TETRA TECH

December 16, 2014

Mr. James Johnson
On-Scene Coordinator
U.S. Environmental Protection Agency, Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219

Subject: Data Deliverable Package 06
West Lake Landfill Site, Bridgeton, Missouri
CERCLIS ID: MOD079900932
EPA Region 7, START 4, Contract No. EP-S7-13-06, Task Order No. 0058
Task Monitor: James Johnson, On-Scene Coordinator

Dear Mr. Johnson:

Tetra Tech, Inc. is submitting the following analytical laboratory reports with associated data validation reports for sampling at locations off-site of the West Lake Landfill Site in Bridgeton, Missouri.

Sample Delivery Group	Analysis Type	Sample Collection Date
J2246	Volatile Organic Compounds	10/23/2014
J2258	Volatile Organic Compounds	10/30/2014
J2295	Volatile Organic Compounds	11/06/2014
J8366	Alpha-emitting Ra and Isotopic U/Th	09/11/2014
J8468	Gamma scan and gross alpha/beta	09/17/2014
J8693	Alpha-emitting Ra and Isotopic U/Th	10/01/2014
J8840	Alpha-emitting Ra and Isotopic U/Th	10/09/2014
J8934	Gamma scan and gross alpha/beta	10/16/2014
J8934	Alpha-emitting Ra and Isotopic U/Th	10/16/2014
J9055	Gamma scan and gross alpha/beta	10/23/2014
J9055	Alpha-emitting Ra and Isotopic U/Th	10/23/2014
J9175	Gamma scan and gross alpha/beta	10/30/2014
J9298	Gamma scan and gross alpha/beta	11/06/2014

If you have any questions or comments, please contact Rob Monnig at (816) 412-1775.

Sincerely,

for Dave Kinroth
START Project Manager

for Ted Faile, PG, CHMM
START Program Manager

Enclosures

cc: Debra Dorsey, EPA START Project Officer (cover letter only)

415 Oak Street, Kansas City, MO 64106
Tel 816.412.1741 Fax 816.410.1748 www.tetratech.com

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Knoxville, Tennessee)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	November 17, 2014
Sample Delivery Group (SDG):	J2246
Sample Numbers:	WAA-01-SU-PS-20141023, WAA-02-SU-PS-20141023, WAA-03-SU-PS-20141023, WAA-04-SU-PS-20141023, WAA-04-SU-DU-20141023, WAA-05-SU-PS-20141023, and WAA-00-SU-TB-20141023
Matrix / Number of Samples:	5 Air Samples, 1 Field Duplicate Sample, and 1 Trip Blank

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) was used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.

I, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

17 November 2014

Certified by Harry Ellis, Chemist

Date

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DATA VALIDATION QUALIFIERS

U — The analyte was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

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DATA ASSESSMENT

