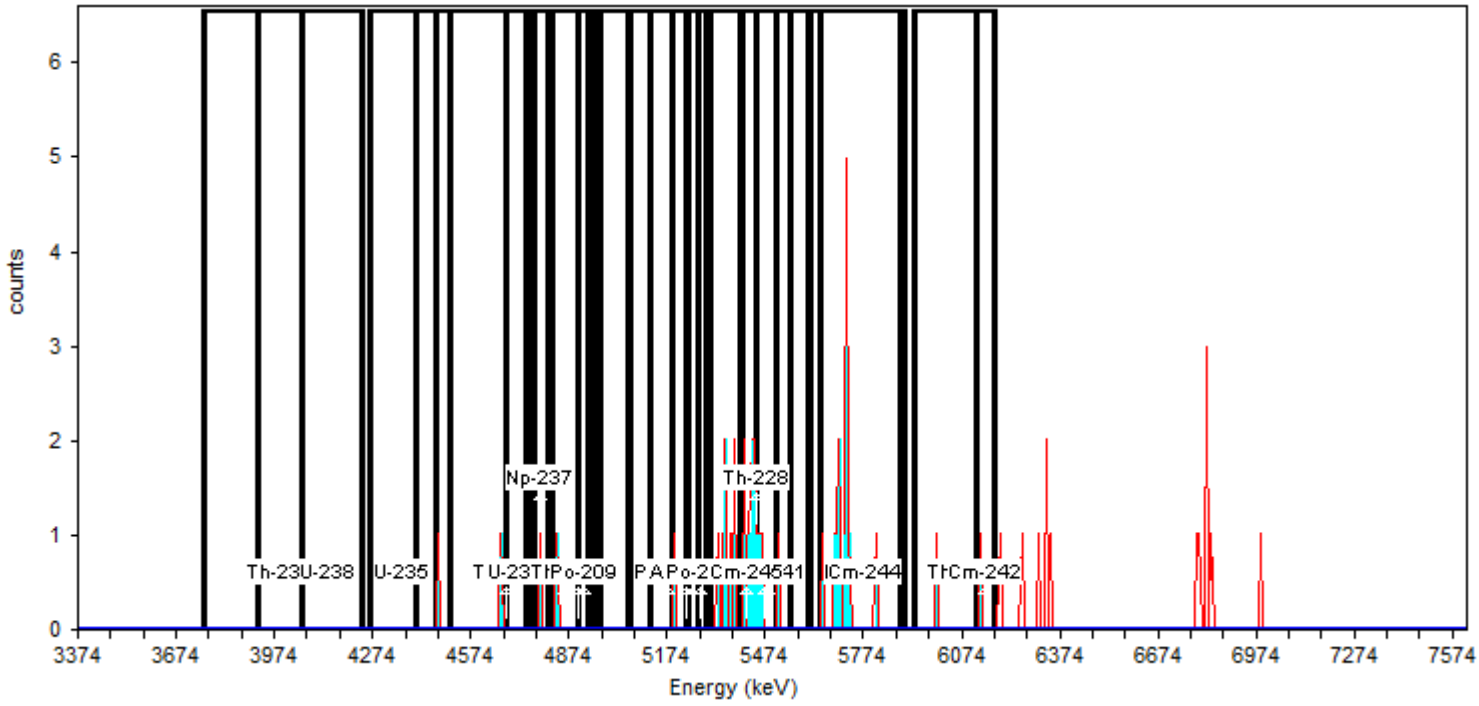
Batch

Batch Name: February2017
Description:

Acquisition

Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 2/17/2017 3:50:36PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9793;AV208-20161201a
Calibration Date: 12/1/2016 2:11:34PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 50.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	2.00	2.083E-003	1.804E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	17.00	1.771E-002	4.419E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	17.00	1.771E-002	4.419E-003
Am-241	5,484.90	5,298.46	5,604.22	17.00	1.771E-002	4.419E-003
Cm-245	5,417.78	5,395.41	5,447.61	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	13.00	1.354E-002	3.898E-003
Cm-244	5,775.74	5,641.51	5,902.52	13.00	1.354E-002	3.898E-003
Th-227	6,074.04	5,932.35	6,178.45	2.00	2.083E-003	1.804E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

Sample

Sample Name: ICB;AV209
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

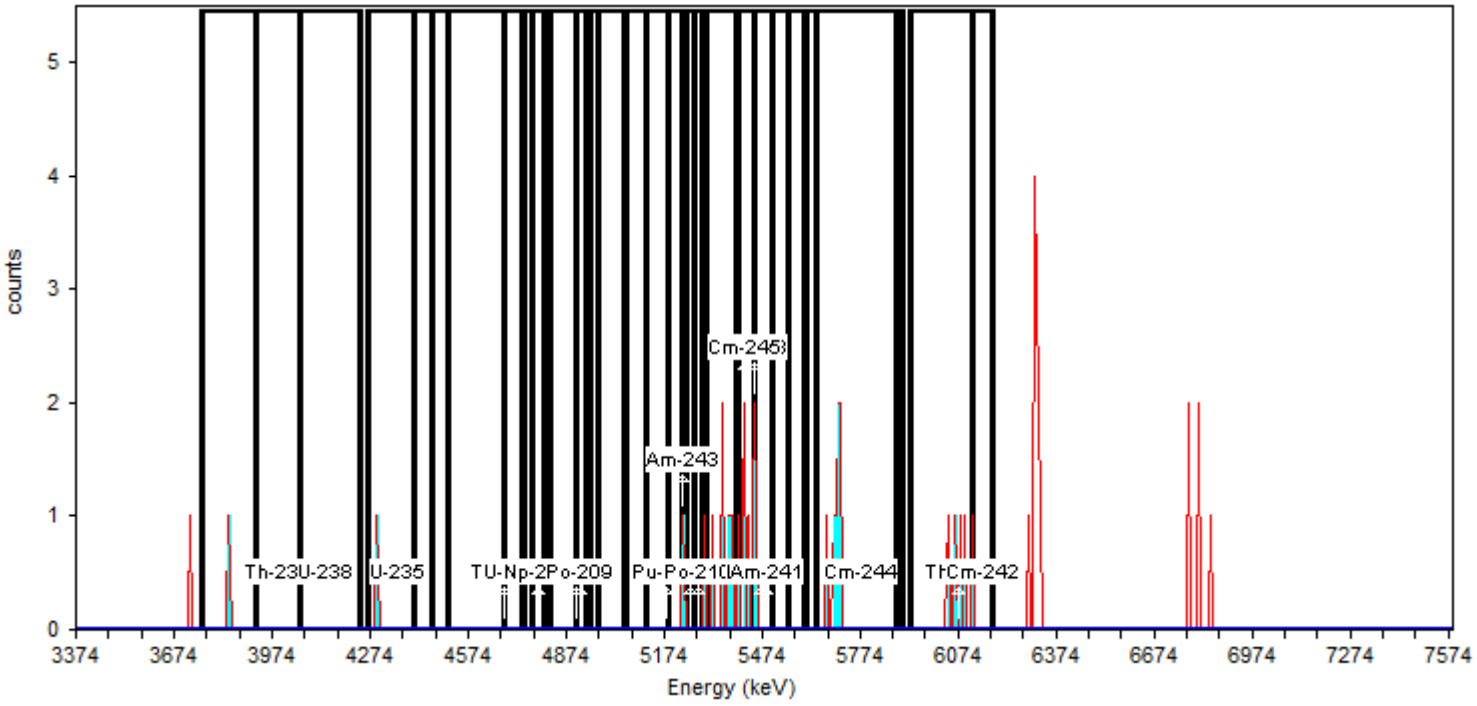
Batch

Batch Name: February2017
Description:

Acquisition

Detector: AV209 , SN: 50-117H7
Acquisition Start Date: 2/17/2017 3:50:37PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9794;AV209-20161201a
Calibration Date: 12/1/2016 2:11:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



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 (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	0.00	0.000E+000	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	8.00	8.333E-003	3.125E-003
Th-228	5,447.61	5,186.59	5,507.27	14.00	1.458E-002	4.034E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	13.00	1.354E-002	3.898E-003
Am-241	5,484.90	5,298.46	5,604.22	13.00	1.354E-002	3.898E-003
Cm-245	5,417.78	5,395.41	5,447.61	6.00	6.250E-003	2.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	7.00	7.292E-003	2.946E-003
Cm-244	5,775.74	5,641.51	5,902.52	7.00	7.292E-003	2.946E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

Sample

Sample Name: ICB;AV214
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

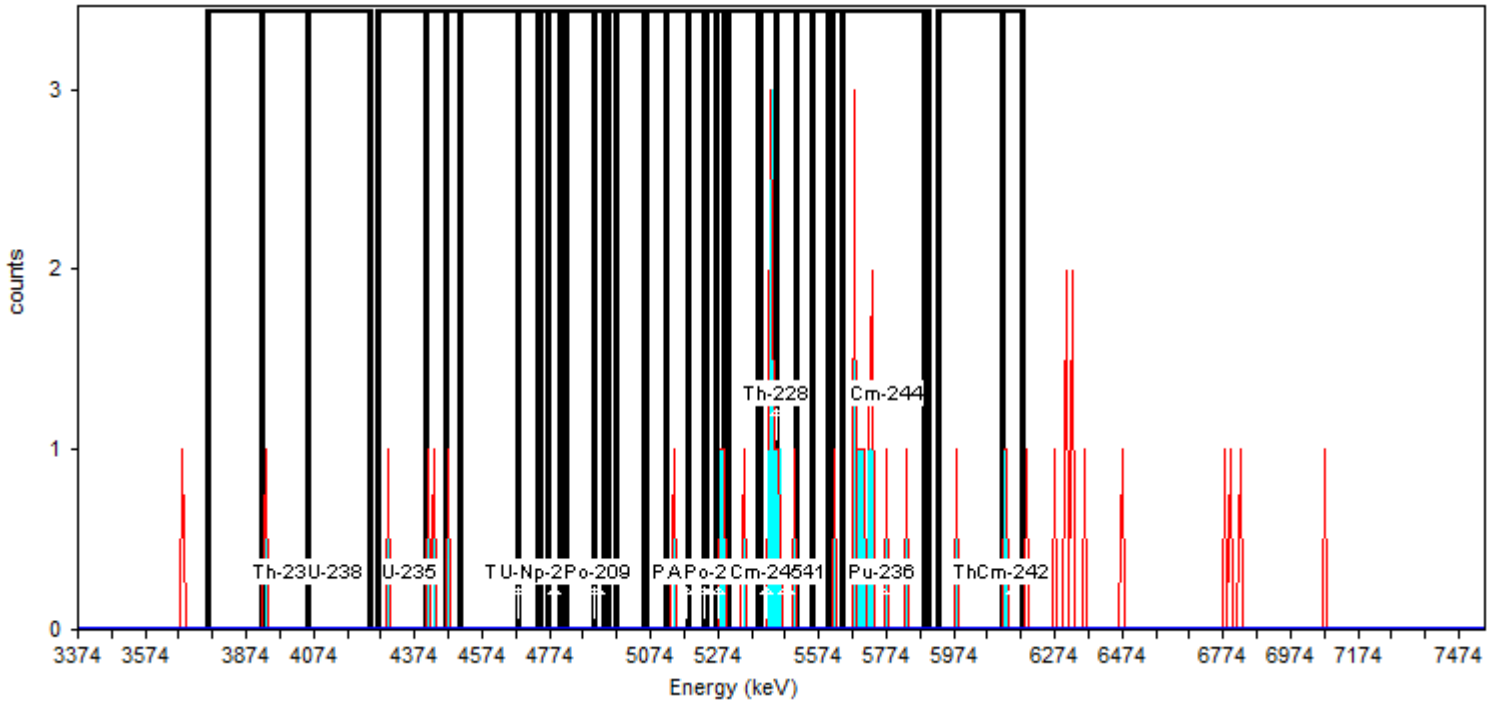
Batch

Batch Name: February2017
Description:

Acquisition

Detector: AV214 , SN: 50-112Z7
Acquisition Start Date: 2/17/2017 3:50:37PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9886;AV214-20161006a
Calibration Date: 10/7/2016 10:38:08AM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 46.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	3.00	3.125E-003	2.083E-003
Th-230	4,679.48	4,403.55	4,746.60	3.00	3.125E-003	2.083E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	0.00	0.000E+000	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	4.00	4.167E-003	2.329E-003
Th-228	5,447.61	5,186.59	5,507.27	11.00	1.146E-002	3.608E-003
Po-210	5,276.09	5,231.34	5,291.00	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	11.00	1.146E-002	3.608E-003
Am-241	5,484.90	5,298.46	5,604.22	9.00	9.375E-003	3.294E-003
Cm-245	5,417.78	5,395.41	5,447.61	6.00	6.250E-003	2.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	12.00	1.250E-002	3.756E-003
Cm-244	5,775.74	5,641.51	5,902.52	11.00	1.146E-002	3.608E-003
Th-227	6,074.04	5,932.35	6,178.45	3.00	3.125E-003	2.083E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:00:23AM 2/18/2017

Sample

Sample Name: ICB;AV215
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

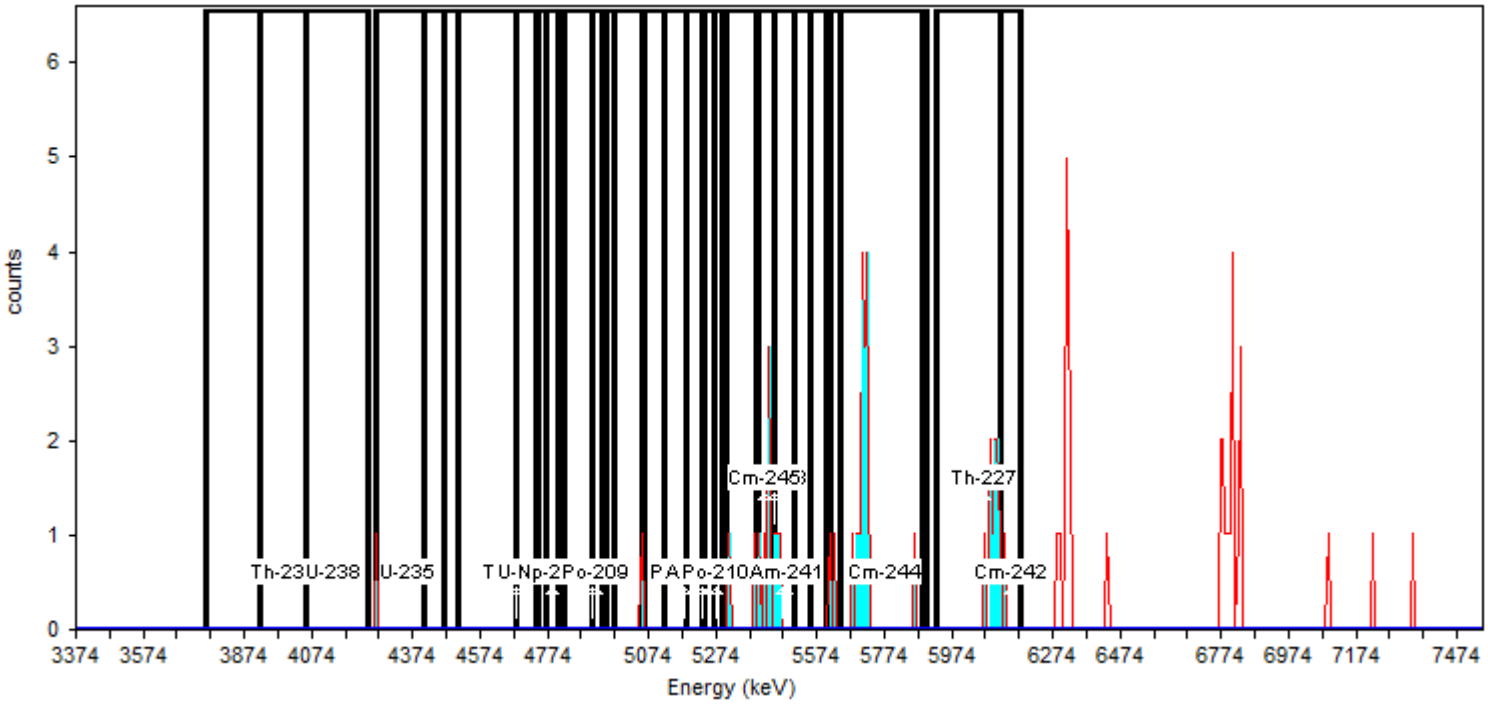
Batch

Batch Name: February2017
Description:

Acquisition

Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 2/17/2017 3:50:37PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-7107;AV215-20161006a
Calibration Date: 10/7/2016 10:38:03AM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



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 (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	1.00	1.042E-003	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	3.00	3.125E-003	2.083E-003
Th-228	5,447.61	5,186.59	5,507.27	10.00	1.042E-002	3.455E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	10.00	1.042E-002	3.455E-003
Am-241	5,484.90	5,298.46	5,604.22	10.00	1.042E-002	3.455E-003
Cm-245	5,417.78	5,395.41	5,447.61	6.00	6.250E-003	2.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	17.00	1.771E-002	4.419E-003
Cm-244	5,775.74	5,641.51	5,902.52	15.00	1.563E-002	4.167E-003
Th-227	6,074.04	5,932.35	6,178.45	10.00	1.042E-002	3.455E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

Sample

Sample Name: ICB;AV216
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

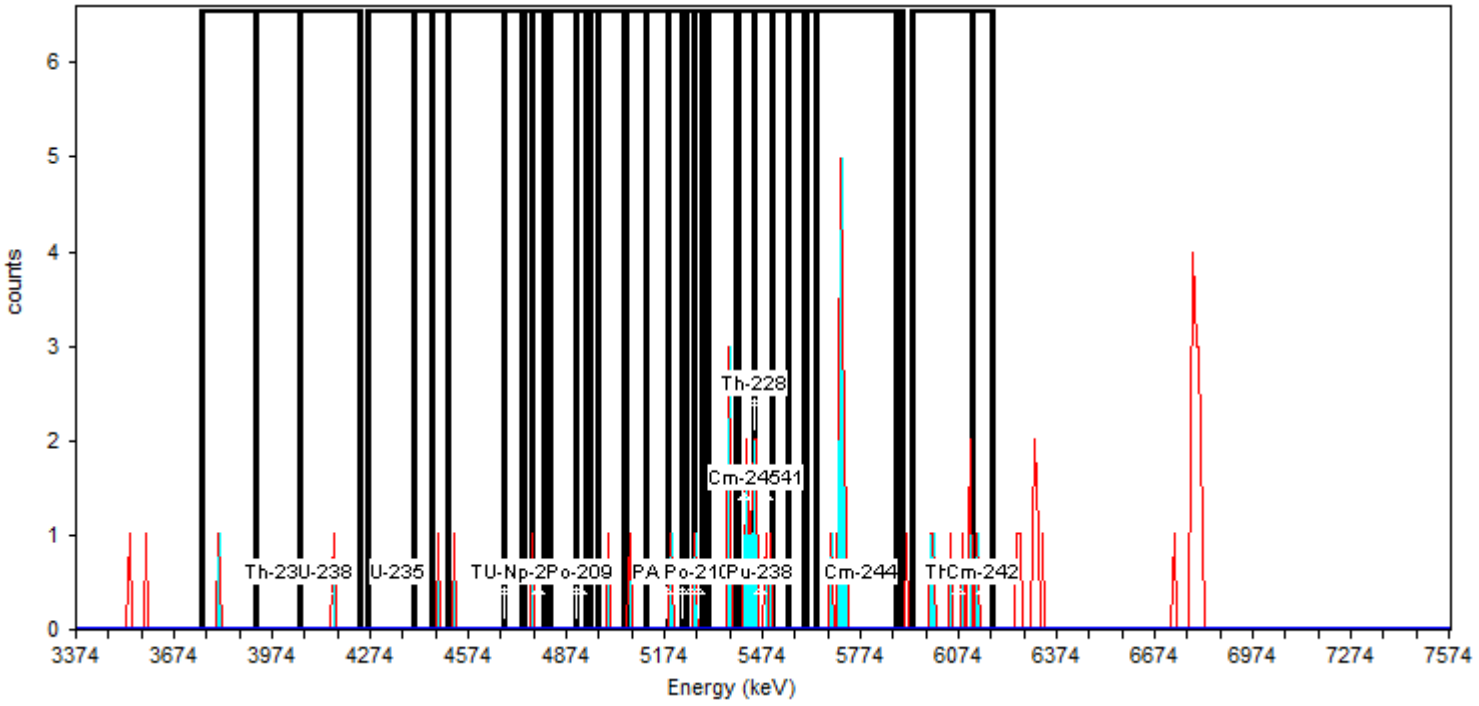
Batch

Batch Name: February2017a
Description:

Acquisition

Detector: AV216 , SN: 50-117J5
Acquisition Start Date: 2/20/2017 7:48:27AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8874;AV216-20161006a
Calibration Date: 10/7/2016 10:38:13AM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



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 (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	2.00	2.083E-003	1.804E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	15.00	1.563E-002	4.167E-003
Am-241	5,484.90	5,298.46	5,604.22	14.00	1.458E-002	4.034E-003
Cm-245	5,417.78	5,395.41	5,447.61	7.00	7.292E-003	2.946E-003
Pu-236	5,760.83	5,611.67	5,887.60	11.00	1.146E-002	3.608E-003
Cm-244	5,775.74	5,641.51	5,902.52	11.00	1.146E-002	3.608E-003
Th-227	6,074.04	5,932.35	6,178.45	7.00	7.292E-003	2.946E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

Sample

Sample Name: ICB;AV217
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

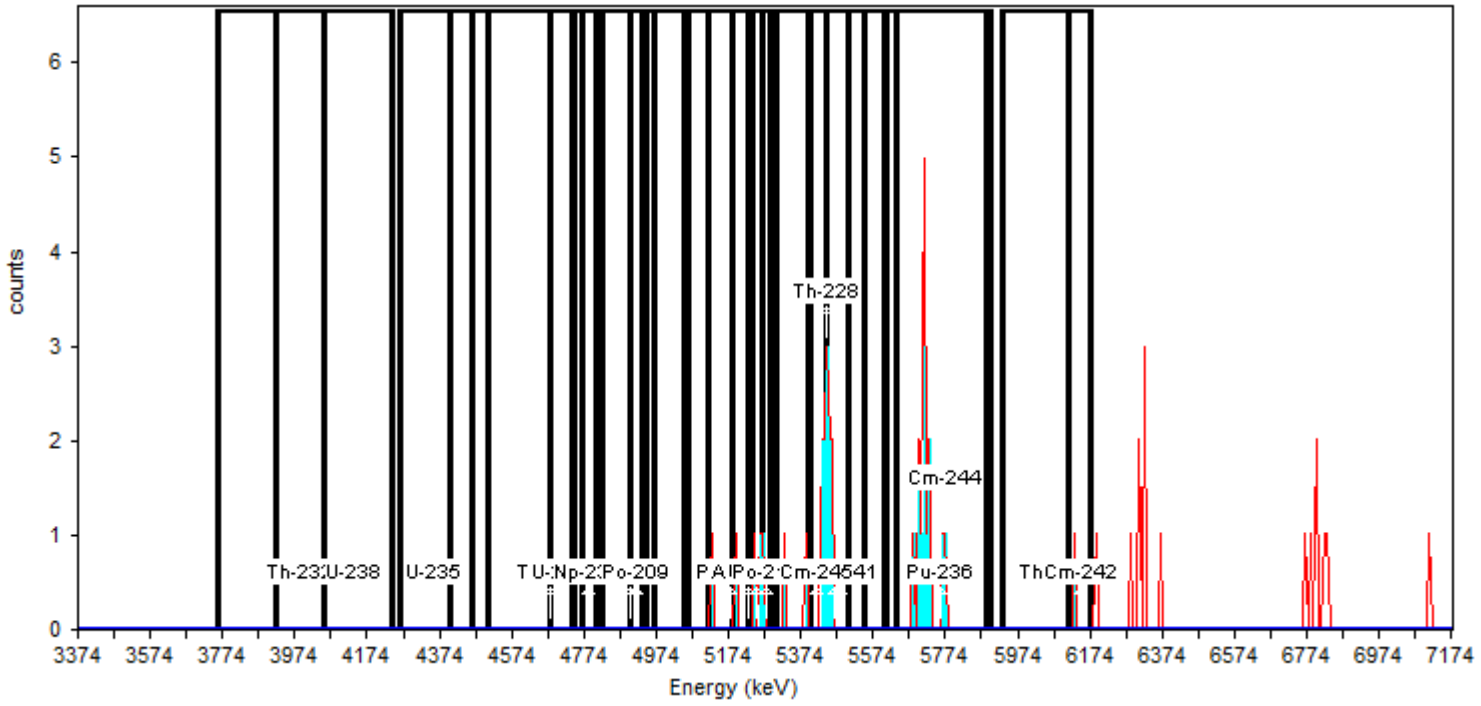
Batch

Batch Name: February2017
Description:

Acquisition

Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 2/17/2017 3:50:38PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8875;AV217-20161006a
Calibration Date: 10/7/2016 10:38:18AM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 48.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	0.00	0.000E+000	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	5.00	5.208E-003	2.552E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	17.00	1.771E-002	4.419E-003
Po-210	5,276.09	5,231.34	5,291.00	3.00	3.125E-003	2.083E-003
Pu-238	5,469.98	5,268.63	5,552.01	14.00	1.458E-002	4.034E-003
Am-241	5,484.90	5,298.46	5,604.22	13.00	1.354E-002	3.898E-003
Cm-245	5,417.78	5,395.41	5,447.61	7.00	7.292E-003	2.946E-003
Pu-236	5,760.83	5,611.67	5,887.60	14.00	1.458E-002	4.034E-003
Cm-244	5,775.74	5,641.51	5,902.52	14.00	1.458E-002	4.034E-003
Th-227	6,074.04	5,932.35	6,178.45	1.00	1.042E-003	1.473E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

Run Logs

Alpha Spectroscopy Run Log

Detector: AV154

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/10/16 12:21	140	IC 160-279042/1		279042			PS
12/16/16 08:41	60	ICV 160-284329/1		284329			PS
02/20/17 07:48	960	ICB 160-293540/1		293540			PS
02/21/17 08:25	60	CCV 160-293975/1		293975			PS
02/28/17 13:51	1	PULSER 160-295175/1		295175			ALD
02/28/17 18:28	600	160-21079-7	GW-BR04RB-021517	295175	293762	A-01-R	ALD

Detector: AV207

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
12/01/16 11:41	140	IC 160-281977/1		281977			PS
12/06/16 14:58	60	ICV 160-284128/1		284128			PS
02/17/17 15:50	960	ICB 160-293497/1		293497			PS
02/21/17 13:07	60	CCV 160-294017/1		294017			PS
02/27/17 09:18	1	PULSER 160-294919/1		294919			ALD
02/27/17 15:42	600	MB 160-293762/1-A		294919	293762	A-01-R	ALD

Detector: AV208

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
12/01/16 11:41	140	IC 160-281978/1		281978			PS
12/06/16 14:57	60	ICV 160-284129/1		284129			PS
02/17/17 15:50	960	ICB 160-293498/1		293498			PS
02/21/17 13:07	60	CCV 160-294018/1		294018			PS
02/27/17 09:18	1	PULSER 160-294920/1		294920			ALD
02/27/17 15:42	600	LCS 160-293762/2-A		294920	293762	A-01-R	ALD

Detector: AV209

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
12/01/16 11:41	140	IC 160-281979/1		281979			PS
12/06/16 14:58	60	ICV 160-284130/1		284130			PS
02/17/17 15:50	960	ICB 160-293499/1		293499			PS
02/21/17 13:13	60	CCV 160-294019/1		294019			PS
02/27/17 09:18	1	PULSER 160-294921/1		294921			ALD
02/27/17 15:42	600	160-21079-6	GW-NB71-021517	294921	293762	A-01-R	ALD

Detector: AV214

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/06/16 15:54	140	IC 160-273881/1		273881			PS
10/12/16 16:02	60	ICV 160-274599/1		274599			PS
02/17/17 15:50	960	ICB 160-293502/1		293502			PS
02/21/17 13:08	60	CCV 160-294021/1		294021			PS
02/27/17 09:31	1	PULSER 160-294923/1		294923			ALD
02/27/17 15:42	600	160-21079-7 MS	GW-BR04RB-021517 MS	294923	293762	A-01-R	ALD

Detector: AV215

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/06/16 15:54	140	IC 160-273882/1		273882			PS
10/11/16 15:45	60	ICV 160-274588/1		274588			PS

Alpha Spectroscopy Run Log

Detector: AV215 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
02/17/17 15:50	960	ICB 160-293503/1		293503			PS
02/21/17 14:23	60	CCV 160-294022/1		294022			PS
02/27/17 09:31	1	PULSER 160-294924/1		294924			
02/27/17 10:09	1	PULSER 160-294924/2		294924			ALD
02/27/17 15:42	600	160-21079-7 MSD	GW-BR04RB-021517 MSD	294924	293762	A-01-R	ALD

Detector: AV216

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/06/16 15:54	140	IC 160-273883/1		273883			PS
10/11/16 15:43	60	ICV 160-274589/1		274589			PS
02/20/17 07:48	960	ICB 160-293550/1		293550			PS
02/21/17 14:23	60	CCV 160-294023/1		294023			PS
02/27/17 09:31	1	PULSER 160-294925/1		294925			ALD
02/27/17 15:42	600	160-21079-8	GW-BR04RB-021517-FD	294925	293762	A-01-R	ALD

Detector: AV217

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
10/06/16 15:55	140	IC 160-273884/1		273884			PS
10/11/16 15:44	60	ICV 160-274590/1		274590			PS
02/17/17 15:50	960	ICB 160-293505/1		293505			PS
02/21/17 14:24	60	CCV 160-294024/1		294024			PS
02/27/17 09:31	1	PULSER 160-294926/1		294926			ALD
02/27/17 15:42	600	160-21079-9	GW-NB80-021517	294926	293762	A-01-R	ALD

GAMMA SPECTROSCOPY

Method TC-02-RC Tracers

Technetium-99 Tracers

Prep Batch: 295354

Technetium-99 Tracers Prep

Test America St. Louis Spectrum ID: 5_Gamma_20170227

Sample Description: 295354_Gamma_TCCLBA 160-295354~1-a
Detector: Detector # 5
Batch ID: 295354
Work Order Number: Gamma
Lot Number: TCCLBA 160-295354~1-a

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 08:32:35 Real Time: 603 sec
Analysis Time: 3/2/2017 08:43 Dead Time: 0.43 %
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_Tc-99m.lib
Bkgd Correction File: 5_2017-02-05_0914.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.037E+03	3.2	3.325E+01	6.242E+01	2.342E+01
Total	1.037E+03				

Analyst: kody Saulters

TestAmerica Inc Spectrum name: 5_Gamma_20170227.An1

Sample description
295354_Gamma_TCCLBA 160-295354~1-a

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20170227.An1

Acquisition information
Start time:	3/2/2017 8:32:35 AM
Live time:	600
Real time:	603
Dead time:	0.43 %
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_Tc-99m.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G800W064
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(3.7000E-02* 1.0000E+00) = 2.7027E+01
Detection limit method:	Reg. Guide 4.16 Method

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

Corrections                          Status          Comments
       Decay correct to date:         YES       3/2/2017 12:00:00 PM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  YES       5_2017-02-05_0914.PBC
                                                2/5/2017 9:14:17 AM

       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    1 cutoff: 5.00E+01 %
       Energy Calibration
            Normalized diff:       0.0428

*****   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    pCi/Samp
_____________________________________________________________________________
  140.47     1032.   3.21   0.86  3.411E-02   140.51  89.060  1.037E+03 TC99M
No unknown peaks passed sensitivity test.

------------------------------------------------------------
This section based on library: Client_Tc-99m.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
_____________________________________________________________________________
TC-99M    561.88   140.51        20.      1032.     1.719     3.21   0.855D

  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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Peak Code	Peak MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.0372E+03				2.51E-01	
							Energy duplication
			140.51	1.037E+03	(	2.342E+01 3.21E+00	8.91E+01 G K

(- 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 *****

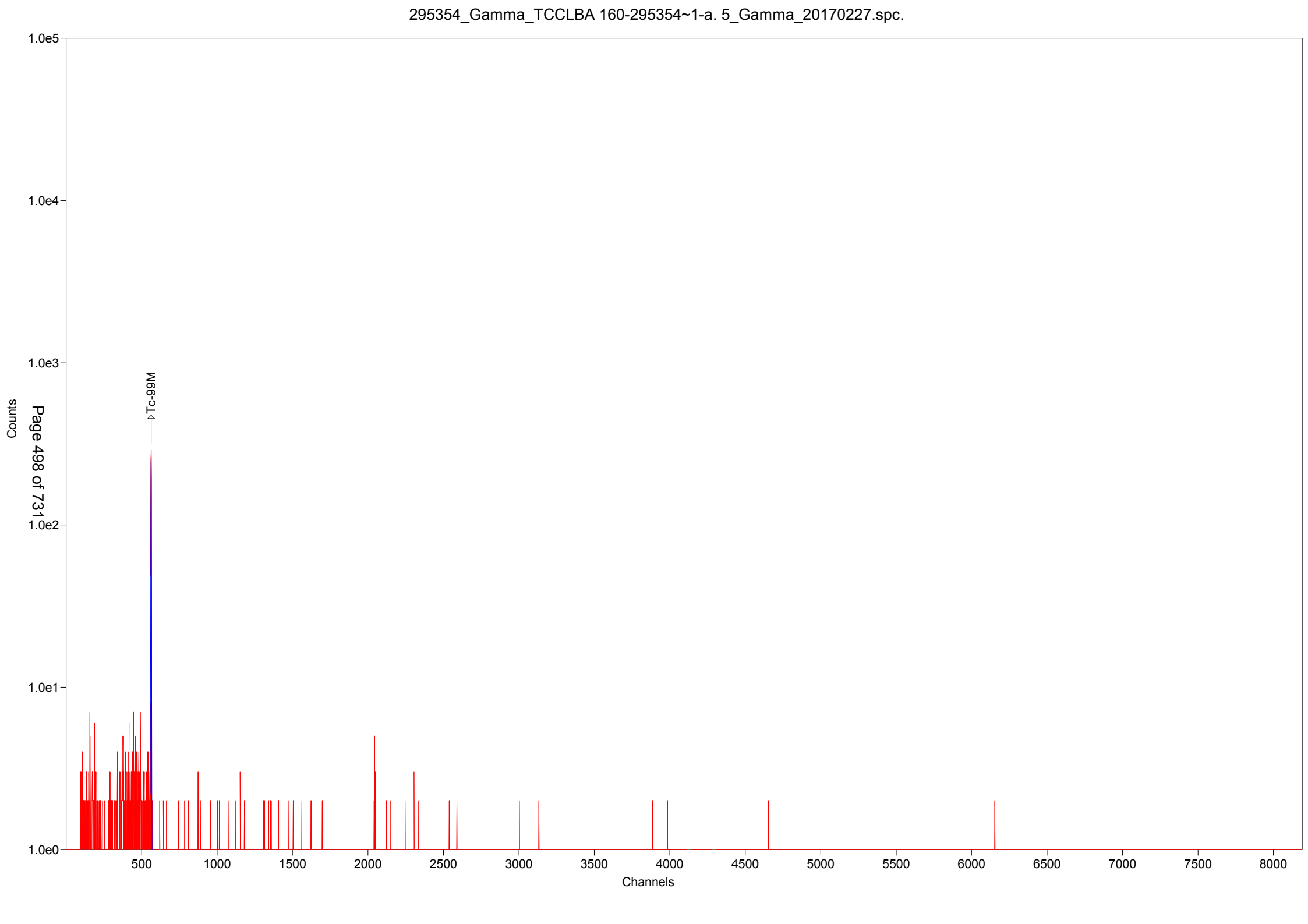
Nuclide	Time of Count Activity pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M	1.5443E+03	1.0372E+03	3.205E+00%	2.34E+01

< - 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 2000.8 keV) 1.544E+03 pCi/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 1.0371737E+03 pCi/Sample

The library has energies which are not separable.


295354_Gamma_TCCLBA 160-295354~1-a. 5_Gamma_20170227.spc.
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Tc-99M
Page 498 of 731
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Channels

Test America St. Louis Spectrum ID: 7_Gamma_20170171

Sample Description: 295354_Gamma_TCCLBA 160-295354~1-A
Detector: Detector # 7
Batch ID: 295354
Work Order Number: Gamma
Lot Number: TCCLBA 160-295354~1-A

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 09:24:29 Real Time: 609 sec
Analysis Time: 3/2/2017 09:35 Dead Time: 1.40 %
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_Tc-99m.lib
Bkgd Correction File: 7_2017-02-05_0929.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.056E+03	2.8	2.936E+01	6.128E+01	2.437E+01
Total	1.056E+03				

Analyst: kody Saulters

(Page 1 of 5)

TestAmerica Inc Spectrum name: 7_Gamma_20170171.An1

Sample description
295354_Gamma_TCCLBA 160-295354~1-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20170171.An1

Acquisition information
Start time: 3/2/2017 9:24:29 AM
Live time: 600
Real time: 609
Dead time: 1.40 %
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_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) =
2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections                          Status          Comments
       Decay correct to date:         YES       3/2/2017 12:00:00 PM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  YES       7_2017-02-05_0929.PBC
                                                 2/5/2017 9:29:08 AM

       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    1 cutoff: 5.00E+01 %
       Energy Calibration
            Normalized diff:       1.0000

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    pCi/Samp
_____________________________________________________________________________
  140.50     1487.   2.78   1.57  5.336E-02   140.51  89.060  1.056E+03 TC99M
No unknown peaks passed sensitivity test.

-------------------------------------------------------------
This section based on library: Client_Tc-99m.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
_____________________________________________________________________________
TC-99M    561.63   140.51        46.      1487.     2.478     2.78   1.565D

  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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Code	MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.0560E+03				2.51E-01	
							Energy duplication
			140.51	1.056E+03	*(	2.437E+01 2.78E+00 8.91E+01	G K

(- 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 pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M #	1.4233E+03	1.0560E+03	2.780E+00%	2.44E+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) 1.423E+03 pCi/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 1.0560399E+03 pCi/Sample

The library has energies which are not separable.

295354_Gamma_TCCLBA 160-295354~1-A. 7_Gamma_20170171.spc.

Test America St. Louis Spectrum ID: 8_Gamma_20170273

Sample Description: 295354_Gamma_TCCLBA 160-295354~1-A
Detector: Detector # 8
Batch ID: 295354
Work Order Number: Gamma
Lot Number: TCCLBA 160-295354~1-A

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 09:48:08 Real Time: 615 sec
Analysis Time: 3/2/2017 09:59 Dead Time: 2.36 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Tc-99m.lib
Bkgd Correction File: 8_2017-02-05_0935.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.072E+03	3.2	3.386E+01	6.424E+01	2.066E+01
Total	1.072E+03				

Analyst: kody Saulters

TestAmerica Inc Spectrum name: 8_Gamma_20170273.An1

Sample description
295354_Gamma_TCCLBA 160-295354~1-A

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20170273.An1

Acquisition information
Start time:	3/2/2017 9:48:08 AM
Live time:	600
Real time:	615
Dead time:	2.36 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

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

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

Library Files
Main analysis library:	Client_Tc-99m.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G800W064
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.97keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(3.7000E-02* 1.0000E+00) = 2.7027E+01
Detection limit method:	Reg. Guide 4.16 Method

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

Corrections                          Status          Comments
       Decay correct to date:         YES       3/2/2017 12:00:00 PM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  YES       8_2017-02-05_0935.PBC
                                                2/5/2017 9:35:39 AM

       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    1 cutoff: 5.00E+01 %
       Energy Calibration
            Normalized diff:       0.0017

*****   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    pCi/Samp
_____________________________________________________________________________
  140.51     1066.   3.16   0.95  3.945E-02   140.51  89.060  1.072E+03 TC99M
No unknown peaks passed sensitivity test.

-------------------------------------------------------------
This section based on library: Client_Tc-99m.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
_____________________________________________________________________________
TC-99M    561.86   140.51        15.      1066.     1.777     3.16   0.951D

  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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Peak Code	Peak MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.0718E+03				2.51E-01	
							Energy duplication
			140.51	1.072E+03	(	2.066E+01 3.16E+00 8.91E+01	G K

(- 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 pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M	1.3805E+03	1.0718E+03	3.159E+00%	2.07E+01

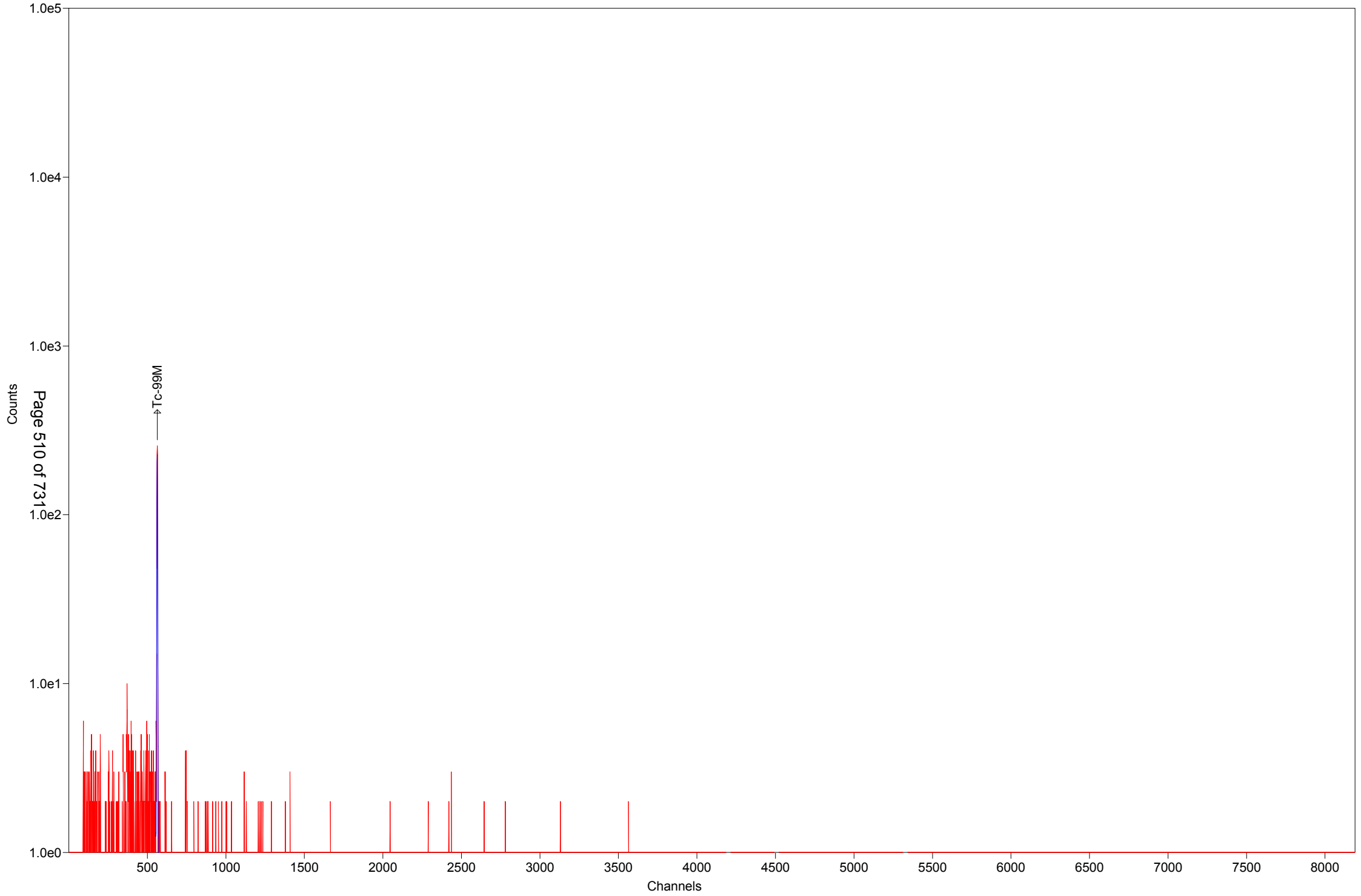
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

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

Total Activity (37.5 to 2000.0 keV) 1.381E+03 pCi/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 1.0718329E+03 pCi/Sample

The library has energies which are not separable.

295354_Gamma_TCCLBA 160-295354~1-A. 8_Gamma_20170273.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20170170

Sample Description: 295354_Gamma_TCCLBB 160-295354~2-A
Detector: Detector # 7
Batch ID: 295354
Work Order Number: Gamma
Lot Number: TCCLBB 160-295354~2-A

Decay to Time: 3/2/2017 12:00 Live Time: 1800 sec
Acquisition Time: 3/2/2017 08:31:07 Real Time: 1825 sec
Analysis Time: 3/7/2017 08:46 Dead Time: 1.37 %
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_Tc-99m.lib
Bkgd Correction File: 7_2017-02-05_0929.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.156E+03	1.5	1.692E+01	6.128E+01	1.300E+01
Total	1.156E+03				

Analyst: Amanda Dick

TestAmerica Inc Spectrum name: 7_Gamma_20170170.An1

Sample description
295354_Gamma_TCCLBB 160-295354~2-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20170170.An1

Acquisition information
Start time: 3/2/2017 8:31:07 AM
Live time: 1800
Real time: 1825
Dead time: 1.37 %
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_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) =
2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections                            Status          Comments
       Decay correct to date:           YES       3/2/2017 12:00:00 PM
       Decay during acquisition:        YES
       Decay during collection:         NO
       True coincidence correction:     NO
       Peaked background correction:    YES       7_2017-02-05_0929.PBC
                                                  2/5/2017 9:29:08 AM

       Absorption (Internal):           NO
       Geometry correction:             NO
       Random summing:                  NO


total peaks alloc.    1 cutoff: 5.00E+01 %
       Energy Calibration
            Normalized diff:       1.0000

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    pCi/Samp
_____________________________________________________________________________
  140.47     5308.   1.46   1.57  5.336E-02   140.51  89.060  1.156E+03 TC99M
No unknown peaks passed sensitivity test.

-------------------------------------------------------------
This section based on library: Client_Tc-99m.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
_____________________________________________________________________________
TC-99M    561.63   140.51       150.      5308.     2.949     1.46   1.565D

  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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Peak Code	MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.1565E+03				2.51E-01	
							Energy duplication
			140.51	1.156E+03	*(	1.300E+01 1.46E+00	8.91E+01 G K

(- 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 *****

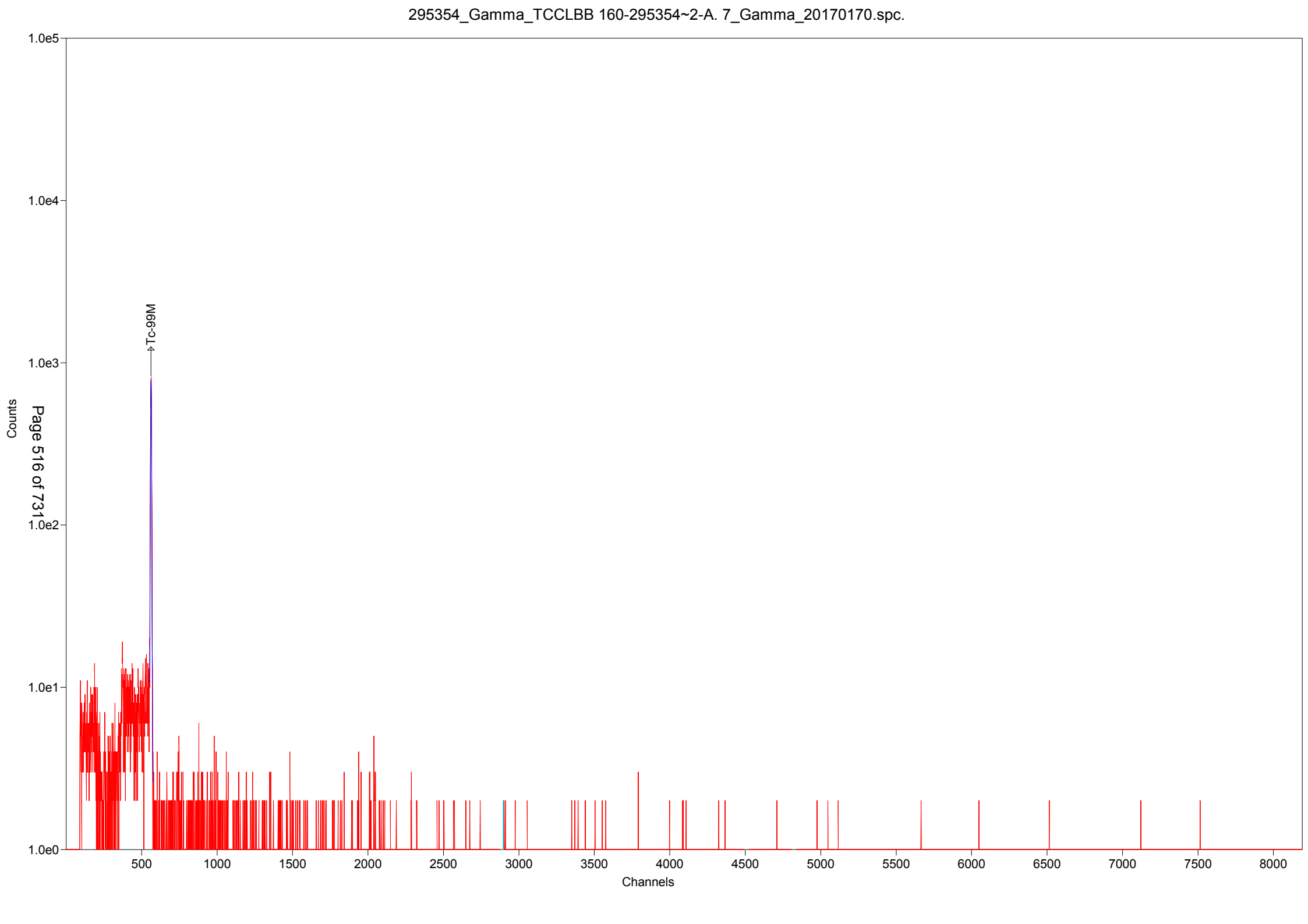
Nuclide	Time of Count Activity pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M #	1.7268E+03	1.1565E+03	1.463E+00%	1.30E+01

- 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) 1.727E+03 pCi/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 1.1564700E+03 pCi/Sample

The library has energies which are not separable.


295354_Gamma_TCCLBB 160-295354~2-A. 7_Gamma_20170170.spc.
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Tc-99M
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Channels

Test America St. Louis Spectrum ID: 8_Gamma_20170272

Sample Description: 295354_Gamma_TCCLBB 160-295354~2-A
Detector: Detector # 8
Batch ID: 295354
Work Order Number: Gamma
Lot Number: TCCLBB 160-295354~2-A

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 09:25:44 Real Time: 615 sec
Analysis Time: 3/2/2017 09:36 Dead Time: 2.38 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Tc-99m.lib
Bkgd Correction File: 8_2017-02-05_0935.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.068E+03	3.1	3.319E+01	6.371E+01	2.217E+01
Total	1.068E+03				

Analyst: kody Saulters

TestAmerica Inc Spectrum name: 8_Gamma_20170272.An1

Sample description
295354_Gamma_TCCLBB 160-295354~2-A

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20170272.An1

Acquisition information
Start time: 3/2/2017 9:25:44 AM
Live time: 600
Real time: 615
Dead time: 2.38 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

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

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

Library Files
Main analysis library: Client_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) = 2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections                          Status          Comments
       Decay correct to date:         YES       3/2/2017 12:00:00 PM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  YES       8_2017-02-05_0935.PBC
                                                2/5/2017 9:35:39 AM

       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    1 cutoff: 5.00E+01 %
       Energy Calibration
            Normalized diff:       0.0024

*****   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    pCi/Samp
_____________________________________________________________________________
  140.51     1109.   3.11   0.82  3.945E-02   140.51  89.060  1.068E+03 TC99M
No unknown peaks passed sensitivity test.

-------------------------------------------------------------
This section based on library: Client_Tc-99m.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
_____________________________________________________________________________
TC-99M    561.86   140.51        19.      1109.     1.848     3.11   0.822D

  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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Peak Code	Peak MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.0678E+03				2.51E-01	
							Energy duplication
			140.51	1.068E+03	(	2.217E+01 3.11E+00	8.91E+01 G K

(- 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 *****

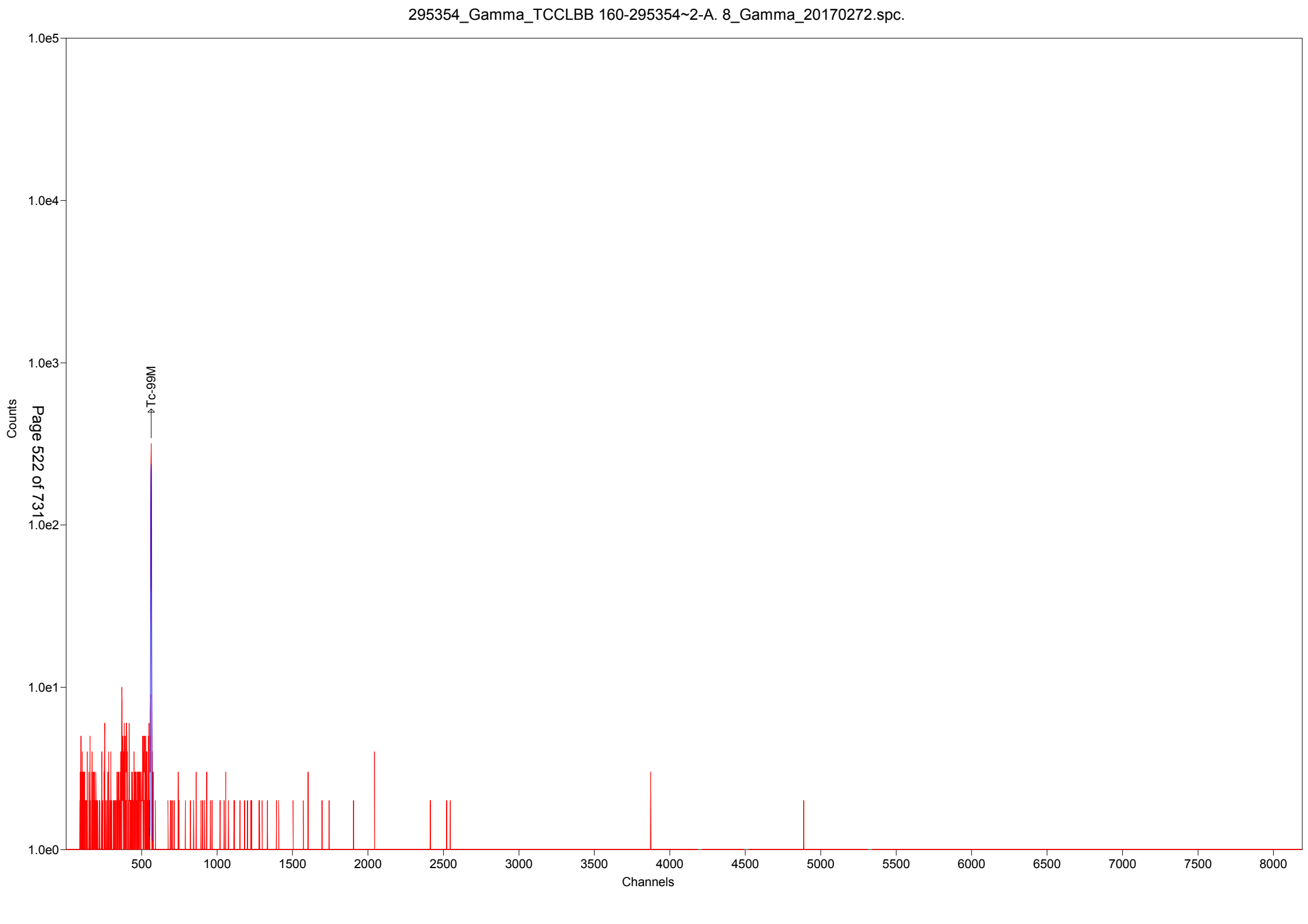
Nuclide	Time of Count Activity pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M	1.4357E+03	1.0678E+03	3.108E+00%	2.22E+01

< - 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 2000.0 keV) 1.436E+03 pCi/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 1.0678148E+03 pCi/Sample

The library has energies which are not separable.


295354_Gamma_TCCLBB 160-295354~2-A. 8_Gamma_20170272.spc.
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Tc-99M
Page 522 of 731
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Channels

Test America St. Louis Spectrum ID: 5_Gamma_20170229

Sample Description: 295354_Gamma_TCCLBB 160-295354~2-A
Detector: Detector # 5
Batch ID: 295354
Work Order Number: Gamma
Lot Number: TCCLBB 160-295354~2-A

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 09:50:29 Real Time: 604 sec
Analysis Time: 3/2/2017 10:00 Dead Time: 0.60 %
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_Tc-99m.lib
Bkgd Correction File: 5_2017-02-05_0914.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.082E+03	3.3	3.622E+01	6.596E+01	2.037E+01
Total	1.082E+03				

Analyst: kody Saulters

TestAmerica Inc Spectrum name: 5_Gamma_20170229.An1

Sample description
295354_Gamma_TCCLBB 160-295354~2-A

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20170229.An1

Acquisition information
Start time:	3/2/2017 9:50:29 AM
Live time:	600
Real time:	604
Dead time:	0.60 %
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_Tc-99m.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G800W064
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(3.7000E-02* 1.0000E+00) = 2.7027E+01
Detection limit method:	Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	3/2/2017 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2017-02-05_0914.PBC 2/5/2017 9:14:17 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0697

***** 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. pCi/Samp	Nuc
140.45	927.	3.35	0.72	3.412E-02	140.51	89.060	1.082E+03	TC99M

No unknown peaks passed sensitivity test.

This section based on library: Client_Tc-99m.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
TC-99M	561.88	140.51	10.	927.	1.545	3.35	0.718D

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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Peak Code	Peak MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.0824E+03				2.51E-01	
							Energy duplication
			140.51	1.082E+03	(	2.037E+01 3.35E+00	8.91E+01 G K

(- 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 *****

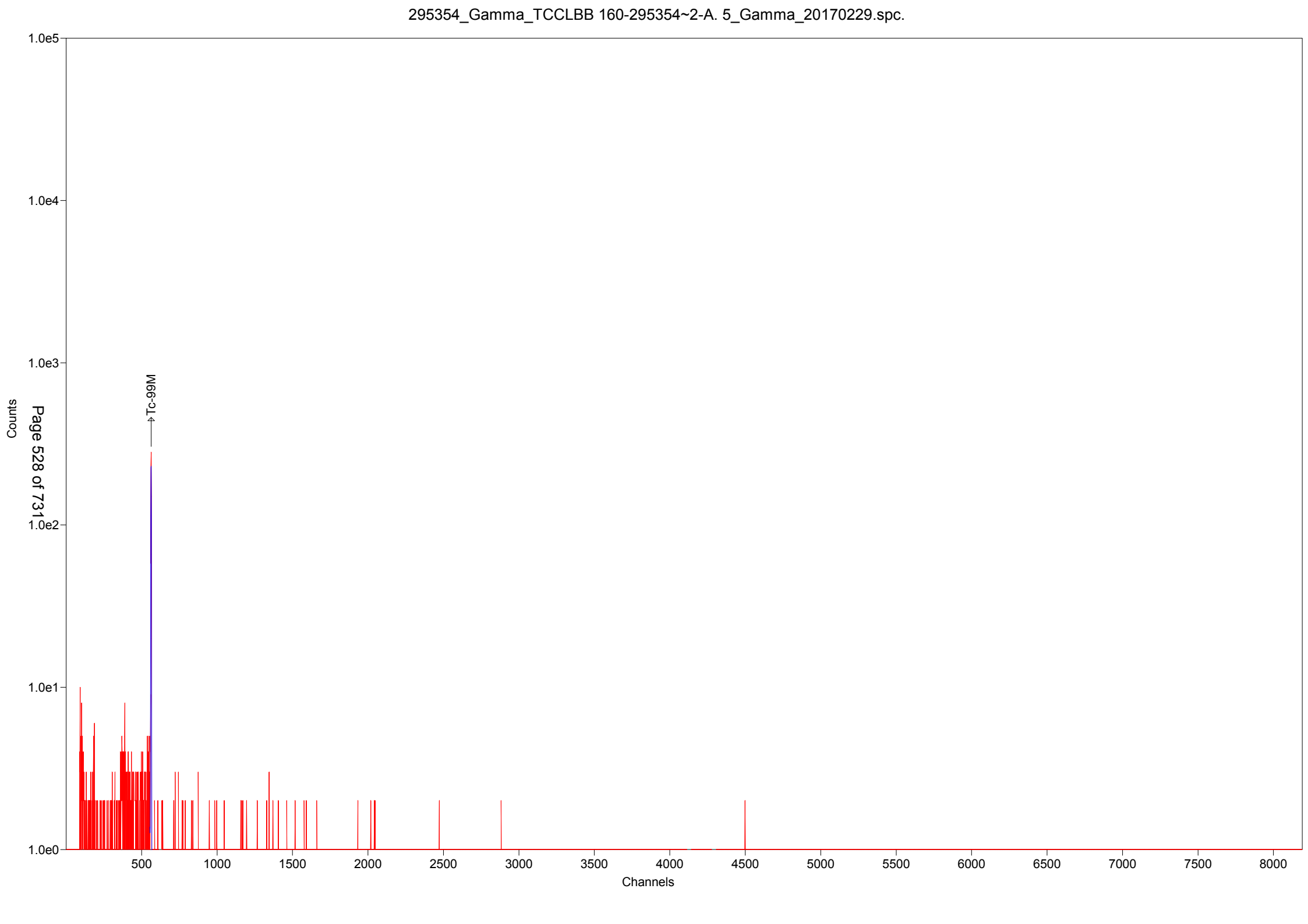
Nuclide	Time of Count Activity pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M	1.3879E+03	1.0824E+03	3.346E+00%	2.04E+01

< - 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 2000.8 keV) 1.388E+03 pCi/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 1.0824250E+03 pCi/Sample

The library has energies which are not separable.


295354_Gamma_TCCLBB 160-295354~2-A. 5_Gamma_20170229.spc.
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Tc-99M
Page 528 of 731
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Channels

Test America St. Louis Spectrum ID: 8_Gamma_20170271

Sample Description: 295354_Gamma_TCCLBC 160-295354~3-A
Detector: Detector # 8
Batch ID: 295354
Work Order Number: Gamma
Lot Number: TCCLBC 160-295354~3-A

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 08:30:17 Real Time: 615 sec
Analysis Time: 3/2/2017 08:41 Dead Time: 2.37 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Tc-99m.lib
Bkgd Correction File: 8_2017-02-05_0935.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.065E+03	3.0	3.159E+01	6.279E+01	2.183E+01
Total	1.065E+03				

Analyst: kody Saulters

TestAmerica Inc Spectrum name: 8_Gamma_20170271.An1

Sample description
295354_Gamma_TCCLBC 160-295354~3-A

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20170271.An1

Acquisition information
Start time: 3/2/2017 8:30:17 AM
Live time: 600
Real time: 615
Dead time: 2.37 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

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

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

Library Files
Main analysis library: Client_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) = 2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	3/2/2017 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2017-02-05_0935.PBC 2/5/2017 9:35:39 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0181

***** 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. pCi/Samp	Nuc
140.49	1231.	2.97	0.88	3.946E-02	140.51	89.060	1.065E+03	TC99M

No unknown peaks passed sensitivity test.

This section based on library: Client_Tc-99m.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	
TC-99M	561.86	140.51	23.	1231.	2.051	2.97	0.879	D

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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Peak Code	MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.0653E+03				2.51E-01	
							Energy duplication
			140.51	1.065E+03	(	2.183E+01 2.97E+00	8.91E+01 G K

(- 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 pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M	1.5933E+03	1.0653E+03	2.965E+00%	2.18E+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 2000.0 keV) 1.593E+03 pCi/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 1.0653380E+03 pCi/Sample

The library has energies which are not separable.

295354_Gamma_TCCLBC 160-295354~3-A. 8_Gamma_20170271.spc.

Test America St. Louis Spectrum ID: 5_Gamma_20170228

Sample Description: 295354_Gamma_TCCLBC 160-295354~3-A
Detector: Detector # 5
Batch ID: 295354
Work Order Number: Gamma
Lot Number: TCCLBC 160-295354~3-A

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 09:23:37 Real Time: 602 sec
Analysis Time: 3/2/2017 09:34 Dead Time: 0.40 %
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_Tc-99m.lib
Bkgd Correction File: 5_2017-02-05_0914.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.057E+03	3.3	3.494E+01	6.419E+01	1.988E+01
Total	1.057E+03				

Analyst: kody Saulters

TestAmerica Inc Spectrum name: 5_Gamma_20170228.An1

Sample description
295354_Gamma_TCCLBC 160-295354~3-A

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20170228.An1

Acquisition information
Start time: 3/2/2017 9:23:37 AM
Live time: 600
Real time: 602
Dead time: 0.40 %
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_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) =
2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	3/2/2017 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2017-02-05_0914.PBC 2/5/2017 9:14:17 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0763

***** 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. pCi/Samp	Nuc
140.44	953.	3.30	0.82	3.412E-02	140.51	89.060	1.057E+03	TC99M

No unknown peaks passed sensitivity test.

This section based on library: Client_Tc-99m.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
TC-99M	561.88	140.51	11.	953.	1.589	3.30	0.824D

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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Peak Code	MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.0572E+03				2.51E-01	
							Energy duplication
			140.51	1.057E+03	(	1.988E+01	3.30E+00 8.91E+01 G K

(- 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 *****

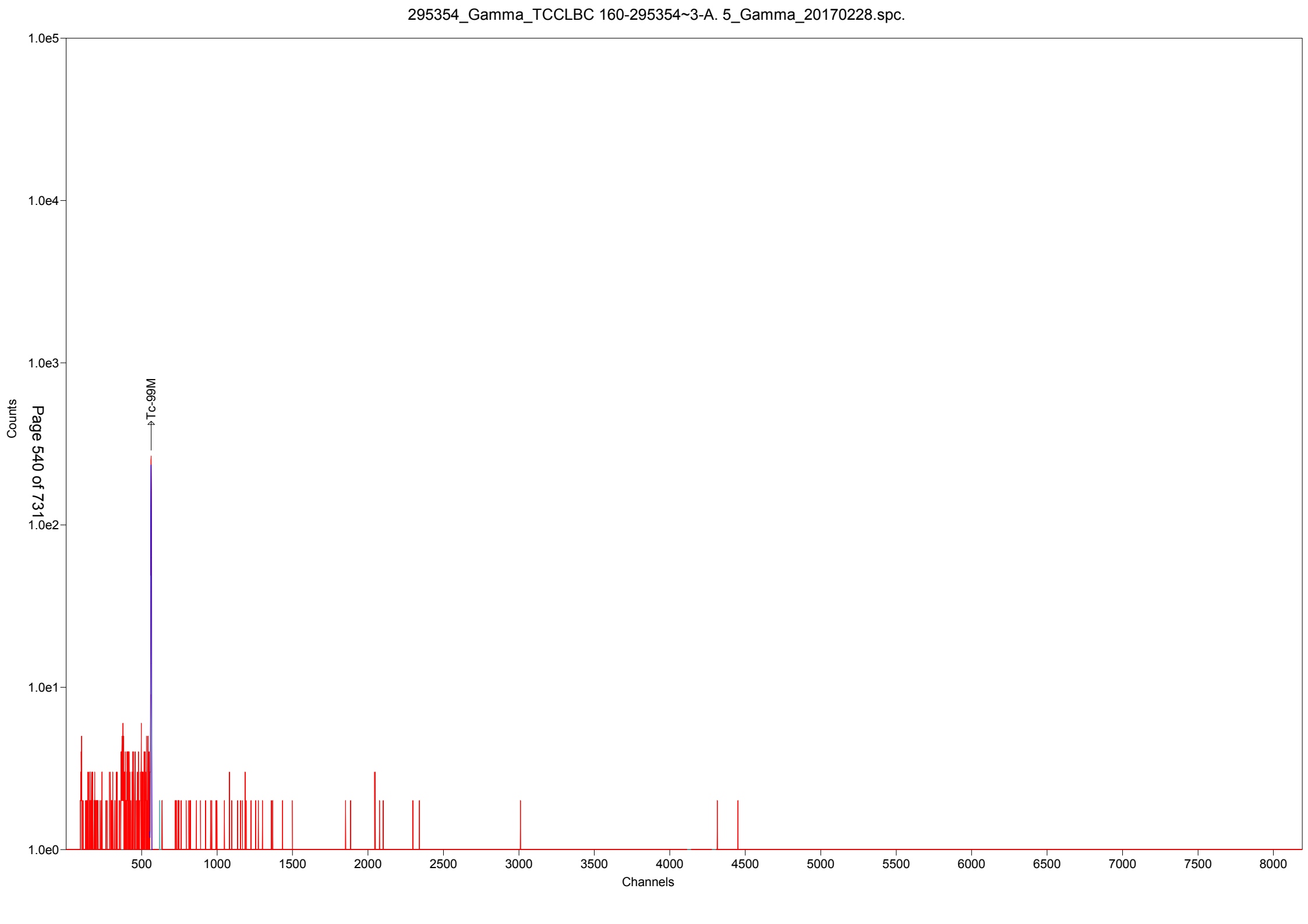
Nuclide	Time of Count Activity pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty Counting	1 Sigma MDA pCi/Sample
TC-99M	1.4273E+03	1.0572E+03	3.305E+00%	1.99E+01

< - 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 2000.8 keV) 1.427E+03 pCi/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 1.0572107E+03 pCi/Sample

The library has energies which are not separable.


295354_Gamma_TCCLBC 160-295354~3-A. 5_Gamma_20170228.spc.
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Tc-99M
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Channels

Test America St. Louis Spectrum ID: 7_Gamma_20170172

Sample Description: 295354_Gamma_TCCLBC 160-295354~3-A
Detector: Detector # 7
Batch ID: 295354
Work Order Number: Gamma
Lot Number: TCCLBC 160-295354~3-A

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 09:49:00 Real Time: 609 sec
Analysis Time: 3/2/2017 09:59 Dead Time: 1.42 %
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_Tc-99m.lib
Bkgd Correction File: 7_2017-02-05_0929.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.120E+03	2.7	3.005E+01	6.446E+01	2.037E+01
Total	1.120E+03				

Analyst: kody Saulters

TestAmerica Inc Spectrum name: 7_Gamma_20170172.An1

Sample description
295354_Gamma_TCCLBC 160-295354~3-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20170172.An1

Acquisition information
Start time: 3/2/2017 9:49:00 AM
Live time: 600
Real time: 609
Dead time: 1.42 %
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_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) =
2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections                          Status          Comments
       Decay correct to date:         YES       3/2/2017 12:00:00 PM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  YES       7_2017-02-05_0929.PBC
                                                2/5/2017 9:29:08 AM

       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    1 cutoff: 5.00E+01 %
       Energy Calibration
            Normalized diff:       1.0000

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    pCi/Samp
_____________________________________________________________________________
  140.44     1504.   2.68   1.47  5.337E-02   140.51  89.060  1.120E+03 TC99M
No unknown peaks passed sensitivity test.

-------------------------------------------------------------
This section based on library: Client_Tc-99m.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
_____________________________________________________________________________
TC-99M    561.63   140.51        28.      1504.     2.507     2.68   1.466D

  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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Code	MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.1196E+03				2.51E-01	
							Energy duplication
			140.51	1.120E+03	*(	2.037E+01 2.68E+00	8.91E+01 G K

(- 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 *****

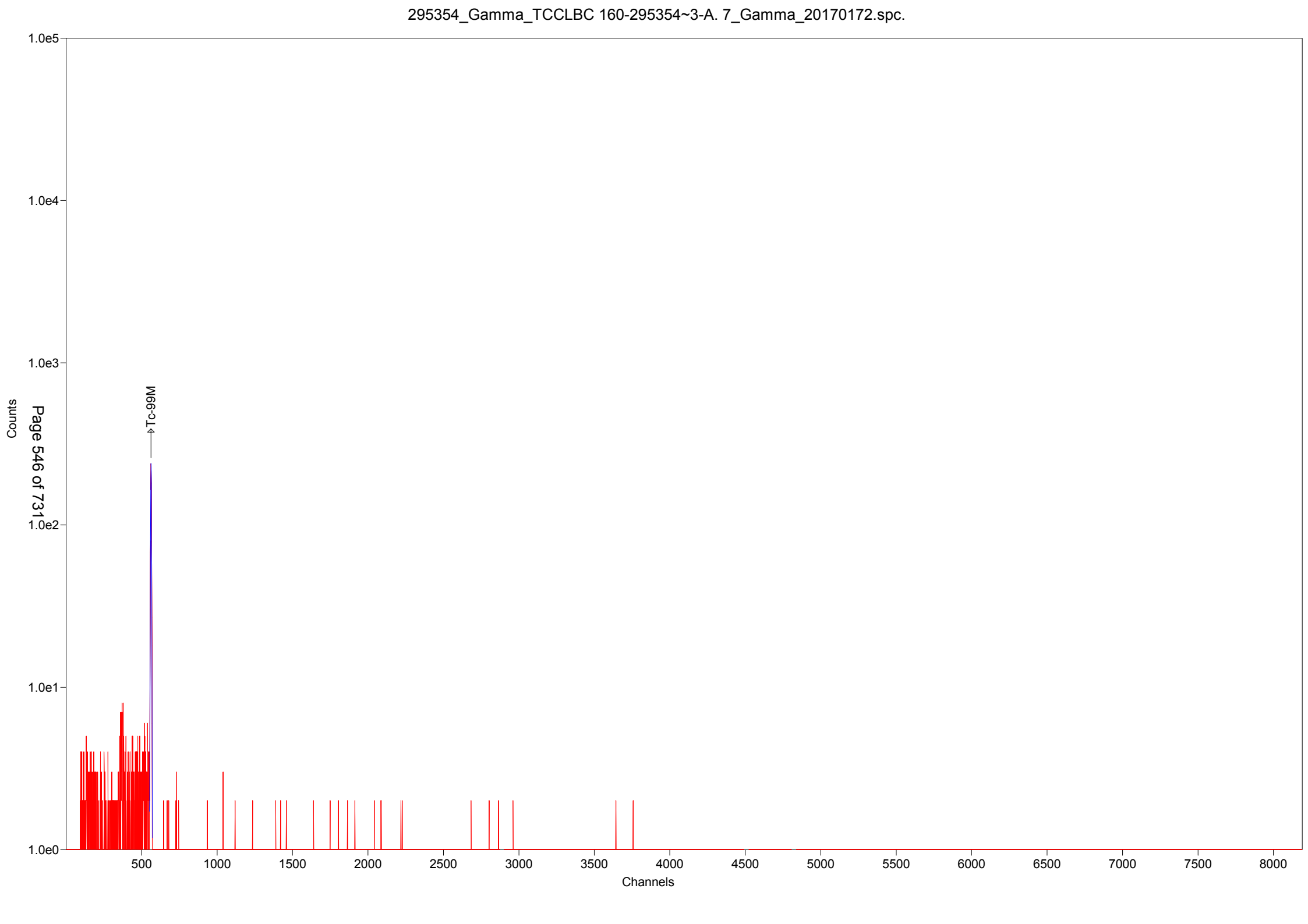
Nuclide	Time of Count Activity pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M #	1.4396E+03	1.1196E+03	2.684E+00%	2.04E+01

- 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) 1.440E+03 pCi/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 1.1195740E+03 pCi/Sample

The library has energies which are not separable.


295354_Gamma_TCCLBC 160-295354~3-A. 7_Gamma_20170172.spc.
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Tc-99M
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Channels

Prep Batch: 295355

Technetium-99 Tracers Prep

Test America St. Louis Spectrum ID: 5_Gamma_20170235

Sample Description: 295355_Gamma_MB 160-295355~1-A
Detector: Detector # 5
Batch ID: 295355
Work Order Number: Gamma
Lot Number: MB 160-295355~1-A

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 16:23:32 Real Time: 602 sec
Analysis Time: 3/2/2017 16:34 Dead Time: 0.41 %
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_Tc-99m.lib
Bkgd Correction File: 5_2017-02-05_0914.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.153E+03	4.7	5.473E+01	8.027E+01	3.427E+01
Total	1.153E+03				

Analyst: conrad.reuscher

TestAmerica Inc Spectrum name: 5_Gamma_20170235.An1

Sample description
295355_Gamma_MB 160-295355~1-A

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20170235.An1

Acquisition information
Start time: 3/2/2017 4:23:32 PM
Live time: 600
Real time: 602
Dead time: 0.41 %
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_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) =
2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	3/2/2017 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2017-02-05_0914.PBC 2/5/2017 9:14:17 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0860

***** 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. pCi/Samp	Nuc
140.43	464.	4.75	0.72	3.412E-02	140.51	89.060	1.153E+03	TC99M

No unknown peaks passed sensitivity test.

This section based on library: Client_Tc-99m.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
TC-99M	561.88	140.51	6.	464.	0.774	4.75	0.722D

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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Peak Code	MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.1528E+03				2.51E-01	
							Energy duplication
			140.51	1.153E+03	(	3.427E+01 4.75E+00	8.91E+01 G K

(- 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 pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M	6.9517E+02	1.1528E+03	4.748E+00%	3.43E+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 2000.8 keV) 6.952E+02 pCi/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 1.1527755E+03 pCi/Sample

The library has energies which are not separable.

295355_Gamma_MB 160-295355~1-A. 5_Gamma_20170235.spc.

Test America St. Louis Spectrum ID: 7_Gamma_20170178

Sample Description: 295355_Gamma_LCS 160-295355~2-A
Detector: Detector # 7
Batch ID: 295355
Work Order Number: Gamma
Lot Number: LCS 160-295355~2-A

Decay to Time: 3/2/2017 12:00 Live Time: 1800 sec
Acquisition Time: 3/2/2017 16:24:18 Real Time: 1827 sec
Analysis Time: 3/2/2017 22:40 Dead Time: 1.45 %
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_Tc-99m.lib
Bkgd Correction File: 7_2017-02-05_0929.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.063E+03	2.4	2.587E+01	5.999E+01	2.248E+01
Total	1.063E+03				

Analyst: Mike Aldridge

TestAmerica Inc Spectrum name: 7_Gamma_20170178.An1

Sample description
295355_Gamma_LCS 160-295355~2-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20170178.An1

Acquisition information
Start time: 3/2/2017 4:24:18 PM
Live time: 1800
Real time: 1827
Dead time: 1.45 %
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_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) = 2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	3/2/2017 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2017-02-05_0929.PBC 2/5/2017 9:29:08 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 1.0000

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/Samp	Nuc
140.48	1973.	2.43	1.65	5.336E-02	140.51	89.060	1.066E+03	TC99M

No unknown peaks passed sensitivity test.

This section based on library: Client_Tc-99m.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	
TC-99M	561.63	140.51	70.	1967.	1.093	2.43	1.648	D

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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Code	MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.0628E+03				2.51E-01	
							Energy duplication
			140.51	1.063E+03	*(	2.248E+01 2.43E+00 8.91E+01	G K

(- 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 *****

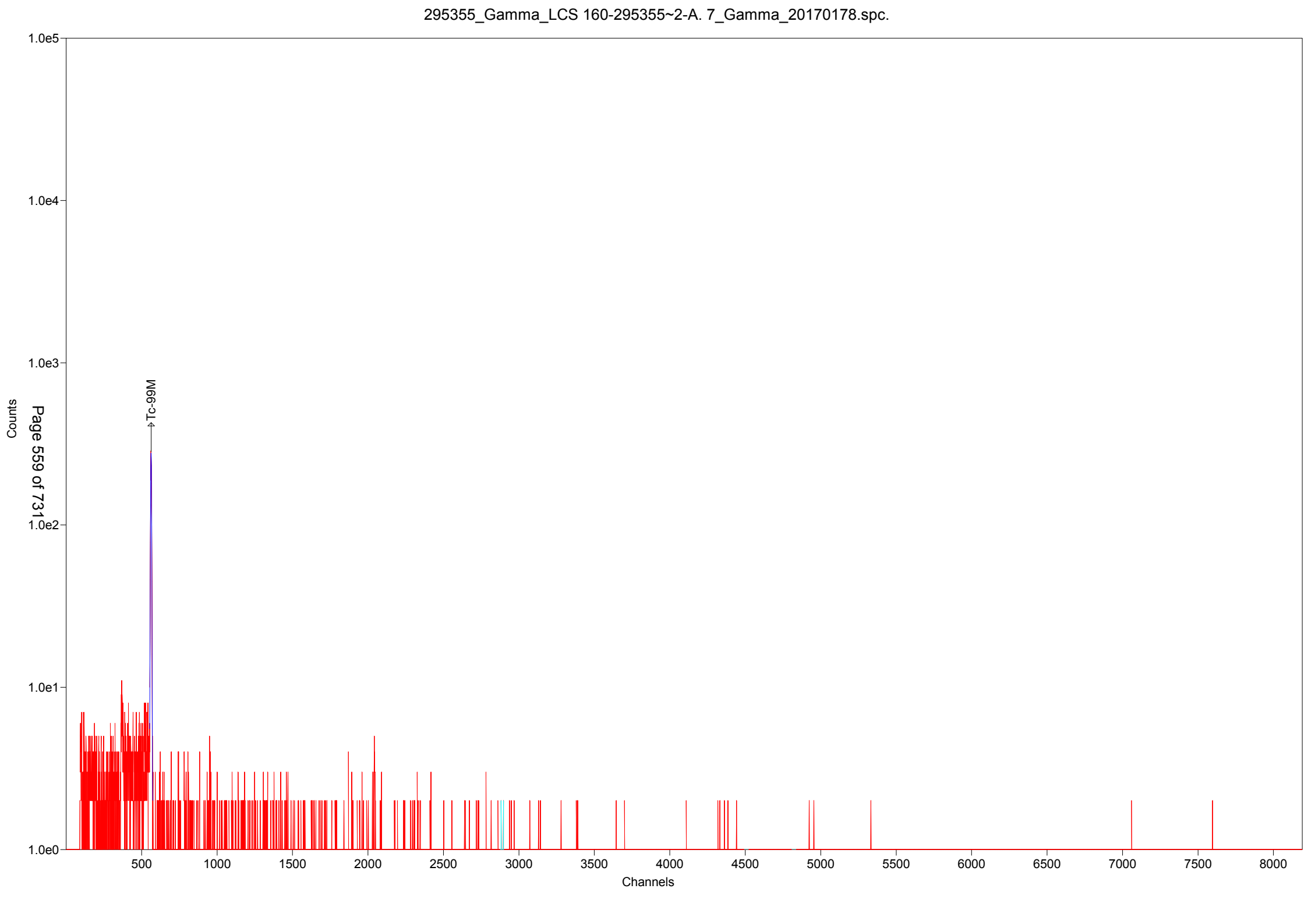
Nuclide	Time of Count Activity pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M #	6.3996E+02	1.0628E+03	2.434E+00%	2.25E+01

\# - 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) 6.400E+02 pCi/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 1.0627858E+03 pCi/Sample

The library has energies which are not separable.


295355_Gamma_LCS 160-295355~2-A. 7_Gamma_20170178.spc.
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Tc-99M
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Channels

Test America St. Louis Spectrum ID: 5_Gamma_20170236

Sample Description: 295355_Gamma_160-21079-C-6-B
Detector: Detector # 5
Batch ID: 295355
Work Order Number: Gamma
Lot Number: 160-21079-C-6-B

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 17:17:15 Real Time: 602 sec
Analysis Time: 3/2/2017 17:28 Dead Time: 0.40 %
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_Tc-99m.lib
Bkgd Correction File: 5_2017-02-05_0914.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.066E+03	5.3	5.641E+01	7.831E+01	4.485E+01
Total	1.066E+03				

Analyst: conrad.reuscher

TestAmerica Inc Spectrum name: 5_Gamma_20170236.An1

Sample description
295355_Gamma_160-21079-C-6-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20170236.An1

Acquisition information
Start time: 3/2/2017 5:17:15 PM
Live time: 600
Real time: 602
Dead time: 0.40 %
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_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) =
2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	3/2/2017 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2017-02-05_0914.PBC 2/5/2017 9:14:17 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0489

***** 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. pCi/Samp	Nuc
140.47	388.	5.29	0.74	3.411E-02	140.51	89.060	1.066E+03	TC99M

No unknown peaks passed sensitivity test.

This section based on library: Client_Tc-99m.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
TC-99M	561.88	140.51	8.	388.	0.646	5.29	0.740D

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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Peak Code	MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.0665E+03				2.51E-01	
							Energy duplication
			140.51	1.066E+03	(	4.485E+01	5.29E+00 8.91E+01 G K

(- 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 pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M	5.8014E+02	1.0665E+03	5.289E+00%	4.49E+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 2000.8 keV) 5.801E+02 pCi/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 1.0664939E+03 pCi/Sample

The library has energies which are not separable.

295355_Gamma_160-21079-C-6-B. 5_Gamma_20170236.spc.

Test America St. Louis Spectrum ID: 7_Gamma_20170179

Sample Description: 295355_Gamma_160-21079-C-7-D
Detector: Detector # 7
Batch ID: 295355
Work Order Number: Gamma
Lot Number: 160-21079-C-7-D

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 17:18:04 Real Time: 609 sec
Analysis Time: 3/2/2017 17:28 Dead Time: 1.43 %
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_Tc-99m.lib
Bkgd Correction File: 7_2017-02-05_0929.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.040E+03	4.5	4.638E+01	7.040E+01	4.330E+01
Total	1.040E+03				

Analyst: conrad.reuscher

TestAmerica Inc Spectrum name: 7_Gamma_20170179.An1

Sample description
295355_Gamma_160-21079-C-7-D

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20170179.An1

Acquisition information
Start time: 3/2/2017 5:18:04 PM
Live time: 600
Real time: 609
Dead time: 1.43 %
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_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) = 2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections                          Status          Comments
       Decay correct to date:         YES       3/2/2017 12:00:00 PM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  YES       7_2017-02-05_0929.PBC
                                                2/5/2017 9:29:08 AM

       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    1 cutoff: 5.00E+01 %
       Energy Calibration
            Normalized diff:       1.0000

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    pCi/Samp
_____________________________________________________________________________
  140.44      590.   4.46   1.75  5.337E-02   140.51  89.060  1.040E+03 TC99M
No unknown peaks passed sensitivity test.

------------------------------------------------------------
This section based on library: Client_Tc-99m.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
_____________________________________________________________________________
TC-99M    561.63   140.51        22.       590.     0.983     4.46   1.749D

  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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Code	MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.0398E+03				2.51E-01	
							Energy duplication
			140.51	1.040E+03	*(	4.330E+01 4.46E+00	8.91E+01 G K

(- 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 *****

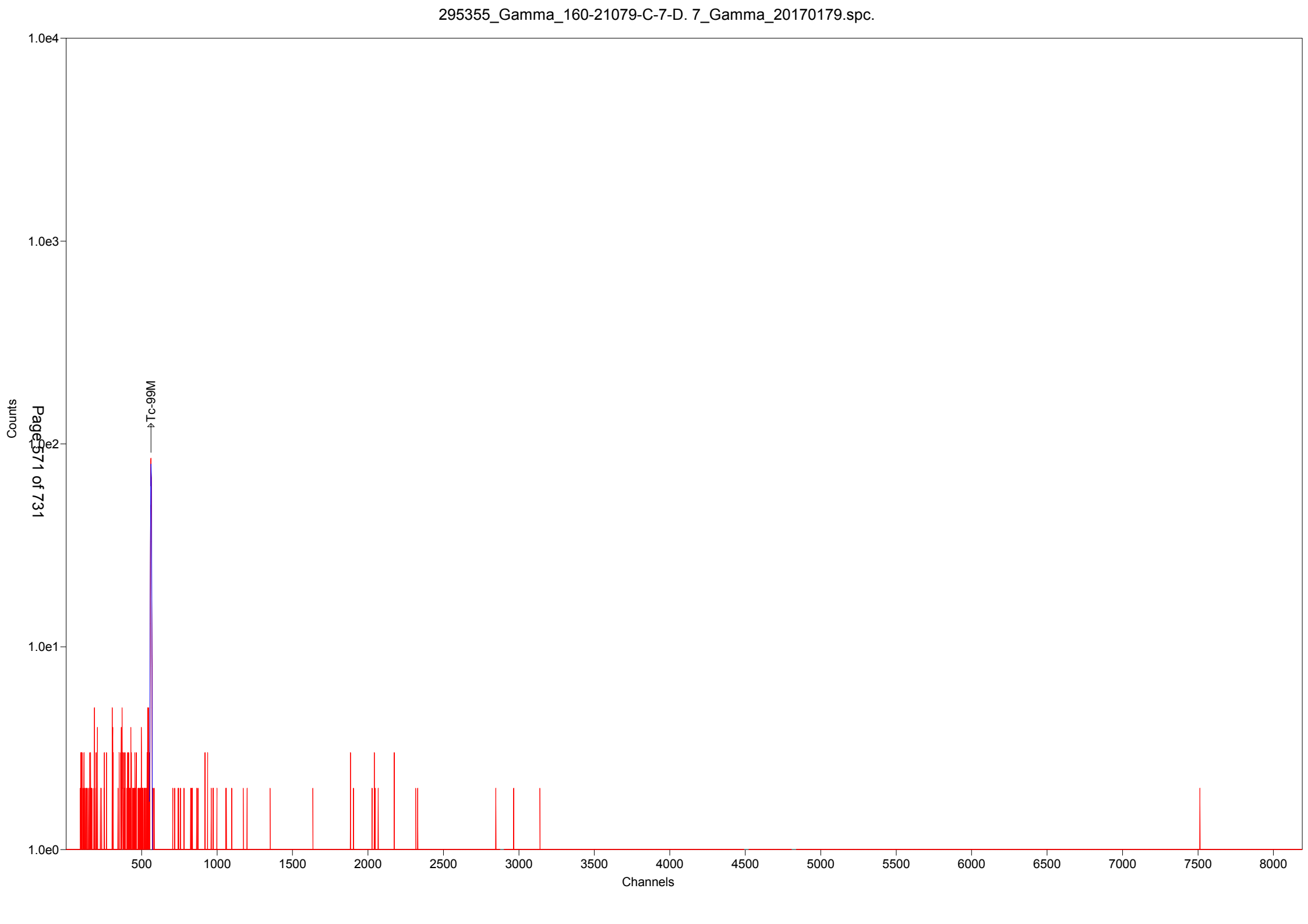
Nuclide	Time of Count Activity pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M #	5.6474E+02	1.0398E+03	4.461E+00%	4.33E+01

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

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

Total Activity (37.6 to 2000.1 keV) 5.647E+02 pCi/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 1.0398038E+03 pCi/Sample

The library has energies which are not separable.


295355_Gamma_160-21079-C-7-D. 7_Gamma_20170179.spc.
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Tc-99M
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Channels

Test America St. Louis Spectrum ID: 8_Gamma_20170280

Sample Description: 295355_Gamma_160-21079-D-7-D MS
Detector: Detector # 8
Batch ID: 295355
Work Order Number: Gamma
Lot Number: 160-21079-D-7-D MS

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 17:19:18 Real Time: 615 sec
Analysis Time: 3/2/2017 17:29 Dead Time: 2.36 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Tc-99m.lib
Bkgd Correction File: 8_2017-02-05_0935.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	9.948E+02	5.0	4.974E+01	7.100E+01	2.780E+01
Total	9.948E+02				

Analyst: conrad.reuscher

TestAmerica Inc Spectrum name: 8_Gamma_20170280.An1

Sample description
295355_Gamma_160-21079-D-7-D MS

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20170280.An1

Acquisition information
Start time: 3/2/2017 5:19:18 PM
Live time: 600
Real time: 615
Dead time: 2.36 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

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

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

Library Files
Main analysis library: Client_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) =
2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections                          Status          Comments
       Decay correct to date:         YES       3/2/2017 12:00:00 PM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  YES       8_2017-02-05_0935.PBC
                                                2/5/2017 9:35:39 AM

       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    1 cutoff: 5.00E+01 %
       Energy Calibration
            Normalized diff:       0.0494

*****   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    pCi/Samp
_____________________________________________________________________________
  140.46      416.   5.00   0.84  3.946E-02   140.51  89.060  9.948E+02 TC99M
No unknown peaks passed sensitivity test.

------------------------------------------------------------
This section based on library: Client_Tc-99m.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
_____________________________________________________________________________
TC-99M    561.86   140.51         4.       416.     0.694     5.00   0.836D

  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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Peak Code	Peak MDA Value pCi/Sample	COMMENTS
TC-99M	I	9.9476E+02				2.51E-01	
							Energy duplication
			140.51	9.948E+02 (	2.780E+01	5.00E+00	8.91E+01 G K

(- 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 pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M	5.3900E+02	9.9476E+02	5.001E+00%	2.78E+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 2000.0 keV) 5.390E+02 pCi/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 9.9476294E+02 pCi/Sample

The library has energies which are not separable.

295355_Gamma_160-21079-D-7-D MS. 8_Gamma_20170280.spc.

Test America St. Louis Spectrum ID: 5_Gamma_20170237

Sample Description: 295355_Gamma_160-21079-C-7-E MSD
Detector: Detector # 5
Batch ID: 295355
Work Order Number: Gamma
Lot Number: 160-21079-C-7-E MSD

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 18:04:03 Real Time: 603 sec
Analysis Time: 3/2/2017 18:14 Dead Time: 0.44 %
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_Tc-99m.lib
Bkgd Correction File: 5_2017-02-05_0914.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.017E+03	5.8	5.878E+01	7.834E+01	5.539E+01
Total	1.017E+03				

Analyst: conrad.reuscher

TestAmerica Inc Spectrum name: 5_Gamma_20170237.An1

Sample description
295355_Gamma_160-21079-C-7-E MSD

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20170237.An1

Acquisition information
Start time: 3/2/2017 6:04:03 PM
Live time: 600
Real time: 603
Dead time: 0.44 %
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_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) = 2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections                          Status          Comments
       Decay correct to date:         YES       3/2/2017 12:00:00 PM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  YES       5_2017-02-05_0914.PBC
                                                2/5/2017 9:14:17 AM

       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    1 cutoff: 5.00E+01 %
       Energy Calibration
            Normalized diff:       0.0383

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    pCi/Samp
_____________________________________________________________________________
  140.48      338.   5.78   0.88  3.411E-02   140.51  89.060  1.017E+03 TC99M
No unknown peaks passed sensitivity test.

------------------------------------------------------------
This section based on library: Client_Tc-99m.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
_____________________________________________________________________________
TC-99M    561.88   140.51        11.       338.     0.563     5.78   0.877D

  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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Peak Code	MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.0167E+03				2.51E-01	
							Energy duplication
			140.51	1.017E+03	(	5.539E+01 5.78E+00	8.91E+01 G K

(- 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 pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M	5.0553E+02	1.0167E+03	5.781E+00%	5.54E+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 2000.8 keV) 5.055E+02 pCi/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 1.0166803E+03 pCi/Sample

The library has energies which are not separable.

295355_Gamma_160-21079-C-7-E MSD. 5_Gamma_20170237.spc.

Test America St. Louis Spectrum ID: 7_Gamma_20170180

Sample Description: 295355_Gamma_160-21079-C-8-B
Detector: Detector # 7
Batch ID: 295355
Work Order Number: Gamma
Lot Number: 160-21079-C-8-B

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 18:04:57 Real Time: 609 sec
Analysis Time: 3/2/2017 18:15 Dead Time: 1.41 %
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_Tc-99m.lib
Bkgd Correction File: 7_2017-02-05_0929.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.135E+03	4.4	5.034E+01	7.667E+01	4.457E+01
Total	1.135E+03				

Analyst: conrad.reuscher

TestAmerica Inc Spectrum name: 7_Gamma_20170180.An1

Sample description
295355_Gamma_160-21079-C-8-B

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20170180.An1

Acquisition information
Start time: 3/2/2017 6:04:57 PM
Live time: 600
Real time: 609
Dead time: 1.41 %
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_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) =
2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	3/2/2017 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2017-02-05_0929.PBC 2/5/2017 9:29:08 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 1.0000

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/Samp	Nuc
140.48	589.	4.43	1.72	5.336E-02	140.51	89.060	1.135E+03	TC99M

No unknown peaks passed sensitivity test.

This section based on library: Client_Tc-99m.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
TC-99M	561.63	140.51	19.	589.	0.981	4.43	1.724D

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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Peak Code	MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.1354E+03				2.51E-01	
							Energy duplication
			140.51	1.135E+03	*(	4.457E+01 4.43E+00	8.91E+01 G K

(- 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 *****

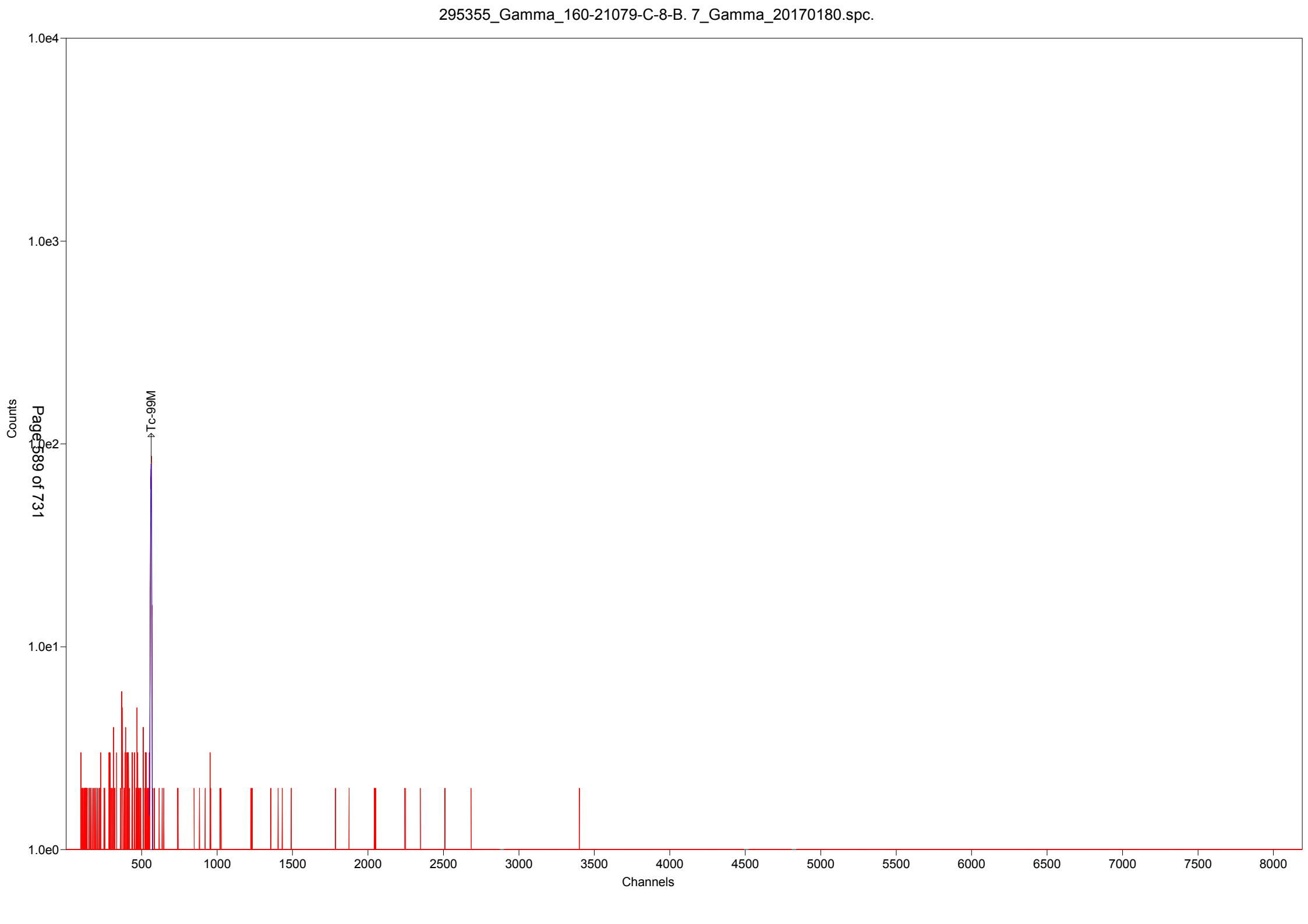
Nuclide	Time of Count Activity pCi/Sample	Time Corrected Activity pCi/Sample	Uncertainty 1 Sigma Counting	MDA pCi/Sample
TC-99M #	5.6362E+02	1.1354E+03	4.433E+00%	4.46E+01

- 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) 5.636E+02 pCi/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 1.1354498E+03 pCi/Sample

The library has energies which are not separable.


295355_Gamma_160-21079-C-8-B. 7_Gamma_20170180.spc.
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Tc-99M
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Channels

Test America St. Louis Spectrum ID: 8_Gamma_20170281

Sample Description: 295355_Gamma_160-21079-D-9-B
Detector: Detector # 8
Batch ID: 295355
Work Order Number: Gamma
Lot Number: 160-21079-D-9-B

Decay to Time: 3/2/2017 12:00 Live Time: 600 sec
Acquisition Time: 3/2/2017 18:06:17 Real Time: 615 sec
Analysis Time: 3/2/2017 18:16 Dead Time: 2.37 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Tc-99m.lib
Bkgd Correction File: 8_2017-02-05_0935.PBC

Nuclide	Activity pCi/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert pCi/Sample	1-Sigma Total Uncert pCi/Sample	Minimum Detectable Activity pCi/Sample
TC-99M	1.095E+03	5.0	5.435E+01	7.788E+01	2.877E+01
Total	1.095E+03				

Analyst: conrad.reuscher

TestAmerica Inc Spectrum name: 8_Gamma_20170281.An1

Sample description
295355_Gamma_160-21079-D-9-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20170281.An1

Acquisition information
Start time: 3/2/2017 6:06:17 PM
Live time: 600
Real time: 615
Dead time: 2.37 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

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

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

Library Files
Main analysis library: Client_Tc-99m.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(3.7000E-02* 1.0000E+00) =
2.7027E+01
Detection limit method: Reg. Guide 4.16 Method

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

Corrections	Status	Comments
Decay correct to date:	YES	3/2/2017 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2017-02-05_0935.PBC 2/5/2017 9:35:39 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 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. pCi/Samp	Nuc
63.50	14.	29.24	0.68	3.105E-02				
140.47	419.	4.96	0.84	3.946E-02	140.51	89.060	1.095E+03	TC99M

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
253.81	63.50	1.	14.	4.455E+02	29.24	0.675	-	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_Tc-99m.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
TC-99M	561.71	140.47	3.	419.	0.698	4.96	0.838

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 pCi/Sample	Peak Energy keV	Peak Activity pCi/Sample	Code	MDA Value pCi/Sample	COMMENTS
TC-99M	I	1.0952E+03				2.51E-01	
			140.51	1.095E+03	(	2.877E+01 4.96E+00 8.91E+01	G K

(- 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	Activity pCi/Sample	Time of Count Activity pCi/Sample	Time Corrected Uncertainty Counting	1 Sigma	MDA pCi/Sample
TC-99M	5.4223E+02	1.0952E+03	4.963E+00%		2.88E+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 2000.0 keV) 5.422E+02 pCi/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 1.0951671E+03 pCi/Sample

295355_Gamma_160-21079-D-9-B. 8_Gamma_20170281.spc.

Daily Checks

Test America
St. Louis
Quality Control Check

Spectrum: 5_20170302001_QCAsLeft
Description: Quality control Check (QC Source 'A') Post Stabilization
Acquired: 3/2/2017 12:40:12 AM
Detector: Detector # 5
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.58	59.79	60.04	PASS
FWHM	0.74	0.00	0.00	0.74	1.84	1.94	PASS
ActivityDiff	636.60	-5.00	-4.00	-0.37	4.00	5.00	PASS
QA-662							
FWHM	1.36	0.00	0.00	1.36	3.06	3.16	PASS
ActivityDiff	596.80	-5.00	-4.00	-2.76	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.40	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.39	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.80	4.10	4.20	PASS
ActivityDiff	1164.20	-5.00	-4.00	-1.66	4.00	5.00	PASS

Analyst: Mike Aldridge Reviewer: Mike Aldridge

Test America
St. Louis
Background Check

Spectrum: 5_20170302002_BG
Description: Background Contamination Check
Acquired: 3/2/2017 1:02:44 AM
Detector: Detector # 5
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.45	1.30	1.35	1.43	1.55	1.60	PASS

Analyst: Mike Aldridge Reviewer: Mike Aldridge

Test America
St. Louis
Quality Control Check

Spectrum: 7_20170302001_QCAsLeft
Description: Quality control Check (QC Source 'C') Post Stabilization
Acquired: 3/2/2017 12:41:32 AM
Detector: Detector # 7
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.10	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.63	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.39	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	2.03	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.85	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	-0.99	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	1332.41	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.25	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-2.58	4.00	5.00	PASS

Analyst: Mike Aldridge Reviewer: Mike Aldridge

Test America
St. Louis
Background Check

Spectrum: 7_20170302002_BG
Description: Background Contamination Check
Acquired: 3/2/2017 1:03:33 AM
Detector: Detector # 7
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.22	1.40	1.45	PASS

Analyst: Mike Aldridge Reviewer: Mike Aldridge

Test America
St. Louis
Quality Control Check

Spectrum: 8_20170302001_QCAsLeft
Description: Quality control Check (QC Source 'D') Post Stabilization
Acquired: 3/2/2017 12:42:56 AM
Detector: Detector # 8
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.53	59.79	60.04	PASS
FWHM	1.10	0.00	0.00	0.83	2.20	2.30	PASS
ActivityDiff	650.60	-5.00	-4.00	-0.68	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.30	3.23	3.33	PASS
ActivityDiff	609.90	-5.00	-4.00	1.28	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	1332.41	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.80	4.10	4.20	PASS
ActivityDiff	1189.70	-5.00	-4.00	-0.47	4.00	5.00	PASS

Analyst: Mike Aldridge Reviewer: Mike Aldridge

Test America
St. Louis
Background Check

Spectrum: 8_20170302002_BG
Description: Background Contamination Check
Acquired: 3/2/2017 1:04:45 AM
Detector: Detector # 8
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.54	1.68	1.74	PASS

Analyst: Mike Aldridge Reviewer: Mike Aldridge

Initial Calibrations

Gamma Verification per Geometry

Detector: Ge5

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard Rad12-0007

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

Reviewed By: Jody Watson

Date: 3/27/2012

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

Calibration Description:
5_Soil_TunaCan_90099_032612

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

Energy/FWHM Table

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

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

Efficiency Table

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

Calibration Certificate Table

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

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

Sample description
     5_TunaCan_90099_032612


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

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

Detector system
     Ge 5 SN/157


Calibration
       Filename:                   5_Soil_TunaCan.Clb
     5_Soil_TunaCan_90099_032612


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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(- This peak used in the nuclide activity average.

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

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

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

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

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

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

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

P - Peakbackground subtraction

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

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

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

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

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

Analyzed by: ______________________________
Admin

Reviewed by: ______________________________
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector: Ge7

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14726	98.7
Am-241	2037	418	0.3590	1163	1241.6	106.7
Cd-109	2881	591	0.0361	16363	15976	97.6
Co-57	1511	310	0.8560	362	346.77	95.8
Ce-139	2139	439	0.7990	549	539.48	98.3
Hg-203	4651	954	0.8146	1171	1199.2	102.4
Sn-113	3015	618	0.6400	966	976.76	101.1
Cs-137	1938	397	0.8510	467	467.66	100.2
Y-88	7264	1489	0.9370	1589	1567.3	98.6
Co-60	3580	734	0.9997	734	726.23	98.9
Co-60	3581	734	0.9999	734	719.64	98.0
Y-88	7690	1577	0.9920	1589	1635.7	102.9

Reviewed By: Jody Watson

Date: 3/16/2012

Calibration Data from file: 7_Soil_TunaCan.Clb
Energy Calibration Date: 3/16/2012 Time: 11:44:50 AM
Efficiency Calibration Date: 3/16/2012 Time: 11:45:14 AM

Calibration Description:
7_TunaCan_90099_030512

Energy Calibration Fit
Energy = 0.1533 +0.249954*Channel +6.71576e-009*Channel**2
FWHM (ch) = 3.2969 +0.001030*Channel -2.25091e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.73	46.54	46.58	-0.08%	0.86	0.87	-1.80%
237.72	59.54	59.57	-0.06%	0.86	0.88	-3.29%
351.56	88.03	88.03	0.00%	0.91	0.91	-0.17%
487.42	122.06	121.99	0.06%	0.97	0.95	2.36%
662.55	165.85	165.76	0.05%	1.00	0.99	1.26%
1116.52	279.17	279.24	-0.03%	1.13	1.10	1.85%
1566.54	391.69	391.73	-0.01%	1.21	1.21	-0.23%
2646.25	661.66	661.64	0.00%	1.47	1.47	0.54%
3591.85	898.02	898.04	-0.00%	1.66	1.68	-1.15%
4692.53	1173.24	1173.22	0.00%	1.92	1.91	0.69%
5329.58	1332.50	1332.49	0.00%	2.02	2.04	-0.87%
7343.37	1836.01	1836.02	-0.00%	2.42	2.41	0.28%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.8690 %
Ln(Eff) = 0.6717 -0.616654*Ln(Eng) -0.0206592*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4845 %
Ln(Eff) = -26.8969 +10.195443*Ln(Eng) -1.08167*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.3732E-002	2.4829E-002	-4.62%
59.54	3.9252E-002	3.7016E-002	5.70%
88.03	5.1999E-002	5.3285E-002	-2.47%
122.06	5.3679E-002	5.6057E-002	-4.43%
165.85	========== Knee ==========		
165.85	4.7932E-002	4.8811E-002	-1.83%
279.17	3.2322E-002	3.1541E-002	2.42%
391.69	2.3837E-002	2.3601E-002	0.99%
661.66	1.4947E-002	1.4924E-002	0.15%
898.02	1.1205E-002	1.1367E-002	-1.45%
1173.24	8.8255E-003	8.9287E-003	-1.17%
1332.50	7.7833E-003	7.9508E-003	-2.15%
1836.01	6.0876E-003	5.9192E-003	2.77%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14941.00	635.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	967.19	619.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	467.08	398.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1590.20	1490.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	735.15	735.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1590.70	1578.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  2/28/2014 11:43:43 AM
TestAmerica                    Spectrum name: 7_TunaCan_20120388.An1

Sample description
     7_TunaCan_90099_030512


Spectrum Filename: C:\User\SPC\Det7\7_TunaCan_20120388.An1

Acquisition information
       Start time:                3/5/2012 2:07:36 PM
       Live time:               3600
       Real time:               3721
       Dead time:                 3.25 %
       Detector ID:                  7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                  7_Soil_TunaCan.Clb
     7_TunaCan_90099_032712


       Energy Calibration
            Created:              3/16/2012 11:44:50 AM
            Zero offset:          0.153 keV
            Gain:                 0.250 keV/channel
            Quadratic:            6.716E-09 keV/channel^2

       Efficiency Calibration
            Created:              3/16/2012 11:45:14 AM
            Knee Energy:        165.85 keV
            Above the Knee:       Quadratic        Uncertainty =   0.87 %
            Log(Eff):             6.716580E-01 + (-6.166540E-01*Log(E) ) +
                                  ( -2.065917E-02*Log(E)^2 )
            Below the Knee:       Quadratic        Uncertainty =   1.48 %
            Log(Eff):            -2.689695E+01 + ( 1.019544E+01*Log(E) ) +
                                  ( -1.081671E+00*Log(E)^2 )

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

Analysis parameters
       Analysis engine:           Env32   G53W4.25
       Start channel:           150 (    37.65keV )
       Stop channel:           8000 (  2000.21keV )
       Peak rejection level:     10.000%
       Peak search sensitivity:  3
       Sample Size:              1.0000E+00
       Activity scaling factor:  1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                 1.0000E+00
       Detection limit method:   Reg. Guide 4.16 Method
```

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

*************** 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	1.4646E+04	1.4726E+04	6.521E-01%	1.74E+02
AM-241	1.2413E+03	1.2416E+03	6.489E-01%	1.46E+01
CD-109	1.4512E+04	1.5976E+04	4.292E-01%	1.09E+02
CO-57	2.9445E+02	3.4677E+02	7.076E-01%	4.14E+00
Ce-139	3.9059E+02	5.3948E+02	5.652E-01%	4.59E+00
Hg-203	4.6224E+02	1.1992E+03	5.917E-01%	9.42E+00
SN-113	6.6381E+02	9.7676E+02	6.552E-01%	8.15E+00
CS-137	4.6577E+02	4.6766E+02	7.730E-01%	5.58E+00
Y-898	1.0329E+03	1.5673E+03	6.291E-01%	1.06E+01
Co-1173	7.0966E+02	7.2623E+02	8.534E-01%	6.39E+00
Co-1332	7.0321E+02	7.1964E+02	8.542E-01%	6.07E+00
Y-1836	1.0780E+03	1.6357E+03	7.017E-01%	5.82E+00

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

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

Total Activity (701.8 to 2000.2 keV) 3.620E+04 Bq
Total Decayed Activity (701.8 to 2000.2 keV) 4.0121711E+04 Bq

Analyzed by: ______________________
Admin

Reviewed by: ______________________
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

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

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

Reviewed By: Jody Watson

Date: 3/28/2012

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

Calibration Description:
8_Soil_TunaCan_90099_032712

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

Energy/FWHM Table

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

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

Efficiency Table

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

Calibration Certificate Table

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

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

Sample description
     8_TunaCan_90099_032712


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

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

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


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

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

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

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

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

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

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

Energy Calibration

Normalized diff: 0.0205

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

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

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

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

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

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

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

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

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

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

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

(- This peak used in the nuclide activity average.

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

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

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

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

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

- -

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

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

P - Peakbackground subtraction

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

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

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

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

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

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Initial Calibration Verifications

2nd Source Verification

Detector: Ge5

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1160.9	99.7
Cs-137	1926	396	0.851	465	442.36	95.1
Co-60	3611	742	0.99974	742	700.21	94.3
Co-60	3612	742	0.999856	742	701.86	94.6

Reviewed By: Jody Watson

Date: 3/27/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 7:35:49 AM    Page  1
TestAmerica                     Spectrum name: 5_TunaCan2nd_20120813.An1

Sample description
     5_TunaCan2nd_Rad10_032712


Spectrum Filename: C:\User\SPC\Det5\5_TunaCan2nd_20120813.An1

Acquisition information
       Start time:                 3/27/2012 10:12:05 AM
       Live time:                7200
       Real time:                7250
       Dead time:                   0.69 %
       Detector ID:                    5

Detector system
     Ge 5 SN/157


Calibration
       Filename:                   5_Soil_TunaCan.Clb
     5_Soil_TunaCan_90099_032612


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

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

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

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.61keV )
       Stop channel:            8000 (  2000.53keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

□

     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 7:35:49 AM    Page  2
TestAmerica                     Spectrum name: 5_TunaCan2nd_20120813.An1
                                      Page 1
```

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

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

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2012-02-26_0305.PBC 2/26/2012 3:05:30 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 33.1557

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.81	1005.	12.08	0.62	1.151E-02				
46.61	72616.	0.49	0.73	1.792E-02	46.54	4.250	1.421E+04	Pb210
49.73	1326.	15.18	0.68	1.987E-02				
59.57	75329.	0.49	0.74	2.535E-02	59.54	35.700	1.161E+03	AM241
87.94	40851.	0.68	0.80	3.460E-02	88.03	3.610	1.542E+04	CD109
96.44	148.	47.31	0.80	3.568E-02				
99.01	160.	48.52	0.81	3.589E-02				
105.59	109.	69.79	0.52	3.619E-02				
121.94	9225.	1.66	0.84	3.583E-02	122.06	85.600	3.348E+02	CO57
129.89	126.	62.97	0.30	3.522E-02				
136.43	1263.	7.42	0.90	3.457E-02				
165.86	1574.	6.14	0.84	3.133E-02	165.85	79.900	5.319E+02	Ce139
238.72	327.	27.04	0.86	2.319E-02				
247.25	57.	84.47	0.31	2.252E-02				
259.02	93.	60.17	0.97	2.167E-02				
260.46	98.	58.62	0.97	2.157E-02				
322.65	45.	91.14	0.46	1.806E-02				
351.63	256.	27.79	1.06	1.681E-02				
391.95	494.	16.33	1.15	1.536E-02	391.69	64.000	9.501E+02	SN113
407.02	43.	90.43	0.56	1.489E-02				
412.80	202.	35.90	0.77	1.471E-02				
420.83	123.	52.91	0.72	1.448E-02				
510.72	188.	44.32	0.50	1.232E-02				
542.81	148.	28.69	0.36	1.171E-02				
583.30	161.	33.50	0.69	1.103E-02				
661.70	25605.	0.71	1.39	9.924E-03	661.66	85.210	4.424E+02	CS137
762.61	129.	36.06	0.79	8.812E-03				
796.90	151.	38.71	0.30	8.493E-03				
886.67	129.	46.77	0.30	7.766E-03				
897.77	428.	19.21	1.38	7.686E-03	898.02	93.700	1.665E+03	Y898
932.49	230.	35.52	0.82	7.445E-03				

1008.65	104.	56.29	0.28	6.970E-03				
1173.15	23044.	0.73	1.79	6.138E-03	1173.24	99.900	7.002E+02	Co1173
1332.39	20769.	0.71	1.87	5.515E-03	1332.50	99.982	7.019E+02	Co1332
1836.05	245.	7.47	1.56	4.208E-03	1836.01	99.200	1.642E+03	Y1836

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.78	36.81	4847.	1005.	8.731E+04	12.08	0.625	-	
198.52	49.73	12365.	1326.	6.673E+04	15.18	0.681	-	s
385.40	96.42	1874.	90.	2.532E+03	71.31	0.588	-	sc
395.68	98.99	2103.	121.	3.381E+03	58.44	0.394	-	s

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
```

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

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

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-02-26_0327.PBC 2/26/2012 3:27:47 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0270

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	788.	12.78	0.82	1.487E-02				
40.49	109.	96.90	0.59	1.869E-02				
46.62	49142.	0.63	0.84	2.491E-02	46.54	4.250	1.386E+04	Pb210
49.64	876.	18.72	0.86	2.792E-02				
59.61	54530.	0.58	0.87	3.707E-02	59.54	35.700	1.150E+03	AM241
76.99	260.	38.90	1.03	4.881E-02				
88.06	31019.	0.77	0.89	5.329E-02	88.03	3.610	1.522E+04	CD109
122.04	6834.	2.04	0.94	5.606E-02	122.06	85.600	3.171E+02	CO57
136.41	810.	9.51	1.00	5.411E-02				
165.84	1193.	6.45	0.96	4.765E-02	165.85	79.900	5.180E+02	Ce139
185.66	92.	57.01	0.73	4.445E-02				
213.19	122.	50.56	0.75	3.960E-02				
272.80	146.	47.29	0.28	3.217E-02				
391.67	372.	19.60	1.11	2.360E-02	391.69	64.000	9.332E+02	SN113
442.91	47.	93.72	0.45	2.122E-02				
483.77	95.	38.10	0.62	1.965E-02				
524.63	67.	65.12	0.73	1.831E-02				
604.78	31.	59.37	0.27	1.616E-02				
628.99	32.	94.37	0.58	1.561E-02				
661.67	19152.	0.86	1.47	1.492E-02	661.66	85.210	4.405E+02	CS137
898.03	322.	23.53	1.90	1.137E-02	898.02	93.700	1.694E+03	Y898
910.18	180.	33.99	0.85	1.123E-02				
963.79	49.	71.39	0.69	1.067E-02				
1173.23	16317.	0.86	1.89	8.929E-03	1173.24	99.900	6.817E+02	Co1173
1332.49	14763.	0.85	2.04	7.951E-03	1332.50	99.982	6.921E+02	Co1332
1836.09	186.	9.19	1.40	5.919E-03	1836.01	99.200	1.780E+03	Y1836

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.00	36.65	3116.	788.	5.300E+04	12.78	0.819	-	
161.37	40.49	4419.	109.	5.831E+03	96.90	0.587	-	c
197.99	49.64	8222.	876.	5.931E+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:
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	278.81	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

2nd Source Verification

Detector: Ge8

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1175.4	101.0
Cs-137	1926	396	0.851	465	446.61	96.0
Co-60	3611	742	0.99974	742	697.22	93.9
Co-60	3612	742	0.999856	742	691.92	93.2

Reviewed By: Jody Watson

Date: 3/29/2012

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     ORTEC g v - i (3263) Env32  G53W4.25  3/29/2012 7:45:38 AM    Page  1
TestAmerica                     Spectrum name: 8_TunaCan2nd_20120697.An1

Sample description
     8_TunaCan_81427-334_2ndsource_032912


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan2nd_20120697.An1

Acquisition information
       Start time:                 3/29/2012 1:58:04 AM
       Live time:               3600
       Real time:               3622
       Dead time:                  0.61 %
       Detector ID:                   8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


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

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

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

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

□

     ORTEC g v - i (3263) Env32  G53W4.25  3/29/2012 7:45:38 AM    Page  2
TestAmerica                     Spectrum name: 8_TunaCan2nd_20120697.An1
                                      Page 1
```

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

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

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2012-03-02_0402.PBC 3/2/2012 4:02:11 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 27.9595

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.61	594.	17.47	1.15	1.254E-02				
46.53	38495.	0.62	0.95	2.001E-02	46.54	4.250	1.345E+04	Pb210
49.81	542.	25.92	1.04	2.243E-02				
59.48	43371.	0.71	0.98	2.878E-02	59.54	35.700	1.175E+03	AM241
84.86	327.	26.82	0.98	3.922E-02				
88.03	22911.	0.76	0.98	3.992E-02	88.03	3.610	1.504E+04	CD109
122.06	5318.	2.55	1.03	4.146E-02	122.06	85.600	3.349E+02	CO57
136.54	691.	14.03	0.89	3.998E-02				
165.93	1033.	8.62	1.19	3.628E-02	165.85	79.900	6.077E+02	Ce139
177.05	71.	70.08	0.69	3.453E-02				
185.74	128.	40.98	0.85	3.329E-02				
227.93	52.	65.04	0.45	2.844E-02				
270.79	87.	50.41	0.41	2.486E-02				
278.94	44.	131.33	1.13	2.428E-02	279.17	81.500	HL>Cutoff	Hg203
302.52	63.	54.81	0.69	2.279E-02				
370.09	35.	84.23	0.41	1.941E-02				
391.61	316.	17.91	0.81	1.855E-02	391.69	64.000	1.016E+03	SN113
409.22	93.	50.95	0.41	1.791E-02				
428.24	88.	46.51	0.39	1.726E-02				
564.57	72.	45.26	0.57	1.378E-02				
591.73	73.	42.60	0.61	1.326E-02				
661.62	15734.	0.88	1.38	1.209E-02	661.66	85.210	4.466E+02	CS137
720.39	41.	72.89	0.46	1.126E-02				
831.73	36.	50.61	0.44	9.986E-03				
897.91	396.	17.93	1.52	9.360E-03	898.02	93.700	2.554E+03	Y898
1092.31	69.	44.41	0.50	7.924E-03				
1173.30	13922.	0.92	1.73	7.452E-03	1173.24	99.900	6.972E+02	Co1173
1332.56	12390.	0.92	1.75	6.677E-03	1332.50	99.982	6.919E+02	Co1332
1836.18	152.	9.00	1.63	5.046E-03	1836.01	99.200	1.724E+03	Y1836

8_TunaCan2nd_20120697

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.23	36.61	3218.	594.	4.742E+04	17.47	1.147	- s
199.01	49.81	6400.	542.	2.416E+04	25.92	1.039	- sM
339.16	84.85	3491.	236.	6.026E+03	42.58	0.697	- sM

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.91	136.54	2178.	691.	1.728E+04	14.03	0.888	-
707.94	177.05	893.	71.	2.046E+03	70.08	0.693	- sM
742.68	185.74	978.	128.	3.835E+03	40.98	0.847	- sM
911.43	227.93	546.	52.	1.829E+03	65.04	0.445	- sc
1082.86	270.79	683.	87.	3.486E+03	50.41	0.413	- sM
1209.76	302.52	484.	63.	2.765E+03	54.81	0.692	- s
1480.00	370.09	385.	35.	1.803E+03	84.23	0.412	- sc
1636.49	409.22	685.	93.	5.212E+03	50.95	0.407	- s
1712.56	428.24	565.	88.	5.117E+03	46.51	0.393	- s
2257.86	564.57	330.	72.	5.224E+03	45.26	0.565	- s
2366.45	591.73	298.	73.	5.505E+03	42.60	0.613	- s
2881.06	720.39	284.	41.	3.640E+03	72.89	0.464	- s
3326.37	831.73	148.	36.	3.605E+03	50.61	0.439	- s
4368.55	1092.31	290.	69.	8.708E+03	44.41	0.495	- s

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

This section based on library: DET_EnergyStandardMix & Pb.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.71	46.48	12173.	40702.	11.306	0.74	0.992
AM-241	237.70	59.48	10649.	43371.	12.047	0.71	0.984
CD-109	351.85	88.02	4506.	23196.	6.443	0.88	1.056
CO-57	487.99	122.06	2908.	5318.	1.477	2.55	1.026
Ce-139	663.47	165.93	1722.	1033.	0.287	8.62	1.189s
Hg-203	1115.46	278.94	1642.	44.	0.012	131.33	1.133
SN-113	1566.07	391.61	822.	316.	0.088	17.91	0.806s
CS-137	2646.01	661.62	665.	15731.	4.370	0.88	1.379
Y-898	3591.03	897.91	871.	396.	0.110	17.93	1.524
Co-1173	4692.46	1173.30	374.	13922.	3.867	0.92	1.726
Co-1332	5329.42	1332.56	82.	12390.	3.442	0.92	1.753
Y-1836	7343.62	1836.18	6.	152.	0.042	9.00	1.626s

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

***** 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	1.4221E+04				8.15E+03	
			46.54	1.422E+04	(	1.806E+02 7.43E-01 4.25E+00	G
AM-241		1.1754E+03				1.58E+05	
			59.54	1.175E+03	(	1.311E+01 7.10E-01 3.57E+01	G
CD-109		1.5223E+04				4.63E+02	
			88.03	1.522E+04	(	2.071E+02 8.83E-01 3.61E+00	G
CO-57		3.3494E+02				2.72E+02	
			122.06	3.349E+02	(	1.600E+01 2.55E+00 8.56E+01	G
Ce-139		6.0766E+02				1.38E+02	
			165.85	6.077E+02	*(	1.153E+02 8.62E+00 7.99E+01	G
Hg-203		6.1671E-01				4.66E+01	
			279.17	6.167E-01	(	2.689E+00 1.31E+02 8.15E+01	G
SN-113		1.0157E+03				1.15E+02	
			391.69	1.016E+03	(	4.390E+02 1.79E+01 6.40E+01	G
CS-137		4.4661E+02				1.10E+04	
			661.66	4.466E+02	(P	3.489E+00 8.85E-01 8.52E+01	G
Y-898		2.5543E+03				1.07E+02	
			898.02	2.554E+03	(	9.046E+02 1.79E+01 9.37E+01	G
Co-1173		6.9722E+02				1.93E+03	
			1173.24	6.972E+02	(	4.649E+00 9.19E-01 9.99E+01	G
Co-1332		6.9192E+02				1.93E+03	
			1332.50	6.919E+02	(	2.515E+00 9.18E-01 1.00E+02	G
Y-1836		1.7236E+03				1.07E+02	
			1836.01	1.724E+03	(	1.542E+02 9.00E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 5
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

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

- -

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

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

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	1.3265E+04	1.4221E+04	7.429E-01%		1.81E+02
AM-241	1.1712E+03	1.1754E+03	7.101E-01%		1.31E+01
CD-109	4.4713E+03	1.5223E+04	8.832E-01%		2.07E+02
CO-57	4.1631E+01	3.3494E+02	2.551E+00%		1.60E+01
Ce-139 #	9.8959E+00	6.0766E+02	8.616E+00%		1.15E+02
Hg-203 A	6.1671E-01	>12 Halflives	1.3133E+02%	2.6892E+00	
SN-113	7.3819E+00	1.0157E+03	1.791E+01%		4.39E+02
CS-137	4.2415E+02	4.4661E+02	8.848E-01%		3.49E+00
Y-898	1.2542E+01	2.5543E+03	1.793E+01%		9.05E+02
Co-1173	5.1942E+02	6.9722E+02	9.185E-01%		4.65E+00
Co-1332	5.1548E+02	6.9192E+02	9.176E-01%		2.52E+00
Y-1836	8.4633E+00	1.7236E+03	8.997E+00%		1.54E+02

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

S U M M A R Y

Total Activity (	37.6 to	2000.3 keV)	2.045E+04 Bq/Sample
Total Decayed Activity (	37.6 to	2000.3 keV)	3.8690848E+04 Bq/Sample

Annual Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector # 5
SpectrumID: 5__20162316
Analysis Description: ACVTop-1012459;TunaCan2006
Calibration: 5_Soil_TunaCan_90099_032612
Detector: Detector # 5

Verification Date: 2016-12-07 09:33
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	4.70E+02	-4.6%
Cs-137	661.66	400	4.03E+02	-0.7%
Co-1332	1332.5	777	7.80E+02	-0.4%

Comments:

Perform ____Jody Watson 12/7/16_____ Reviev __Rachel Mueller__12/7/16_____

C:\User\CRpt\5__20162316.xls

Test America St. Louis Spectrum ID: 5__20162316

Sample Description: ACVTop-1012459;TunaCan2006
Detector: Detector # 5
Source Date: 10/1/2006 11:00
Acquired: 12/7/2016 09:33:08
Analyzed: 12/7/2016 13:06

Analyst: Jody Watson

Efficiency: 5_Soil_TunaCan_90099_032612
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Sample	Uncertainty %
AM-241	4.699E+02	0.44
CS-137	4.030E+02	0.71
Co-1332	7.800E+02	1.14
Total	1.653E+03	

TestAmerica Inc Spectrum name: 5__20162316.An1

Sample description
ACVTop-1012459;TunaCan2006

Spectrum Filename: C:\User\SPC\Det5\5__20162316.An1

Acquisition information
Start time: 12/7/2016 9:33:08 AM
Live time: 7200
Real time: 7243
Dead time: 0.59 %
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 G800W064
Start channel: 120 (30.13keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 20.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Traditional ORTEC method

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

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0548

***** 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/Samp	Nuc
32.18	496.	15.67	0.61	8.524E-03				
36.67	944.	11.09	0.80	1.141E-02				
46.60	62589.	0.55	0.74	1.792E-02				
59.57	84323.	0.44	0.75	2.535E-02	59.54	100.000	4.699E+02	AM241
77.03	510.	14.86	0.78	3.217E-02				
87.79	672.	12.91	0.84	3.458E-02				
238.69	548.	12.32	1.11	2.319E-02				
661.59	22770.	0.71	1.33	9.925E-03	661.66	100.000	4.030E+02	CS137
1173.02	8977.	1.15	1.73	6.139E-03				
1332.35	8114.	1.14	1.91	5.515E-03	1332.50	100.000	7.800E+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	
128.22	32.18	1958.	496.	5.819E+04	15.67	0.614	-	
146.17	36.67	3535.	944.	8.273E+04	11.09	0.805	-	s
185.94	46.60	15385.	62589.	3.493E+06	0.55	0.740	-	
307.75	77.03	1967.	510.	1.586E+04	14.86	0.780	-	
350.84	87.79	2286.	672.	1.944E+04	12.91	0.836	-	
954.87	238.69	1265.	548.	2.362E+04	12.32	1.111	-	

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
4692.35	1173.02	245.	8977.	1.462E+06	1.15	1.727	-

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	237.84	59.57	13512.	84323.	11.712	0.44	0.745
CS-137	2647.08	661.59	590.	22770.	3.162	0.71	1.327
Co-1332	5329.25	1332.35	60.	8114.	1.127	1.14	1.909

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/Sample	Peak Energy keV	Peak Activity uCi/Sample	Code	MDA Value uCi/Sample	COMMENTS
AM-241		4.6987E+02				1.58E+05	
			59.54	4.699E+02	(	4.650E+00 4.41E-01	1.00E+02 G
CS-137		4.0297E+02				1.10E+04	
			661.66	4.030E+02	(	3.268E+00 7.08E-01	1.00E+02 G
Co-1332		7.8001E+02				1.93E+03	
			1332.50	7.800E+02	(	6.623E+00 1.14E+00	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.

= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity uCi/Sample	Time Corrected Activity uCi/Sample	Uncertainty 1 Sigma Counting	MDA
AM-241	4.6227E+02	4.6987E+02	4.411E-01%	4.65E+00
CS-137	3.1865E+02	4.0297E+02	7.083E-01%	3.27E+00
Co-1332	2.0438E+02	7.8001E+02	1.137E+00%	6.62E+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 (30.1 to 2000.8 keV) 9.853E+02 uCi/Sample
Total Decayed Activity (30.1 to 2000.8 keV) 1.6528577E+03 uCi/Sample

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector # 7

SpectrumID: 7_2016120600_fVerif

Analysis Description: ACVTop-1012459

Calibration: 7_TunaCan_90099_032712

Detector: Detector # 7

Verification Date: 2016-12-06 16:15

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	4.30E+02	4.3%
Cs-137	661.66	400	3.83E+02	4.2%
Co-1332	1332.5	777	7.17E+02	7.7%

Comments:

Perform ___Jody Watson 12/7/16_____

Reviev ____Rachel Mueller 12/7/16_____

C:\User\CRpt\7_20161206005_EffVerif.xls

Sample Description: ACVTop-1012459
Detector: Detector # 7
Source Date: 10/1/2006 11:00
Acquired: 12/6/2016 16:15:04
Analyzed: 12/6/2016 18:17

Analyst: conrad.reuscher

Efficiency: 7_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.298E+02	0.33
CS-137	3.831E+02	0.59
Co-1332	7.170E+02	1.00
Total	1.530E+03	

TestAmerica Inc Spectrum name: 7_20161206005_EffVerif.An1

Sample description
ACVTop-1012459

Spectrum Filename: C:\User\SPC\Det7\7_20161206005_EffVerif.An1

Acquisition information
Start time: 12/6/2016 4:15:04 PM
Live time: 7200
Real time: 7334
Dead time: 1.83 %
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 G800W064
Start channel: 120 (30.11keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 20.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Traditional ORTEC method

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

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0928

***** 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
32.17	506.	19.31	1.12	1.067E-02				
36.55	1365.	9.32	1.06	1.477E-02				
46.61	80070.	0.49	0.89	2.489E-02				
57.28	1723.	9.65	0.85	3.504E-02				
59.64	112697.	0.33	0.85	3.707E-02	59.54	100.000	4.298E+02	AM241
77.11	570.	15.94	1.12	4.888E-02				
87.86	837.	13.18	0.72	5.323E-02				
238.60	923.	11.11	1.06	3.602E-02				
609.49	312.	14.49	1.45	1.605E-02				
661.81	32550.	0.59	1.44	1.492E-02	661.66	100.000	3.831E+02	CS137
1173.45	12301.	1.02	1.85	8.927E-03				
1332.71	10758.	1.00	2.03	7.950E-03	1332.50	100.000	7.170E+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	
128.22	32.17	2851.	506.	4.739E+04	19.31	1.115	-	s
145.74	36.55	4682.	1365.	9.241E+04	9.32	1.063	-	s
185.98	46.61	20339.	80070.	3.216E+06	0.49	0.894	-	
228.91	57.24	15661.	1815.	5.182E+04	10.03	0.848	-	sD

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
308.00	77.11	2887.	570.	1.167E+04	15.94	1.123	- s
351.01	87.86	3577.	837.	1.572E+04	13.18	0.716	- s
954.04	238.60	2400.	923.	2.562E+04	11.11	1.058	- s
2437.67	609.49	495.	312.	1.944E+04	14.49	1.452	-
4693.52	1173.45	467.	12301.	1.378E+06	1.02	1.850	-

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	237.72	59.54	12405.	112700.	15.653	0.33	0.850D
CS-137	2646.96	661.81	776.	32550.	4.521	0.59	1.439
Co-1332	5330.54	1332.71	98.	10758.	1.494	1.00	2.029

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		4.2982E+02				1.58E+05	
			59.54	4.298E+02	(	3.052E+00 3.29E-01 1.00E+02 G	
CS-137		3.8308E+02				1.10E+04	
			661.66	3.831E+02	(	2.469E+00 5.88E-01 1.00E+02 G	
Co-1332		7.1700E+02				1.93E+03	
			1332.50	7.170E+02	(	5.561E+00 9.96E-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	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

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

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

P - Peakbackground subtraction

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

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.2287E+02	4.2982E+02	3.290E-01%	3.05E+00
CS-137	3.0293E+02	3.8308E+02	5.884E-01%	2.47E+00
Co-1332	1.8792E+02	7.1700E+02	9.964E-01%	5.56E+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 (30.1 to 2000.1 keV) 9.137E+02 GPS/Source
Total Decayed Activity (30.1 to 2000.1 keV) 1.5299009E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector # 8
SpectrumID: 8__20162079
Analysis Description: ACVTop-1012459;TunaCan2006
Calibration: 8_Soil_TunaCan_90099_032712
Detector: Detector # 8

Verification Date: 2016-12-06 10:28
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	4.74E+02	-5.6%
Cs-137	661.66	400	3.94E+02	1.5%
Co-1332	1332.5	777	7.46E+02	4.0%

Comments:

Perform Jody Watson 12/6/16_____ Reviev _Rachel Mueller 12/6/16_____

C:\User\CRpt\8__20162079.xls

Test America St. Louis Spectrum ID: 8__20162079

Sample Description: ACVTop-1012459;TunaCan2006
Detector: Detector # 8
Source Date: 10/1/2006 11:00
Acquired: 12/6/2016 10:28:22
Analyzed: 12/6/2016 14:38

Analyst: Jody Watson

Efficiency: 8_Soil_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Sample	Uncertainty %
AM-241	4.743E+02	0.43
CS-137	3.938E+02	0.66
Co-1332	7.463E+02	1.05
Total	1.614E+03	

TestAmerica Inc Spectrum name: 8__20162079.An1

Sample description
ACVTop-1012459;TunaCan2006

Spectrum Filename: C:\User\SPC\Det8\8__20162079.An1

Acquisition information
Start time: 12/6/2016 10:28:22 AM
Live time: 7200
Real time: 7401
Dead time: 2.71 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

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

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

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

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 120 (30.05keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 20.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Traditional ORTEC method

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

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0641

***** 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/Samp	Nuc
32.09	707.	14.15	1.02	9.221E-03				
36.58	980.	12.10	0.75	1.251E-02				
46.52	70815.	0.54	0.82	2.004E-02				
59.52	96810.	0.43	0.83	2.880E-02	59.54	100.000	4.743E+02	AM241
77.07	604.	14.42	0.91	3.704E-02				
87.85	746.	13.66	0.82	3.988E-02				
238.63	632.	10.73	0.95	2.744E-02				
582.93	290.	16.79	1.17	1.343E-02				
609.09	274.	15.38	1.27	1.295E-02				
661.53	27112.	0.66	1.30	1.209E-02	661.66	100.000	3.938E+02	CS137
1173.08	10600.	1.06	1.62	7.454E-03				
1332.34	9404.	1.05	1.73	6.678E-03	1332.50	100.000	7.463E+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	
128.14	32.09	2938.	707.	7.668E+04	14.15	1.023	-	
146.11	36.58	4362.	980.	7.832E+04	12.10	0.745	-	s
185.87	46.52	18921.	70815.	3.534E+06	0.54	0.818	-	
308.09	77.24	2470.	604.	1.632E+04	14.42	0.907	-	

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
351.20	87.85	2891.	746.	1.871E+04	13.66	0.815	-
954.37	238.63	1322.	632.	2.303E+04	10.73	0.954	- s
2331.64	582.93	480.	290.	2.160E+04	16.79	1.168	-
2436.28	609.09	411.	274.	2.119E+04	15.38	1.268	-
4692.33	1173.08	306.	10600.	1.422E+06	1.06	1.623	-

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	237.89	59.52	16889.	96810.	13.446	0.43	0.828
CS-137	2646.07	661.53	760.	27112.	3.765	0.66	1.301
Co-1332	5329.41	1332.34	56.	9404.	1.306	1.05	1.731

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/Sample	Peak Energy keV	Peak Activity uCi/Sample	Code	MDA Value uCi/Sample	COMMENTS
AM-241		4.7433E+02				1.58E+05	
			59.54	4.743E+02	(	4.564E+00 4.33E-01 1.00E+02	G
CS-137		3.9384E+02				1.10E+04	
			661.66	3.938E+02	(	3.018E+00 6.58E-01 1.00E+02	G
Co-1332		7.4628E+02				1.93E+03	
			1332.50	7.463E+02	(	5.288E+00 1.05E+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
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 uCi/Sample	Time Corrected Activity uCi/Sample	Uncertainty Counting 1 Sigma	MDA
AM-241	4.6665E+02	4.7433E+02	4.329E-01%	4.56E+00
CS-137	3.1145E+02	3.9384E+02	6.577E-01%	3.02E+00
Co-1332	1.9561E+02	7.4628E+02	1.053E+00%	5.29E+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 (30.1 to 2000.0 keV) 9.737E+02 uCi/Sample
Total Decayed Activity (30.1 to 2000.0 keV) 1.6144471E+03 uCi/Sample

Monthly Backgrounds

Test America
St. Louis
Background Check

Spectrum: 5_20170204001_BGLong
Description: Background Long PBC Count
Acquired: 2/4/2017 1:08:18 PM
Detector: Detector # 5
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.45	1.30	1.35	1.47	1.55	1.60	PASS

Analyst: conrad.reuscher Reviewer:

(Page 1 of 8)

TestAmerica Inc Spectrum name: 5_20170204001_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det5\5_20170204001_BGLong.An1

Acquisition information
Start time:	2/4/2017 1:08:18 PM
Live time:	72000
Real time:	72312
Dead time:	0.43 %
Detector ID:	5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_QC.Clb
Ge5_QC

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

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

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G800W064
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

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

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1487

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.62	619.	9.28	0.72	5.686E-02	46.54	4.250	3.565E+00	PB210
59.63	208.	19.23	0.83	7.432E-02	59.54	35.900	1.085E-01	AM241
63.25	587.	8.14	0.68	7.918E-02	63.29	3.810	2.702E+00	TH234
74.93	231.	15.56	0.81	9.489E-02				
77.09	131.	26.08	0.81	9.778E-02				
84.51	210.	22.77	1.16	1.077E-01				
92.51	862.	6.99	0.96	1.129E-01	92.59	5.584	1.898E+00	TH234
					93.35	5.561	1.904E+00	AC228
185.73	425.	10.40	0.83	9.607E-02	185.72	54.000	1.139E-01	U235
					185.99	3.280	1.876E+00	Ra226
198.45	95.	29.77	0.74	9.298E-02				
238.63	193.	16.57	0.98	8.323E-02	238.63	43.300	7.433E-02	PB212
242.25	115.	26.38	0.98	8.235E-02	242.00	7.430	2.614E-01	PB214
295.35	144.	26.99	1.10	6.947E-02	295.09	19.300	1.485E-01	PB214
351.72	197.	19.96	0.97	5.579E-02	351.93	37.600	1.306E-01	PB214
609.38	191.	21.01	1.03	3.199E-02	609.31	46.090	1.799E-01	BI214
					610.30	5.750	1.445E+00	RU103
661.60	167.	19.48	1.36	2.860E-02	661.66	85.210	9.535E-02	CS137
1119.87	113.	26.54	3.52	1.646E-02	1120.29	15.100	6.313E-01	BI214
					1120.55	99.987	9.537E-02	Sc46
					1121.30	34.900	2.734E-01	Ta182
1460.06	105.	20.54	1.70	1.300E-02	1460.83	10.670	1.052E+00	K40
1764.55	91.	16.76	2.27	1.105E-02	1764.49	15.400	7.412E-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
299.37	74.95	529.	231.	2.430E+03	15.56	0.813 -	D
308.00	77.11	520.	131.	1.342E+03	26.08	0.815 -	D
337.70	84.51	623.	210.	1.950E+03	22.77	1.164 -	s
793.80	198.45	282.	95.	1.022E+03	29.77	0.743 -	sM

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

This section based on library: DET_Long Background PBC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.00	46.62	700.	619.	0.009	9.28	0.717s
AM-241	238.08	59.63	464.	208.	0.003	19.23	0.827
TH-234	252.58	63.25	509.	587.	0.008	8.14	0.684
TH-234	369.72	92.51	722.	862.	0.012	6.99	0.964s
Ra-226	742.91	185.73	460.	425.	0.006	10.40	0.832s
PB-212	954.64	238.63	412.	195.	0.003	16.36	0.978D
PB-214	968.10	242.00	425.	129.	0.002	24.20	0.981D
PB-214	1181.64	295.35	388.	144.	0.002	26.99	1.098
PB-214	1407.23	351.72	368.	197.	0.003	19.96	0.975
BI-214	2438.22	609.38	284.	191.	0.003	21.01	1.031s
CS-137	2647.13	661.60	207.	167.	0.002	19.48	1.358s
BI-214	4479.86	1119.87	121.	113.	0.002	26.54	3.516s
K-40	5839.67	1460.06	72.	105.	0.001	20.54	1.699
BI-214	7056.28	1764.55	24.	91.	0.001	16.76	2.266

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	1.0515E+00				4.66E+11	
			1460.83	1.052E+00	(	4.231E-01 2.05E+01	1.07E+01 G
CS-137	I	9.5353E-02				1.10E+04	
			661.66	9.535E-02	@(	3.972E-02 1.95E+01	8.52E+01 G
PB-210	N	3.5652E+00				8.14E+03	
			46.54	3.565E+00	@(	7.254E-01 9.28E+00	4.25E+00 G
PB-212	N	7.5177E-02				6.98E+02	
			238.63	7.518E-02	(	3.749E-02 1.64E+01	4.33E+01 G
			300.03	0.000E+00	%	3.715E-01 1.00E+03	3.28E+00 GA
PB-214	N	1.3666E-01				5.84E+05	
			351.93	1.306E-01	(	6.104E-02 2.00E+01	3.76E+01 G
			295.09	1.485E-01	(	9.775E-02 2.70E+01	1.93E+01 G
			242.00	2.933E-01	+	2.240E-01 2.42E+01	7.43E+00 GA
BI-214	N	1.7990E-01				5.84E+05	
			609.31	1.799E-01	@(	7.652E-02 2.10E+01	4.61E+01 G
			1120.29	6.313E-01	+	3.015E-01 2.65E+01	1.51E+01 G
			1764.49	7.412E-01	+	2.090E-01 1.68E+01	1.54E+01 G
TH-234	N	2.7022E+00				1.63E+12	
			63.29	2.702E+00	(	4.960E-01 8.14E+00	3.81E+00 G
			92.59	1.898E+00	-	2.819E-01 6.99E+00	5.58E+00 G
Ra-226		1.8759E+00				5.84E+05	
			185.99	1.876E+00	@(	4.526E-01 1.04E+01	3.28E+00 G
AM-241	T	1.0845E-01				1.58E+05	
			59.54	1.085E-01	(	5.375E-02 1.92E+01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide

failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide		Activity DPS	Time of Count Uncertainty Counting 1 Sigma	MDA
BE-7	<	2.2461E-01		
NA-22	<	3.0622E-02		
K-40		1.0515E+00	2.0537E+01%	4.231E-01
Sc-46	<	3.7252E-02		
CR-51	<	1.2736E-01		
MN-54	<	2.6193E-02		
FE-59	<	5.3243E-02		
Co-56	<	2.4184E-02		
CO-57	<	1.0306E-02		
CO-58	<	2.4236E-02		
CO-60	<	3.4665E-02		
ZN-65	<	3.7288E-02		
NB-94	<	2.5484E-02		
ZR-95	<	4.1667E-02		
NB-95	<	4.4748E-02		
RU-103	<	1.8496E-02		
RH-106	<	2.1788E-01		
AG-108M	<	1.8002E-02		

AG-110M	<	4.4213E-02		
SN-113	<	2.4637E-02		
SB-124	<	2.8816E-02		
SB-125	<	5.5927E-02		
I-131	<	1.7402E-02		
BA-133	<	3.3046E-02		
CS-134	<	3.4994E-02		
CS-137	#	9.5353E-02	1.9483E+01%	3.972E-02
CE-139	<	1.1750E-02		
Ba-140	<	7.3704E-02		
La-140	<	3.1494E-02		
CE-141	<	1.8353E-02		
CE-144	<	9.6638E-02		
PM-144	<	2.8662E-02		
EU-152	<	5.1283E-02		
EU-154	<	2.5449E-01		
EU-155	<	4.0045E-02		
HF-181	<	2.8921E-02		
Ta-182	<	1.0487E-01		
Hg-203	<	1.2390E-02		
TL-208	<	2.2867E-02		
pm-146	<	6.4829E-02		
y-88	<	3.0231E-02		
PB-210	#	3.5652E+00	9.2805E+00%	7.254E-01
PB-212		7.5177E-02	1.6363E+01%	3.749E-02
PB-214		1.3666E-01	1.6784E+01%	6.104E-02
BI-207	<	3.5976E-02		
BI-212	<	3.7541E-01		
BI-214		1.7990E-01	2.1014E+01%	7.652E-02
BI-210M	<	2.1264E-02		
RA-224	<	2.7503E-01		
AC-228	<	1.2398E-01		
TH-227	<	6.2162E-02		
TH-229	<	2.1371E-01		
TH-234		2.7022E+00	8.1350E+00%	4.960E-01
PA-231	<	6.9803E-01		
PA-233	<	3.3626E-02		
PA-234	<	6.4953E-02		
PA-234M	<	3.1169E+00		
Ra-226	#	1.8759E+00	1.0402E+01%	4.526E-01
U-235	<	7.9159E-02		
AM-241		1.0845E-01	1.9231E+01%	5.375E-02
Np-237	<	6.2825E-02		

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

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  2000.8 keV)     9.790E+00  DPS
```

Test America
St. Louis
Background Check

Spectrum: 7_20170204001_BGLong
Description: Background Long PBC Count
Acquired: 2/4/2017 1:07:16 PM
Detector: Detector # 7
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.29	1.40	1.45	PASS

Analyst: conrad.reuscher Reviewer:

TestAmerica Inc Spectrum name: 7_20170204001_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det7\7_20170204001_BGLong.An1

Acquisition information
Start time: 2/4/2017 1:07:16 PM
Live time: 72000
Real time: 73266
Dead time: 1.73 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 1/6/2011 8:06:10 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

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

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.3617

***** 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	406.	14.06	1.46	8.129E-02	46.54	4.250	1.638E+00	PB210
63.40	628.	9.66	2.06	1.229E-01	63.29	3.810	1.863E+00	TH234
92.57	790.	8.98	2.20	1.861E-01	92.59	5.584	1.056E+00	TH234
					93.35	5.561	1.059E+00	AC228
185.65	391.	14.52	2.42	1.632E-01	185.72	54.000	PBC<MDA	U235
					185.99	3.280	1.015E+00	Ra226
238.46	248.	20.11	1.78	1.417E-01	238.63	43.300	5.625E-02	PB212
609.38	123.	23.94	0.81	5.308E-02	609.31	46.090	6.982E-02	BI214
1459.87	103.	23.46	2.74	1.997E-02	1460.83	10.670	6.704E-01	K40
1763.88	52.	26.79	2.10	1.692E-02	1764.49	15.400	2.763E-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	
369.85	92.54	1379.	235.	1.263E+03	23.28	0.886	-	sD

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

This section based on library: DET_Long Background PBC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.98	46.61	818.	406.	0.006	14.06	1.465s
TH-234	253.16	63.40	796.	628.	0.009	9.66	2.059s
TH-234	369.93	92.59	1385.	226.	0.003	24.23	0.886D
Ra-226	742.21	185.65	681.	391.	0.005	14.52	2.423s
PB-212	953.47	238.46	586.	248.	0.003	20.11	1.779s
BI-214	2437.25	609.38	186.	123.	0.002	23.94	0.806s
K-40	5839.17	1459.87	82.	103.	0.001	23.46	2.744s
BI-214	7055.14	1763.88	24.	52.	0.001	26.79	2.100

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	6.7041E-01				4.66E+11		
			1460.83	6.704E-01	(	2.931E-01	2.35E+01 1.07E+01 G	
PB-210	N	1.6376E+00				8.14E+03		
			46.54	1.638E+00	*(	5.477E-01	1.41E+01 4.25E+00 G	
PB-212	N	5.6253E-02				6.98E+02		
			238.63	5.625E-02	*(	2.616E-02	2.01E+01 4.33E+01 G	
			300.03	0.000E+00	%	1.945E-01	9.06E+01 3.28E+00 GA	
BI-214	N	6.9815E-02				5.84E+05		
			609.31	6.982E-02	*(	3.761E-02	2.39E+01 4.61E+01 G	
			1120.29	0.000E+00	%	1.269E-01	1.08E+02 1.51E+01 G	
			1764.49	2.763E-01	+	1.366E-01	2.68E+01 1.54E+01 G	
TH-234	N	1.8630E+00				1.63E+12		
			63.29	1.863E+00	*(	3.982E-01	9.66E+00 3.81E+00 G	
			92.59	3.021E-01	-	2.355E-01	2.42E+01 5.58E+00 G	
Ra-226		1.0149E+00				5.84E+05		
			185.99	1.015E+00	*(	3.225E-01	1.45E+01 3.28E+00 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went

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

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

- -

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

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

P - Peakbackground subtraction

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

Nuclide		Activity DPS	Time of Count Uncertainty Counting 1 Sigma	MDA
BE-7	<	5.4924E-02		
NA-22	<	1.0436E-02		
K-40		6.7041E-01	2.3463E+01%	2.931E-01
Sc-46	<	1.4274E-02		
CR-51	<	6.9732E-02		
MN-54	<	1.4394E-02		
FE-59	<	3.3153E-02		
Co-56	<	1.5995E-02		
CO-57	<	7.4116E-03		
CO-58	<	1.7739E-02		
CO-60	<	2.0423E-02		
ZN-65	<	2.1001E-02		
NB-94	<	1.5336E-02		

ZR-95	<	2.3356E-02			
NB-95	<	7.6190E-03			
RU-103	<	1.1586E-02			
RH-106	<	1.1990E-01			
AG-108M	<	9.1488E-03			
AG-110M	<	1.1910E-02			
SN-113	<	1.2518E-02			
SB-124	<	1.3168E-02			
SB-125	<	2.8369E-02			
I-131	<	9.2105E-03			
BA-133	<	1.1956E-02			
CS-134	<	1.7575E-02			
CS-137	<	1.8418E-02			
CE-139	<	6.2985E-03			
Ba-140	<	4.4031E-02			
La-140	<	2.1867E-02			
CE-141	<	1.3051E-02			
CE-144	<	6.6966E-02			
PM-144	<	1.4672E-02			
EU-152	<	2.6534E-02			
EU-154	<	1.9323E-01			
EU-155	<	2.2586E-02			
HF-181	<	1.5884E-02			
Ta-182	<	3.9347E-02			
Hg-203	<	9.5710E-03			
TL-208	<	1.4354E-02			
pm-146	<	3.5361E-02			
y-88	<	1.5106E-02			
PB-210	#	1.6376E+00	1.4063E+01%		5.477E-01
PB-212	#	5.6253E-02	2.0108E+01%		2.616E-02
PB-214	<	2.2074E-02			
BI-207	<	1.6447E-02			
BI-212	<	3.2956E-01			
BI-214		6.9815E-02	2.3939E+01%		3.761E-02
BI-210M	<	1.1696E-02			
RA-224	<	1.6984E-01			
AC-228	<	8.1132E-02			
TH-227	<	4.7428E-02			
TH-229	<	1.2916E-01			
TH-234	#	1.8630E+00	9.6620E+00%		3.982E-01
PA-231	<	3.4422E-01			
PA-233	<	1.8867E-02			
PA-234	<	4.2637E-02			
PA-234M	<	3.1148E+00			
Ra-226	#	1.0149E+00	1.4525E+01%		3.225E-01
U-235	<	4.9308E-02			
AM-241	<	2.5870E-02			
Np-237	<	5.1644E-02			

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

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

Total Activity (37.6 to 2000.1 keV) 5.312E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 8_20170204001_BGLong
Description: Background Long PBC Count
Acquired: 2/4/2017 1:06:34 PM
Detector: Detector # 8
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.58	1.68	1.74	PASS

Analyst: conrad.reuscher Reviewer:

TestAmerica Inc Spectrum name: 8_20170204001_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det8\8_20170204001_BGLong.An1

Acquisition information
Start time:	2/4/2017 1:06:34 PM
Live time:	72000
Real time:	73705
Dead time:	2.31 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_QC.Clb
Ge8_QC

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

Efficiency Calibration
Created:	1/6/2011 8:07:20 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G800W064
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.97keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

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

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1364

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
59.53	482.	8.81	1.02	8.689E-02	59.54	35.900	2.144E-01	AM241
63.32	1107.	4.38	1.03	9.247E-02	63.29	3.810	4.367E+00	TH234
77.03	147.	26.39	0.90	1.127E-01				
90.07	139.	23.93	1.05	1.292E-01				
92.61	2027.	2.89	1.05	1.295E-01	92.59	5.584	3.893E+00	TH234
					93.35	5.561	3.906E+00	AC228
112.83	144.	25.70	1.03	1.321E-01				
143.71	265.	17.56	0.84	1.248E-01	143.79	10.960	2.695E-01	U235
185.68	1145.	6.37	0.87	1.108E-01	185.72	54.000	2.659E-01	U235
					185.99	3.280	4.381E+00	Ra226
238.43	378.	14.77	1.13	9.644E-02	238.63	43.300	1.259E-01	PB212
295.16	208.	21.92	0.47	8.101E-02	295.09	19.300	1.843E-01	PB214
351.85	274.	18.80	1.01	6.560E-02	351.93	37.600	1.543E-01	PB214
583.09	186.	21.79	2.15	3.958E-02	583.02	84.500	7.724E-02	TL208
609.45	228.	18.02	0.97	3.750E-02	609.31	46.090	1.832E-01	BI214
661.58	291.	16.54	0.99	3.335E-02	661.66	85.210	1.423E-01	CS137
1000.61	110.	22.94	1.35	2.158E-02	1001.00	0.837	8.485E+00	PA234M
1172.77	156.	14.68	1.31	1.835E-02	1173.24	99.900	1.185E-01	CO60
1331.93	143.	15.47	1.54	1.637E-02	1332.50	99.980	1.213E-01	CO60
1460.23	145.	17.63	1.67	1.543E-02	1460.83	10.670	1.226E+00	K40
1764.62	59.	25.46	1.76	1.319E-02	1764.49	15.400	4.058E-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
307.93	77.04	512.	147.	1.307E+03	26.39	0.902 -	s
360.23	90.09	483.	138.	1.068E+03	24.09	1.046 -	sD
451.12	112.83	462.	144.	1.093E+03	25.70	1.033 -	s

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

This section based on library: DET_Long Background PBC.lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.95	59.54	659.	483.	0.007	8.79	1.022D
TH-234	252.96	63.29	622.	1108.	0.015	4.38	1.025D
TH-234	370.17	92.59	707.	2027.	0.028	2.89	1.048D
U-235	574.65	143.71	572.	265.	0.004	17.56	0.836
U-235	742.71	185.72	895.	1161.	0.016	4.15	0.874D
PB-212	953.59	238.43	659.	378.	0.005	14.77	1.130
PB-214	1180.52	295.16	446.	208.	0.003	21.92	0.475s
PB-214	1407.29	351.85	476.	274.	0.004	18.80	1.008
TL-208	2332.27	583.09	273.	186.	0.003	21.79	2.150s
BI-214	2437.73	609.45	292.	228.	0.003	18.02	0.969s
CS-137	2646.15	661.55	321.	322.	0.004	15.56	1.001s
PA-234M	4002.45	1000.61	114.	110.	0.002	22.94	1.347
CO-60	4691.11	1172.77	77.	156.	0.002	14.68	1.307s
CO-60	5327.76	1331.93	63.	143.	0.002	15.47	1.541
K-40	5840.99	1460.23	70.	145.	0.002	17.63	1.674
BI-214	7058.59	1764.62	27.	59.	0.001	25.46	1.764

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

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

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS		Peak MDA DPS	Peak Value DPS		COMMENTS
K-40	N	1.2263E+00					4.66E+11		
			1460.83	1.226E+00	(	3.511E-01	1.76E+01	1.07E+01	G
CO-60	F	1.1993E-01					1.93E+03		
			1332.50	1.213E-01	(	3.368E-02	1.55E+01	1.00E+02	G
			1173.24	1.185E-01	(	3.299E-02	1.47E+01	9.99E+01	G
CS-137	I	1.5750E-01					1.10E+04		
			661.66	1.575E-01	(	4.213E-02	1.56E+01	8.52E+01	G
TL-208	N	7.7236E-02					6.98E+02		
			583.02	7.724E-02	*(	3.310E-02	2.18E+01	8.45E+01	G
			277.28	0.000E+00	&	1.657E-01	1.00E+03	6.31E+00	G
			860.56	0.000E+00	&	1.593E-01	1.12E+02	1.24E+01	G
PB-212	N	1.2590E-01					6.98E+02		
			238.63	1.259E-01	(	4.070E-02	1.48E+01	4.33E+01	G
			300.03	0.000E+00	%	4.495E-01	0.00E+00	3.28E+00	GA
PB-214	N	1.6449E-01					5.84E+05		
			351.93	1.543E-01	(	5.879E-02	1.88E+01	3.76E+01	G
			295.09	1.843E-01	*(	8.985E-02	2.19E+01	1.93E+01	G
			242.00	0.000E+00	&	1.846E-01	0.00E+00	7.43E+00	GA
BI-214	N	1.8323E-01					5.84E+05		
			609.31	1.832E-01	*(	6.617E-02	1.80E+01	4.61E+01	G
			1120.29	0.000E+00	%	1.735E-01	3.69E+01	1.51E+01	G
			1764.49	4.058E-01	+	1.831E-01	2.55E+01	1.54E+01	G
TH-234	N	4.3675E+00					1.63E+12		
			63.29	4.367E+00	(	4.692E-01	4.38E+00	3.81E+00	G
			92.59	3.893E+00	-	2.432E-01	2.89E+00	5.58E+00	G
PA-234M	N	8.4850E+00					1.63E+12		
			1001.00	8.485E+00	?(	4.029E+00	2.29E+01	8.37E-01	G
			766.41	0.000E+00	%	6.796E+00	5.00E+01	2.94E-01	G
U-235	N	2.6949E-01					2.57E+11		
			185.72	2.695E-01	}	3.299E-02	4.15E+00	5.40E+01	GA
			143.79	2.695E-01	(	1.159E-01	1.76E+01	1.10E+01	G
			205.33	0.000E+00	%	1.745E-01	3.15E+01	5.01E+00	G
			163.38	0.000E+00	%	1.695E-01	3.01E+01	5.08E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T 2.1487E-01					1.58E+05	
		59.54	2.149E-01	(	5.447E-02	8.79E+00	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
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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	<	1.7864E-01		
NA-22	<	4.5581E-02		
K-40		1.2263E+00	1.7626E+01%	3.511E-01
Sc-46	<	2.8414E-02		

CR-51	<	1.0919E-01			
MN-54	<	2.1634E-02			
FE-59	<	4.1672E-02			
Co-56	<	2.3119E-02			
CO-57	<	1.1143E-02			
CO-58	<	2.5608E-02			
CO-60		1.1993E-01	1.0665E+01%		3.368E-02
ZN-65	<	7.0016E-02			
NB-94	<	2.0891E-02			
ZR-95	<	3.5037E-02			
NB-95	<	2.8862E-02			
RU-103	<	1.6081E-02			
RH-106	<	2.7708E-01			
AG-108M	<	1.6570E-02			
AG-110M	<	5.1513E-02			
SN-113	<	2.3193E-02			
SB-124	<	2.1422E-02			
SB-125	<	5.2923E-02			
I-131	<	1.6969E-02			
BA-133	<	1.7440E-02			
CS-134	<	2.1589E-02			
CS-137		1.5750E-01	1.5565E+01%		4.213E-02
CE-139	<	1.7626E-02			
Ba-140	<	6.4360E-02			
La-140	<	2.5770E-02			
CE-141	<	1.4734E-02			
CE-144	<	5.1031E-02			
PM-144	<	2.3773E-02			
EU-152	<	5.5276E-02			
EU-154	<	3.0082E-01			
EU-155	<	3.7926E-02			
HF-181	<	2.7204E-02			
Ta-182	<	1.0989E-01			
Hg-203	<	1.8006E-02			
TL-208	#	7.7236E-02	2.1786E+01%		3.310E-02
pm-146	<	5.8939E-02			
y-88	<	2.6286E-02			
PB-210	<	3.9643E-01			
PB-212		1.2590E-01	1.4771E+01%		4.070E-02
PB-214		1.6449E-01	1.4438E+01%		5.879E-02
BI-207	<	2.7120E-02			
BI-212	<	2.6197E-01			
BI-214	#	1.8323E-01	1.8020E+01%		6.617E-02
BI-210M	<	1.8412E-02			
RA-224	<	3.4908E-01			
AC-228	<	8.6497E-02			
TH-227	<	1.0695E-01			
TH-229	<	2.0444E-01			
TH-234		4.3675E+00	4.3793E+00%		4.692E-01

PA-231	<	4.8062E-01		
PA-233	<	3.0096E-02		
PA-234	<	7.9675E-02		
PA-234M#		8.4850E+00	2.2943E+01%	4.029E+00
U-235		2.6949E-01	1.7560E+01%	1.159E-01
AM-241		2.1487E-01	8.7927E+00%	5.447E-02
Np-237	<	1.0867E-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 2000.0 keV) 1.539E+01 DPS

Run Logs

Gamma Spectroscopy Run Log

Detector: GV5

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 15:05		IC 160-12297/1		12297			JLW
03/27/12 10:12		ICV 160-12297/2		12297			JLW
12/07/16 01:00		CCB 160-282801/1		282801			
12/07/16 01:42		CCV 160-282801/2		282801			
12/07/16 02:04		CCV 160-282801/3		282801			
12/07/16 07:35	30	ZZZZZ		282801			
12/07/16 08:34	30	ZZZZZ		282801			
12/07/16 09:33		ACVTOP 160-282801/6		282801			KLS
12/07/16 09:33		ACVTOP 160-282835/1		282835			PS
02/04/17 13:08		ICB 160-290982/1		290982			RTM
03/02/17 00:18		CCV 160-295579/1		295579			
03/02/17 00:40		CCV 160-295579/2		295579			RTM
03/02/17 01:02		CCB 160-295579/3		295579			RTM
03/02/17 02:09	30	ZZZZZ		295579			
03/02/17 02:44	30	ZZZZZ		295579			
03/02/17 03:25	30	ZZZZZ		295579			
03/02/17 06:32	30	ZZZZZ		295579			
03/02/17 07:29	30	ZZZZZ		295579			
03/02/17 08:32		TCCLBA 160-295354/1-A		295579	295354	TC-02-RC	RTM
03/02/17 09:23		TCCLBC 160-295354/3-A		295579	295354	TC-02-RC	RTM
03/02/17 09:50		TCCLBB 160-295354/2-A		295579	295354	TC-02-RC	RTM
03/02/17 11:18	30	ZZZZZ		295579			
03/02/17 12:32	30	ZZZZZ		295579			
03/02/17 13:13	30	ZZZZZ		295579			
03/02/17 13:59	30	ZZZZZ		295579			
03/02/17 14:38	30	ZZZZZ		295579			
03/02/17 16:23		MB 160-295355/1-A		295579	295355	TC-02-RC	RTM
03/02/17 17:17		160-21079-6	GW-NB71-021517	295579	295355	TC-02-RC	RTM
03/02/17 18:04		160-21079-7 MSD	GW-BR04RB-021517 MSD	295579	295355	TC-02-RC	RTM
03/02/17 19:23		ZZZZZ		295579			
03/02/17 20:53		ZZZZZ		295579			
03/02/17 21:06		ZZZZZ		295579			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 08:10		IC 160-12302/1		12302			JLW
03/27/12 15:25		ICV 160-12302/2		12302			JLW
12/06/16 16:15		ACVTOP 160-282836/1		282836			PS
02/04/17 13:07		ICB 160-290983/1		290983			RTM
03/02/17 00:19		CCV 160-295580/1		295580			
03/02/17 00:41		CCV 160-295580/2		295580			RTM
03/02/17 01:03		CCB 160-295580/3		295580			RTM
03/02/17 02:10	30	ZZZZZ		295580			
03/02/17 02:45	30	ZZZZZ		295580			
03/02/17 03:26	30	ZZZZZ		295580			
03/02/17 06:30	30	ZZZZZ		295580			
03/02/17 08:31		TCCLBB 160-295354/2-		295580			
03/02/17 08:31		ZZZZZ		295580			

Gamma Spectroscopy Run Log

Detector: GV7 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/02/17 08:31		TCCLBB 160-295354/2-A		295580	295354	TC-02-RC	RTM
03/02/17 09:24		TCCLBA 160-295354/1-A		295580	295354	TC-02-RC	RTM
03/02/17 09:49		TCCLBC 160-295354/3-A		295580	295354	TC-02-RC	RTM
03/02/17 11:17	30	ZZZZZ		295580			
03/02/17 12:31	30	ZZZZZ		295580			
03/02/17 13:14	30	ZZZZZ		295580			
03/02/17 13:57	30	ZZZZZ		295580			
03/02/17 14:39	30	ZZZZZ		295580			
03/02/17 16:24		LCS 160-295355/2-A		295580	295355	TC-02-RC	RTM
03/02/17 17:18		160-21079-7	GW-BR04RB-021517	295580	295355	TC-02-RC	RTM
03/02/17 18:04		160-21079-8	GW-BR04RB-021517-FD	295580	295355	TC-02-RC	RTM
03/02/17 19:25		ZZZZZ		295580			
03/02/17 20:54		ZZZZZ		295580			

Detector: GV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 10:58		IC 160-12311/1		12311			JLW
03/29/12 01:58		ICV 160-12311/2		12311			JLW
12/06/16 10:28		ACVTOP 160-282755/1		282755			PS
02/04/17 13:06		ICB 160-290984/1		290984			RTM
03/02/17 00:20		CCV 160-295581/1		295581			
03/02/17 00:42		CCV 160-295581/2		295581			RTM
03/02/17 01:04		CCB 160-295581/3		295581			RTM
03/02/17 02:11	30	ZZZZZ		295581			
03/02/17 02:46	30	ZZZZZ		295581			
03/02/17 03:27	30	ZZZZZ		295581			
03/02/17 06:26	30	ZZZZZ		295581			
03/02/17 08:30		TCCLBC 160-295354/3-A		295581	295354	TC-02-RC	RTM
03/02/17 09:25		TCCLBB 160-295354/2-A		295581	295354	TC-02-RC	RTM
03/02/17 09:48		TCCLBA 160-295354/1-A		295581	295354	TC-02-RC	RTM
03/02/17 11:15	30	ZZZZZ		295581			
03/02/17 12:30	30	ZZZZZ		295581			
03/02/17 13:15	30	ZZZZZ		295581			
03/02/17 13:58	30	ZZZZZ		295581			
03/02/17 14:41	30	ZZZZZ		295581			
03/02/17 16:25		ZZZZZ		295581			
03/02/17 17:19		160-21079-7 MS	GW-BR04RB-021517 MS	295581	295355	TC-02-RC	RTM
03/02/17 18:06		160-21079-9	GW-NB80-021517	295581	295355	TC-02-RC	RTM
03/02/17 19:28		ZZZZZ		295581			
03/02/17 20:55		ZZZZZ		295581			

LIQUID SCINTILLATION COUNTER

Method TC-02-RC

Technetium-99 (LSC) by Method TC-02-RC

Prep Batch: 295318

Preparation, Extraction Chromatography

Liquid Scintillation Counter Analysis Detail Report
Prep Batch: 295318

Lab ID: MB 160-295318/1-A | Analyzed: 03/07/17 13:21 | Sigma: 2 | Decay Corrected: No | Ts: 45
Client ID: | Detector: LSC3170 | Dil Fac: 1 | Yield Truncated: Yes | Tb: 45

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	EFFs	EFFb	Anly Batch
Technetium 99	-2.099	1.10	1.12	U	pCi/L	3.00	2.01	273.15	376.2	6.070	8.360	0.92900	0.94300	296555

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Tc-99m	576.5				pCi/L		529	109	30 - 110

Lab ID: LCS 160-295318/2-A | Analyzed: 03/07/17 14:08 | Sigma: 2 | Decay Corrected: No | Ts: 45
Client ID: | Detector: LSC3170 | Dil Fac: 1 | Yield Truncated: Yes | Tb: 45

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	EFFs	EFFb	Anly Batch
Technetium 99	207.2	4.45	20.4		pCi/L	3.00	2.06	9765	376.2	217.000	8.360	0.94600	0.94300	296555

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Tc-99m	531.5				pCi/L		555	95.7	30 - 110

Lab ID: 160-21079-6 | Analyzed: 03/07/17 15:41 | Sigma: 2 | Decay Corrected: No | Ts: 45
Client ID: GW-NB71-021517 | Detector: LSC3170 | Dil Fac: 1 | Yield Truncated: Yes | Tb: 45

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	EFFs	EFFb	Anly Batch
Technetium 99	-0.989	1.12	1.13	U	pCi/L	3.00	1.97	329.85	376.2	7.330	8.360	0.94500	0.94300	296555

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Tc-99m	533				pCi/L		529	101	30 - 110

Lab ID: 160-21079-7 | Analyzed: 03/07/17 16:28 | Sigma: 2 | Decay Corrected: No | Ts: 45
Client ID: GW-BR04RB-021517 | Detector: LSC3170 | Dil Fac: 1 | Yield Truncated: Yes | Tb: 45

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	EFFs	EFFb	Anly Batch
Technetium 99	-0.962	1.20	1.20	U	pCi/L	3.00	2.10	336.15	376.2	7.470	8.360	0.95000	0.94300	296555

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Tc-99m	520				pCi/L		555	93.6	30 - 110

Lab ID: 160-21079-7 MS | Analyzed: 03/07/17 17:14 | Sigma: 2 | Decay Corrected: No | Ts: 45
Client ID: GW-BR04RB-021517 | Detector: LSC3170 | Dil Fac: 1 | Yield Truncated: Yes | Tb: 45

Analyte	MS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	EFFs	EFFb	Anly Batch
Technetium 99	212.7	4.58	20.9		pCi/L	3.00	2.13	9720	376.2	216.000	8.360	0.94200	0.94300	296555

Tracer	MS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Tc-99m	497.4				pCi/L		534	93.1	30 - 110

Liquid Scintillation Counter Analysis Detail Report
Prep Batch: 295318

Lab ID: 160-21079-7 MSD | Analyzed: 03/07/17 18:01 | Sigma: 2 | Decay Corrected: No | Ts: 45
Client ID: GW-BR04RB-021517 | Detector: LSC3170 | Dil Fac: 1 | Yield Truncated: Yes | Tb: 45

Analyte	MSD Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	EFFs	EFFb	Anly Batch
Technetium 99	201.6	4.38	19.8		pCi/L	3.00	2.05	9540	376.2	212.000	8.360	0.94700	0.94300	296555

Tracer	MSD Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Tc-99m	508.5				pCi/L		529	96.1	30 - 110

Lab ID: 160-21079-8 | Analyzed: 03/07/17 18:47 | Sigma: 2 | Decay Corrected: No | Ts: 45
Client ID: GW-BR04RB-021517-FD | Detector: LSC3170 | Dil Fac: 1 | Yield Truncated: Yes | Tb: 45

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	EFFs	EFFb	Anly Batch
Technetium 99	-0.963	1.12	1.13	U	pCi/L	3.00	1.96	333	376.2	7.400	8.360	0.95000	0.94300	296555

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Tc-99m	568				pCi/L		555	102	30 - 110

Lab ID: 160-21079-9 | Analyzed: 03/07/17 19:34 | Sigma: 2 | Decay Corrected: No | Ts: 45
Client ID: GW-NB80-021517 | Detector: LSC3170 | Dil Fac: 1 | Yield Truncated: Yes | Tb: 45

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Cs	Cb	CPMs	CPMb	EFFs	EFFb	Anly Batch
Technetium 99	-1.30	1.11	1.12	U	pCi/L	3.00	1.97	315.9	376.2	7.020	8.360	0.94600	0.94300	296555

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Tc-99m	548				pCi/L		534	102	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 160-295318/1-A	Technetium 99			-2.099	U	pCi/L							-3.759715 04

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-295318/2-A	Technetium 99		206	207.2		pCi/L	101	75 - 125					.0757098 395

Matrix Spike ID:	Analyte	Parent Result	Spike Added	MS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-21079-7	Technetium 99	-0.962	206	212.7		pCi/L	103	68 - 121	5				

Matrix Spike Duplicate ID:	Analyte	Parent Result	Spike Added	MSD Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-21079-7	Technetium 99	-0.962	206	201.6		pCi/L	98	68 - 121	5	0.27	0.77	1	

Liquid Scintillation Counter Analysis Detail Report
Prep Batch: 295318

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
- EFFs = Efficiency, Sample
- EFFb = Efficiency, Background

LIQUID SCINTILLATION COUNTER BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-21079-1

SDG No.:

Batch Number: 295318 Batch Start Date: 03/01/17 12:55 Batch Analyst: Burt, Matthew R

Batch Method: Ext_Chrom_LSC Batch End Date: 03/02/17 13:28

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Tc-99 00019				
MB 160-295318/1		Ext_Chrom_LSC, TC-02-RC		500 mL					
LCS 160-295318/2		Ext_Chrom_LSC, TC-02-RC		500 mL	1 mL				
160-21079-C-6	GW-NB71-021517	Ext_Chrom_LSC, TC-02-RC	T	500.79 mL					
160-21079-C-7	GW-BR04RB-021517	Ext_Chrom_LSC, TC-02-RC	T	500.17 mL					
160-21079-D-7 MS	GW-BR04RB-021517	Ext_Chrom_LSC, TC-02-RC	T	500.61 mL	1 mL				
160-21079-C-7 MSD	GW-BR04RB-021517	Ext_Chrom_LSC, TC-02-RC	T	500.38 mL	1 mL				
160-21079-C-8	GW-BR04RB-021517 -FD	Ext_Chrom_LSC, TC-02-RC	T	500.29 mL					
160-21079-D-9	GW-NB80-021517	Ext_Chrom_LSC, TC-02-RC	T	500.67 mL					

Batch Notes	
Balance ID	1121470622
Pipette ID	RAD088, RAD104
Analyst ID - Reagent Drop Witness	KS per MRB
Analyst ID - Reagent Drop	MRB
SOP Number	st-rc-0125

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.

Tc99_2016 Protocol 8

Assay Definition-

Assay Description:

Assay Type: DPM (Single)
Report Name: Tc99_Protocol 8
Output Data Path: \Stlfs01\rad\Upload\PACK_LSC_3170
Raw Results Path: C:\Packard\Tricarb\Results\Default\Tc99_2016 Protocol 8\20170307_1234
\20170307_1234.results
Assay File Name: C:\Packard\TriCarb\Assays\Tc99_2016 Protocol 8.lsa

Additional Data Files Generated with this Protocol:
8Tc99
[Auto] 8Tc99.001

Count Conditions-

Nuclide: Tc99_2016
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 15 sec
Pre-Count Delay (min): 0.00
Quench Set:
Low Energy: Tc99_2016
Count Time (min): 45.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: On - Any Region

Regions	LL	UL	2Sigma % Terminator
A	0.0	292.0	1.50
B	2.0	292.0	0.00
C	292.1	450.0	0.00

Count Corrections-

Static Controller: On Luminescence Correction: Off
Colored Samples: Off Heterogeneity Monitor: Off
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

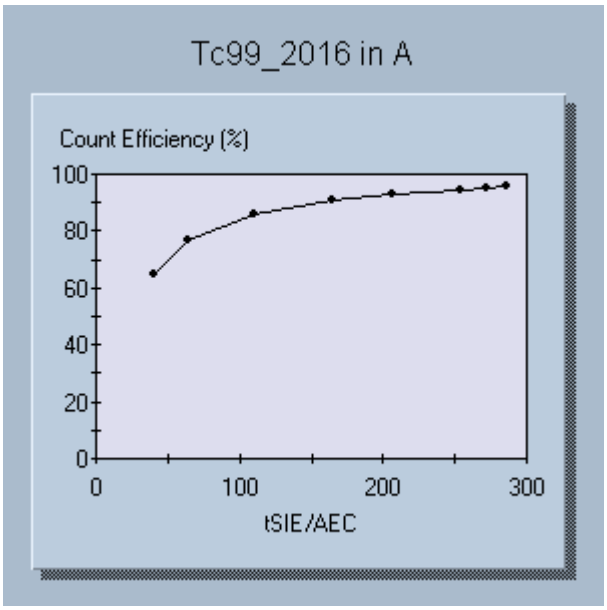
Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results
Quench Curve Block Data

Tc99_2016 Protocol 8

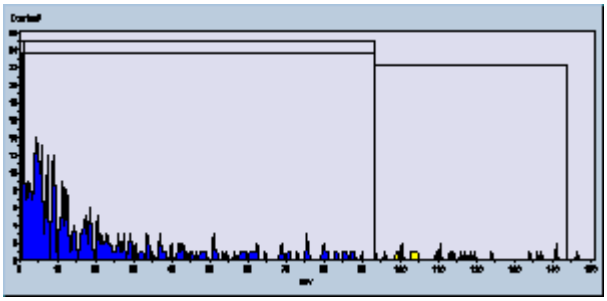


Date Acquired: 06/09/2016
Date Modified:
Tc99_2016 in A

tSIE/AEC	Count Efficiency (%)
285.51	95.61
272.05	95.12
254.47	94.42
207.12	93.11
164.10	91.03
109.60	86.22
63.62	76.43
40.24	64.64

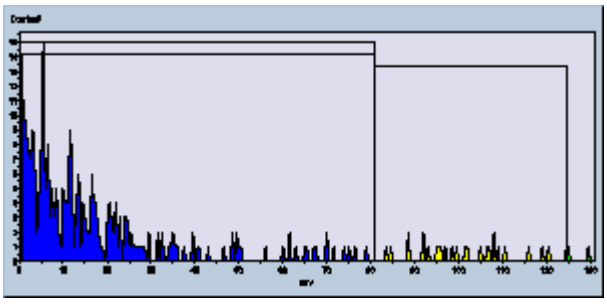
S#	SMPL_ID	Count Time	CPMA	DPM1	TIME	DATE	EFF	tSIE	LUM	MESSAGES
1	BKG	45.00	8.36e+000	8.86e+000	12:35:13 PM	3/7/2017	1	249.75	100	

SpectraView Block Data



2	MB 160-295318/1-A	45.00	6.07e+000	6.53e+000	1:21:55 PM	3/7/2017	1	203.34	100	

SpectraView Block Data



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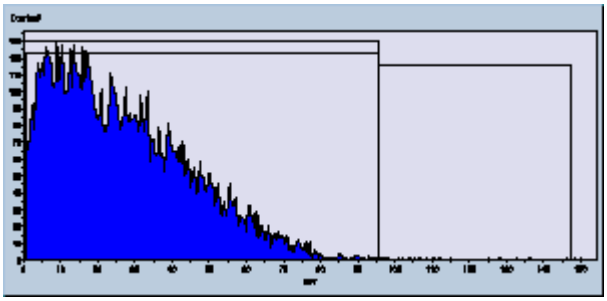
3 LCS 160-295318/2-A 45.00 2.17e+002 2.29e+002 2:08:28 PM 3/7/2017 1 258.17 100

SpectraView Block Data



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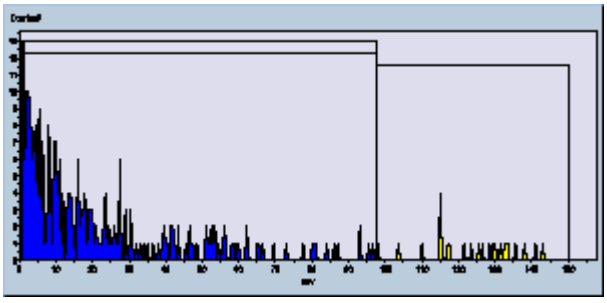
4 160-21077-B-1-A 45.00 6.54e+000 6.89e+000 2:55:10 PM 3/7/2017 1 266.14 100

SpectraView Block Data



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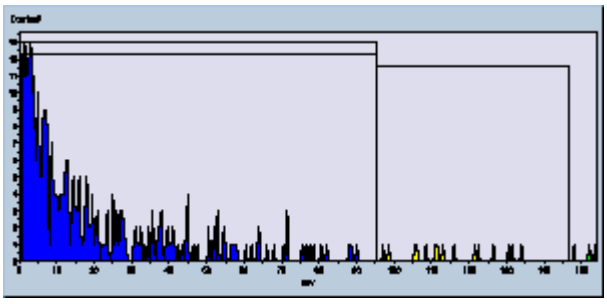
5 160-21079-C-6-A 45.00 7.33e+000 7.76e+000 3:41:50 PM 3/7/2017 1 257.51 100

SpectraView Block Data



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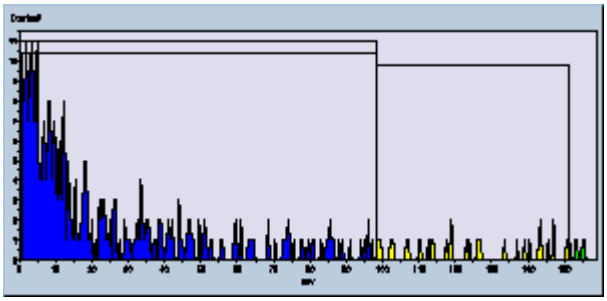
6 160-21079-C-7-B 45.00 7.47e+000 7.86e+000 4:28:16 PM 3/7/2017 1 268.81 100

SpectraView Block Data



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7 160-21079-D-7-C MS 45.00 2.16e+002 2.29e+002 5:14:38 PM 3/7/2017 1 247.40 100

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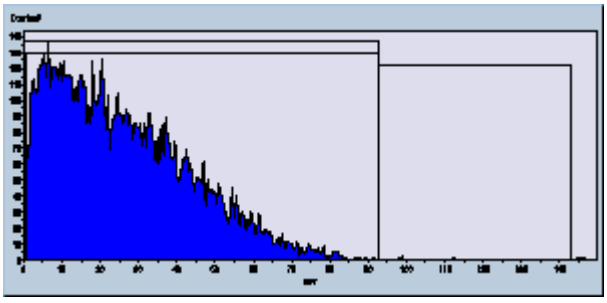

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8 160-21079-C-7-C MSD 45.00 2.12e+002 2.24e+002 6:01:17 PM 3/7/2017 1 262.14 100

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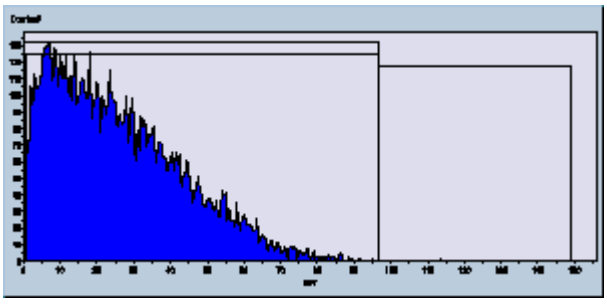

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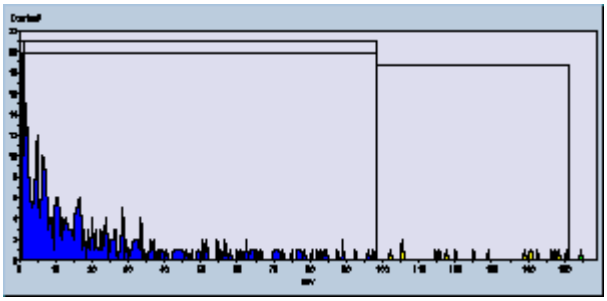

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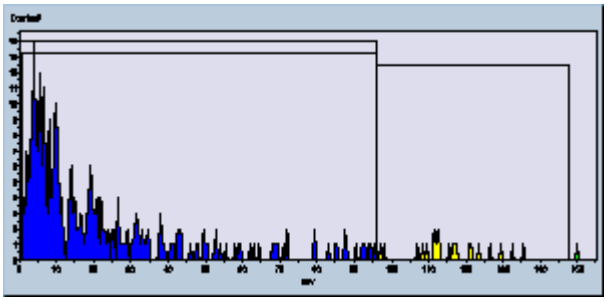
10 160-21079-D-9-A 45.00 7.02e+000 7.42e+000 7:34:36 PM
3/7/2017 1 260.16 100

SpectraView Block Data



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3/7/2017 1 263.45 100

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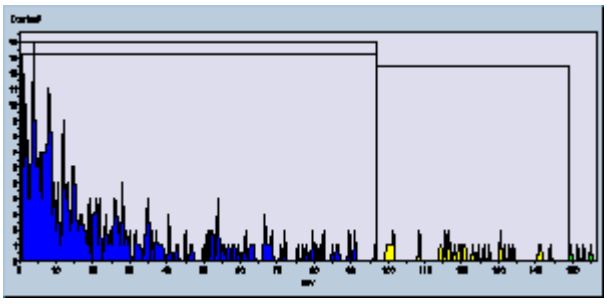

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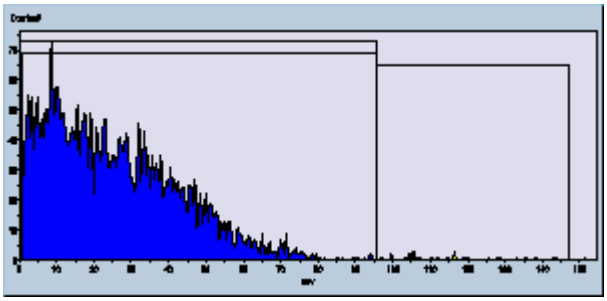
12 160-21127-B-4-A 45.00 8.78e+001 9.29e+001 9:07:17 PM 3/7/2017 1 258.61 100

SpectraView Block Data



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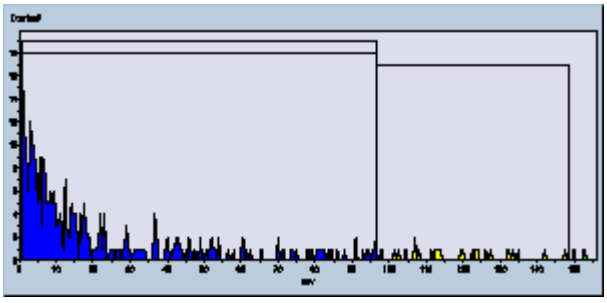
13 160-21127-A-5-A 45.00 7.25e+000 7.65e+000 9:54:01 PM 3/7/2017 1 262.39 100

SpectraView Block Data



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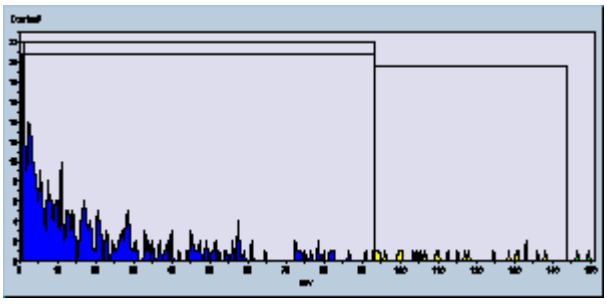
14 160-21127-B-6-A 45.00 7.94e+000 8.42e+000 10:40:42 PM 3/7/2017 1 249.77 100

SpectraView Block Data

Tc99_2016 Protocol 8



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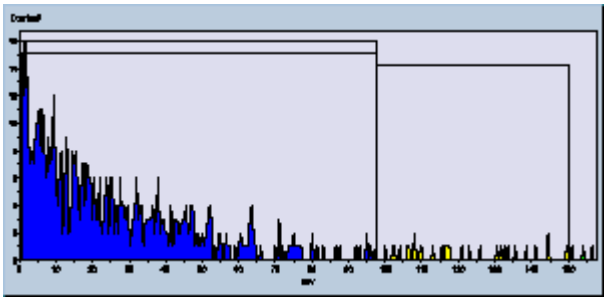
15 160-21127-A-7-B 45.00 1.24e+001 1.31e+001 11:27:23 PM
3/7/2017 1 266.24 100

SpectraView Block Data



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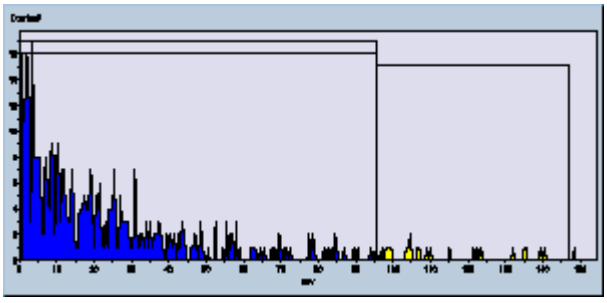
16 160-21127-B-8-B 45.00 9.49e+000 1.00e+001 12:14:05 AM
3/8/2017 1 258.47 100

SpectraView Block Data

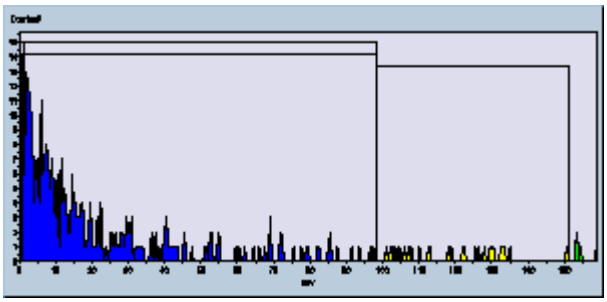


---

17 160-21127-B-10-B 45.00 7.22e+000 7.60e+000 1:00:48 AM
3/8/2017 1 268.76 100

SpectraView Block Data

Tc99_2016 Protocol 8



Daily Checks

SNC Protocol

Calibration Information
Software Version IC: 2.12
Software Version EC: 2.03
Instrument Model: Tri-Carb 3170TR/SL
Instrument Serial Number: 429774
3H Chi Square: 9.47 Date Processed: 3/7/2017 9:30:48 AM
14C Chi Square: 24.75 Date Processed: 3/7/2017 9:30:48 AM
3H E^2/B (1-18.6 keV): 2034.94 Date Processed: 3/7/2017 9:30:48 AM
14C E^2/B (4-156 keV): 10157.49 Date Processed: 3/7/2017 9:30:48 AM
3H Efficiency (0-18.6 keV): 62.40 Date Processed: 3/7/2017 9:30:48 AM
14C Efficiency (0-156 keV): 95.61 Date Processed: 3/7/2017 9:30:48 AM
IPA Background Date Processed: 3/7/2017 9:30:48 AM
3H Background CPM (0-18.6 keV): 2.02 Date Processed: 3/7/2017 9:30:48 AM
14C Background CPM (0-156 keV): 2.10 Date Processed: 3/7/2017 9:30:48 AM
3H Calibration DPM: 286200
3H Reference Date: 2/23/2016
14C Calibration DPM: 112100

Initial Calibrations

Technecium-99 Initial Calibration
2016
LSC 3170

Tc-99 Initial Calibration

STD: Tc-99_00007 (6345)
Activity: 22186dpm/mL
Reference Date: 1/1/2000

Vial #	Insta Gel (mL)	Teva Column	Tc-99_00007 (6345) (mL)	DI Water (mL)	Nitromethane (uL)
1	11	1	0.1	3.9	0
2	10.5	1	0.1	4.4	0
3	10	1	0.1	4.9	0
4	10	1	0.1	4.9	10
5	10	1	0.1	4.9	25
6	10	1	0.1	4.9	50
7	10	1	0.1	4.9	100
8	10	1	0.1	4.9	150

0.25mL of 2M HNO_3 was added to vials to mimic the tracer amount added to counting standards (A, B, C).

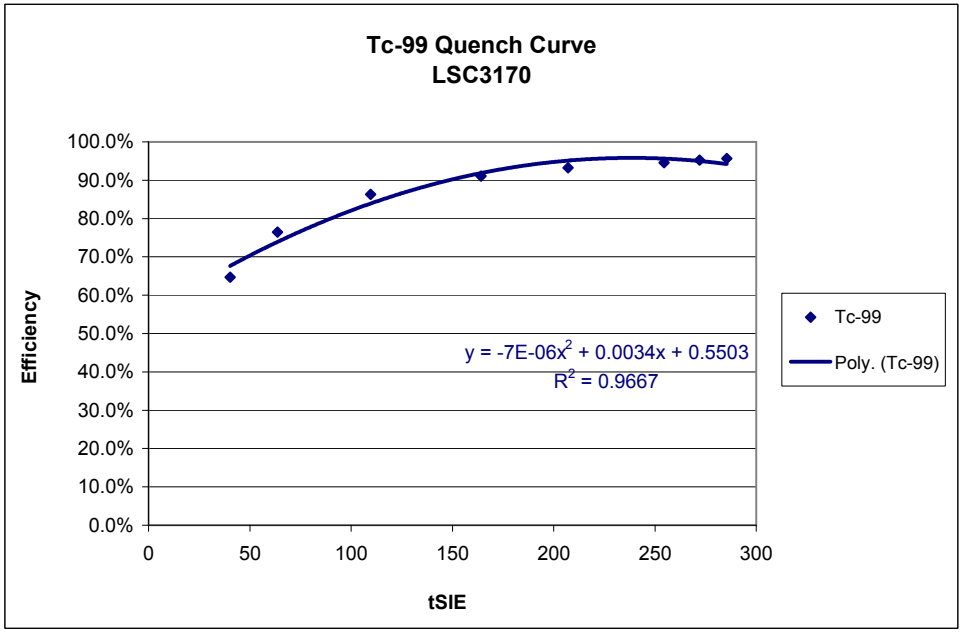
Teva column: conditioned with 5mL 0.01M HNO_3.

Prepared by: Rachel T. Mueller and Amanda L. Dick
Date: 6/8/2016

Tc-99 Quench Curve (IC)
LSC3170

Position	Known (DPM)	CPM	Count (Min)	Counts	Quench (tSIE)	(tSIE)^2	Efficiency
1	2219	2123	60	127380	285.51	81515.96	95.7%
2	2219	2113	60	126780	272.05	74011.2	95.2%
3	2219	2098	60	125880	254.47	64754.98	94.6%
4	2219	2068	60	124080	207.12	42898.69	93.2%
5	2219	2021	60	121260	164.1	26928.81	91.1%
6	2219	1915	60	114900	109.6	12012.16	86.3%
7	2219	1697	60	101820	63.62	4047.504	76.5%
8	2219	1435	60	86100	40.24	1619.258	64.7%
9							

Count Date: 6/9/2016
Standard used: Tc-99_00007 (6345); 22186 dpm/



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.983207228
R Square	0.966696454
Adjusted R Squ	0.953375035
Standard Error	0.024001586
Observations	8

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	0.083608326	0.041804	72.567081	0.000202407
Residual	5	0.002880381	0.000576		
Total	7	0.086488707			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.550337873	0.034789363	15.81914	1.836E-05	0.460908969	0.63976678
X Variable 1	0.003421527	0.000515783	6.633656	0.0011728	0.002095665	0.00474739
X Variable 2	-7.1761E-06	1.53674E-06	-4.66969	0.0054841	-1.11264E-05	-3.226E-06

RESIDUAL OUTPUT

Observation	*Predicted Y*	*Residuals*	*%Diff*
1	0.942252227	0.014657536	1.6%
2	0.95005329	0.002349126	0.2%
3	0.956326324	-0.010684929	-1.1%
4	0.951159698	-0.019040344	-2.0%
5	0.91856693	-0.007632106	-0.8%
6	0.839136922	0.024020024	2.9%
7	0.738970185	0.025926597	3.5%
8	0.676400195	-0.029595904	-4.4%

1st Level Reviewed: ALD 07/08/2016

2nd Level Reviewed: RM 07/08/2016

FORM: Tc99_3170_2016_Quench Curve.xls Revised: 6/7/2016

Tc99_2016 Quench Curve

Assay Definition-

Assay Description:

Assay Type: Quench Standards
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\
Raw Results Path: C:\Packard\Tricarb\Results\Default\Tc99_2016 Quench Curve\20160609_1054\20160609_1054.results
Assay File Name: C:\Packard\TriCarb\Assays\Tc99_2016 Quench Curve.lsa

Count Conditions-

Nuclide: Tc99_2016
   Quench Indicator: tSIE/AEC
   External Std Terminator (sec): 0.5 2s%
   Pre-Count Delay (min): 0.00
Quench Set: n/a
Count Time (min): 60.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: n/a
#Vials/Sample: n/a Calculate % Reference: n/a

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: On - Any Region

Regions	LL	UL	2Sigma % Terminator
A	0.0	2000.0	0.50

Count Corrections-

Static Controller: On Luminescence Correction: n/a
Colored Samples: On Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

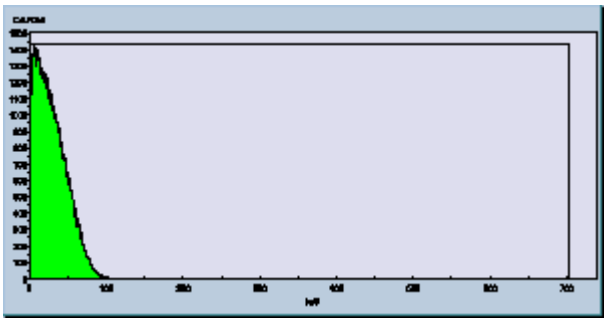
Regions	Half Life	Units	Reference Date	Reference Time
A				

Cycle 1 Results

S#	Count Time	CPMA	SIS	tSIE	MESSAGES
1	60.00	2123	94.92	285.51	S

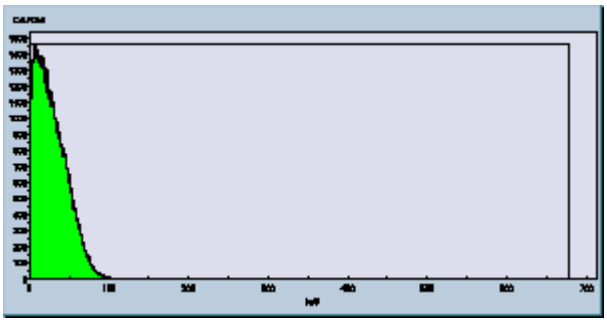
SpectraView Block Data

Tc99_2016 Quench Curve



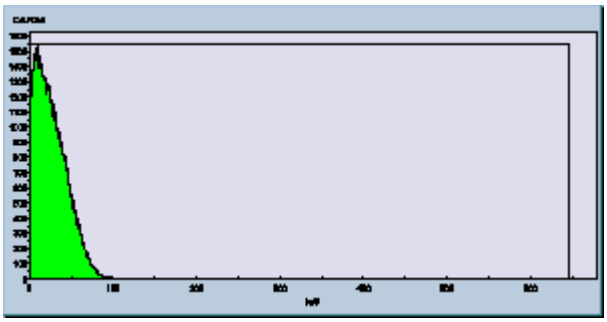
2	60.00	2113	92.07	272.05	S

SpectraView Block Data



3	60.00	2098	88.48	254.47	S

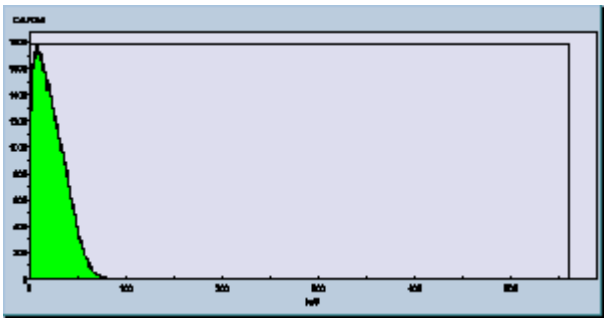
SpectraView Block Data



4	60.00	2068	74.06	207.12	S

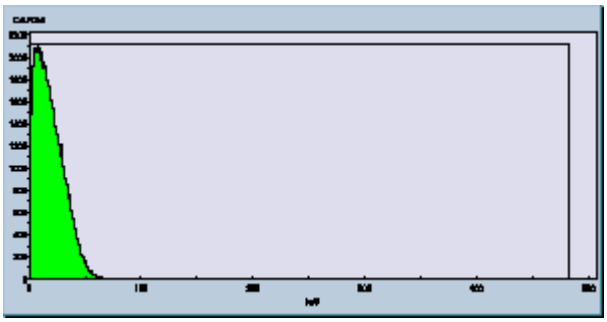
SpectraView Block Data

Tc99_2016 Quench Curve



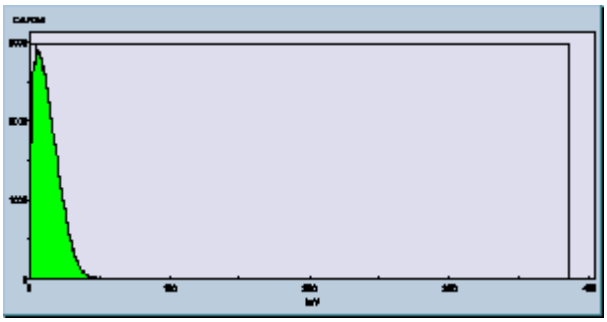
5	60.00	2021	60.60	164.10	S

SpectraView Block Data



6	60.00	1915	42.64	109.60	S

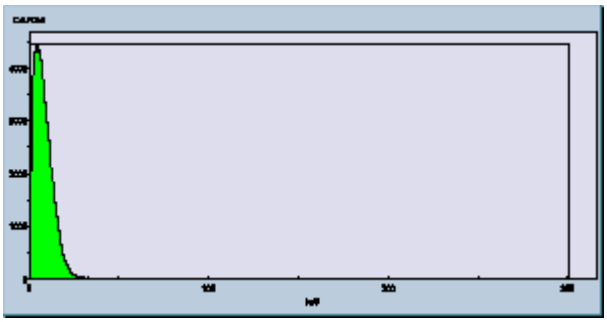
SpectraView Block Data



7	60.00	1697	26.28	63.62	S

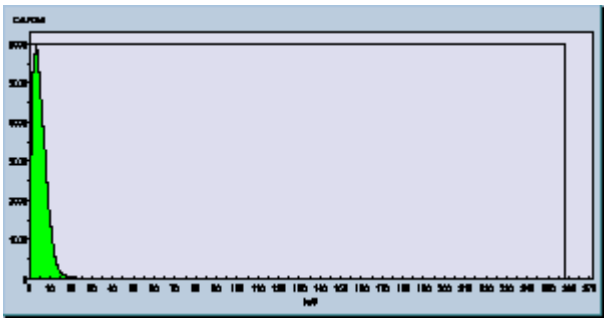
SpectraView Block Data

Tc99_2016 Quench Curve

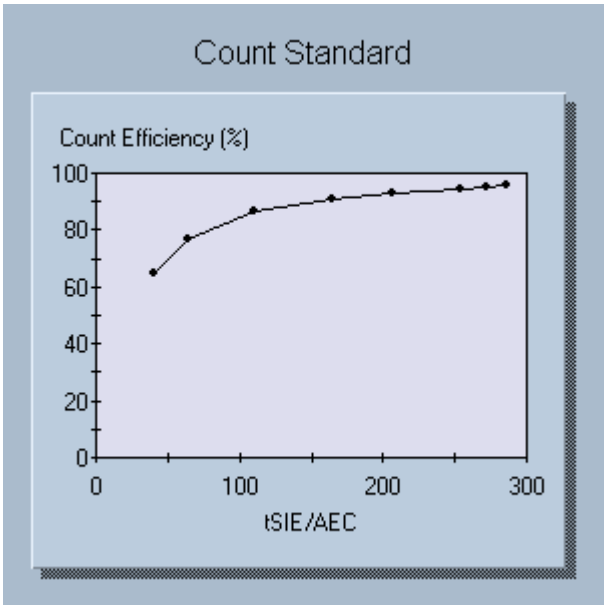


8	60.00	1435	17.89	40.24	S

SpectraView Block Data



Quench Curve Block Data



Date Acquired: 6/10/2016
Date Modified:
Count Standard

tSIE/AEC	Count Efficiency (%)
285.51	95.68

Tc99_2016 Quench Curve

272.05	95.21
254.47	94.53
207.12	93.19
164.10	91.09
109.60	86.28
63.62	76.49
40.24	64.67

Initial Calibration Verifications

Technecium-99 Initial Calibration Verification
2016
LSC 3170

Tc-99 Initial Calibration Verification:

Std #: Tc-99_00019 (869867)
Activity: 228.82dpm/mL
Reference Date: 9/1/1996

Vial #	InstaGel (mL)	Teva Column	Tc-99_00019 (869867) (mL)	DI Water (mL)	Nitromethane (uL)
1	10	1	1	4	0
2	10	1	1	4	25
3	10	1	1	4	100

0.25mL of 2M HNO_3 was added to vials to mimic the tracer amount added to counting standards (A, B, C).

Teva column: conditioned with 5mL 0.01M HNO_3.

Prepared By: Rachel T. Mueller and Amanda L. Dick
Date: 9/1/2016

Tc-99 Verification
LSC3170

Recovery

	CPM	Cnt (Min)	Counts	tSIE	Eff	DPM	Known	Recovery
Analyte ICV 1	203.73	60	12223.8	219.42	0.9556	213	229	93.2%
Analyte ICV 2	200.73	60	12043.8	164.04	0.9185	219	229	95.4%
Analyte ICV 3	166.73	60	10003.8	78.38	0.7744	215	229	94.0%
							Avg:	94.2%

Count Date: 6/13/2016

Tc99_2016 Protocol 8

Assay Definition-

Assay Description:

Assay Type: DPM (Single)
Report Name: Tc99_Protocol 8
Output Data Path: \Stlfs01\rad\Upload\PACK_LSC_3170
Raw Results Path: C:\Packard\Tricarb\Results\Default\Tc99_2016 Protocol 8\20160613_1722
\20160613_1722.results
Assay File Name: C:\Packard\TriCarb\Assays\Tc99_2016 Protocol 8.lsa

Count Conditions-

Nuclide: Tc99_2016
   Quench Indicator: tSIE
   External Std Terminator (sec): 15 sec
   Pre-Count Delay (min): 0.00
Quench Set:
   Low Energy: Tc99_2016
Count Time (min): 60.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: On - Any Region

Regions	LL	UL	2Sigma % Terminator
A	0.0	292.0	1.50
B	2.0	292.0	0.00
C	292.1	450.0	0.00

Count Corrections-

Static Controller: On Luminescence Correction: Off
Colored Samples: Off Heterogeneity Monitor: Off
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

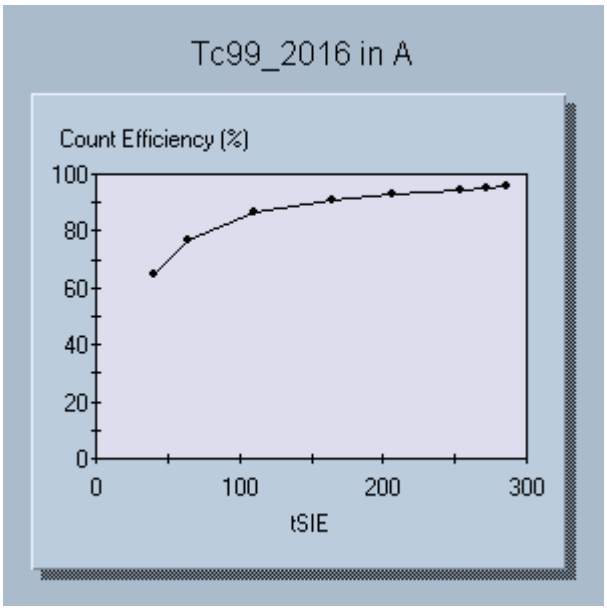
Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results
Quench Curve Block Data

Tc99_2016 Protocol 8

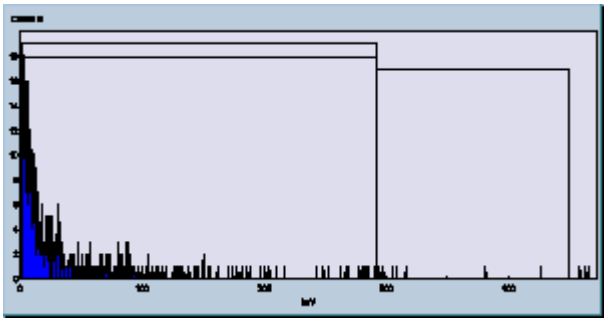


Date Acquired: 06/09/2016
Date Modified:
Tc99_2016 in A

tSIE	Count Efficiency (%)
285.51	95.67
272.05	95.19
254.47	94.51
207.12	93.18
164.10	91.09
109.60	86.28
63.62	76.48
40.24	64.68

S#	SMPL_ID	Count Time	CPMA	DPM1	TIME	DATE	EFF	tSIE	LUM	MESSAGES
1	BKG	60.00	9.27e+000	9.73e+000	5:23:06 PM	6/13/2016	1	272.46	100	

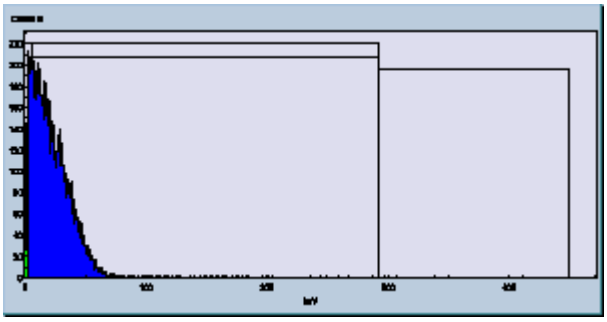
SpectraView Block Data



2	ICV 1	60.00	2.13e+002	2.28e+002	6:25:08 PM	6/13/2016	1	219.42	100	

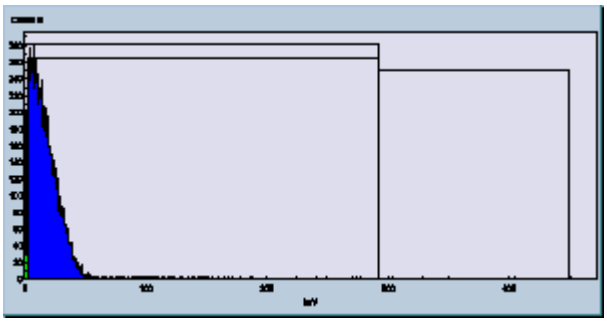
SpectraView Block Data

Tc99_2016 Protocol 8



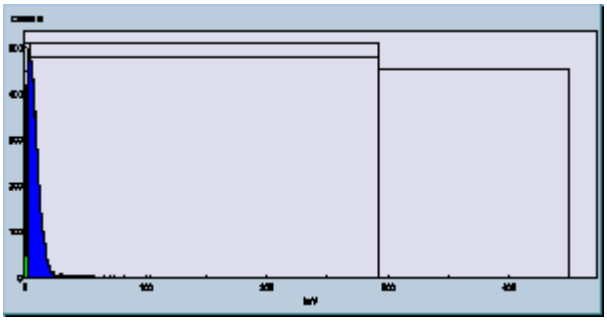
3		ICV 2	60.00	2.10e+002	2.30e+002	7:27:09 PM	
6/13/2016	1	164.04	100				

SpectraView Block Data



4		ICV 3	60.00	1.76e+002	2.21e+002	8:29:06 PM	
6/13/2016	1	78.38	100				

SpectraView Block Data



Run Logs

Liquid Scintillation Counter Run Log

Detector: LSC3170 **Serial Number: 429774**

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/09/16 12:00		IC 160-257601/1		257601			ALD
06/13/16 12:00		ICV 160-257601/2		257601			ALD
03/07/17 09:30		CCV 160-296556/1		296556			ALD
03/07/17 12:35		BBKG 160-296555/1		296555			
03/07/17 13:21	45	MB 160-295318/1-A		296555	295318	TC-02-RC	ALD
03/07/17 14:08	45	LCS 160-295318/2-A		296555	295318	TC-02-RC	ALD
03/07/17 14:55	45	ZZZZZ		296555			
03/07/17 15:41	45	160-21079-6	GW-NB71-021517	296555	295318	TC-02-RC	ALD
03/07/17 16:28	45	160-21079-7	GW-BR04RB-021517	296555	295318	TC-02-RC	ALD
03/07/17 17:14	45	160-21079-7 MS	GW-BR04RB-021517 MS	296555	295318	TC-02-RC	ALD
03/07/17 18:01	45	160-21079-7 MSD	GW-BR04RB-021517 MSD	296555	295318	TC-02-RC	ALD
03/07/17 18:47	45	160-21079-8	GW-BR04RB-021517-FD	296555	295318	TC-02-RC	ALD
03/07/17 19:34	45	160-21079-9	GW-NB80-021517	296555	295318	TC-02-RC	ALD
03/07/17 20:20	45	ZZZZZ		296555			
03/07/17 21:07	45	ZZZZZ		296555			
03/07/17 21:54	45	ZZZZZ		296555			
03/07/17 22:40	45	ZZZZZ		296555			
03/07/17 23:27	45	ZZZZZ		296555			
03/08/17 00:14	45	ZZZZZ		296555			
03/08/17 01:00	45	ZZZZZ		296555			

Shipping and Receiving Documents

FORM HDP-PR-QA-006-1
CHAIN OF CUSTODY

Instructions: Each time the container is transferred to another organization, a person from each organization should sign the CoC. The Laboratory/End User must verify that the sample is correctly identified before the sample is released for use or analysis and send the completed CoC to HDP.

Chain of Custody ID No. 021517-01 **Page** 1/2

Project Name:
Westinghouse Electric Company

Contact Person:
W. Clark Evers

Phone Number:
314-810-3336

Sampler Name:
Thomas Yardy

Laboratory Name:
TA-MO

Laboratory Address:
13715 Rider Trail North
Earth City, MO 63045

Phone No.
314-298-8566

Laboratory Contact Person:
Ivan Vania

Phone No.
708-870-8453

Turn Around Time
Normal (21 days)

Sample ID	Date	Time	Matrix	Comp (C) or Grab (G)	Requested Analysis: Gross Alpha/Beta (Total)	Isotopic Uranium	Tc-99	TSS	VOCs						Total Containers	Remarks
TB-021517	2/15/2017	7:00	L	G					X						2	Trip Blank
GW-BR05RB-021517	2/15/2017	8:15	L	G					X						2	1Q17 IGMP Sampling Event
GW-BR11JC-021517	2/15/2017	9:05	L	G					X						2	1Q17 IGMP Sampling Event
GW-BR02JC-021517	2/15/2017	9:45	L	G					X						2	1Q17 IGMP Sampling Event
GW-BR02RB-021517	2/15/2017	10:30	L	G					X						2	1Q17 IGMP Sampling Event
GW-NB71-021517	2/15/2017	12:40	L	G		X	X		X						4	1Q17 IGMP Sampling Event
GW-BR04RB-021517	2/15/2017	13:45	L	G		X	X		X						4	1Q17 IGMP Sampling Event
GW-BR04RB-021517-FD	2/15/2017	13:45	L	G		X	X		X						4	1Q17 IGMP Sampling Event
GW-BR04RB-021517-MS	2/15/2017	13:45	L	G		X	X		X						4	1Q17 IGMP Sampling Event
GW-BR04RB-021517-MSD	2/15/2017	13:45	L	G		X	X		X						4	1Q17 IGMP Sampling Event
GW-NB80-021517	2/15/2017	14:30	L	G		X	X		X						4	1Q17 IGMP Sampling Event
GW-NB50-021517	2/15/2017	15:10	L	G					X						2	1Q17 IGMP Sampling Event

Relinquished by: [signature]	Date/Time 2-16-17 0830	Received by: [signature] 3815	Date/Time 2-16-17 0830
Company Name: WEC		Company Name: CROSS Roads	
Received by:	Date/Time	Relinquished by:	Date/Time
Company Name:		Company Name:	
Relinquished by: [signature] 3815	Date/Time 2-16-17 12:00	Received by: [signature]	Date/Time 2-16-17 1200
Company Name: CROSS Roads		Company Name: TASI Solutions	

Total Number of Containers: 38

Cooler Temperature: 4 Degrees C

Container ID: N/A

Shipper and Number:

Comments: PO #4500404709

Verified By: [signature] 2-16-17

160-21079 Chain of Custody

FORM HDP-PR-QA-006-1
CHAIN OF CUSTODY

Instructions: Each time the container is transferred to another organization, a person from each organization should sign the CoC. The Laboratory/End User must verify that the sample is correctly identified before the sample is released for use or analysis and send the completed CoC to HDP.

Chain of Cutody ID No. 021517-01 **Page** 2/2

Project Name:
Westinghouse Electric Company

Contact Person:
W. Clark Evers

Phone Number:
314-810-3336

Sampler Name:
Thomas Yardy

Laboratory Name:
TA-MO

Laboratory Address:
13715 Rider Trail North
Earth City, MO 63045

Phone No.
314-298-8566

Laboratory Contact Person:
Ivan Vania

Phone No.
708-870-8453

Turn Around Time
Normal (21 days)

Sample ID	Date	Time	Matrix	Comp (C) or Grab (G)	Gross Alpha/Beta (Total)	Isotopic Uranium	Tc-99	TSS	VOCs						Total Containers	Remarks
					Requested Analysis											
GW-NB57A-021517	2/15/2017	15:55	L	G					X						2	1Q17 IGMP Sampling Event

Relinquished by:	Date/Time	Received by:	Date/Time	Total Number of Containers:	Cooler Temperature:
Company Name: WEC	2-16-17 0830	Company Name: Cross Roads	2-16-17 0836	38	4 Degrees C
				Container ID: N/A	Shipper and Number:
Received by:	Date/Time	Relinquished by:	Date/Time	Comments: PO #4500404709	
Company Name:		Company Name:			
Relinquished by: 3815	Date/Time 2-16-17 12:00	Received by:	Date/Time 2.16.17 1200	Verified By: 2-16-17	
Company Name: Cross Roads		Company Name:			

Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-21079-1

Login Number: 21079
List Number: 1
Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

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?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	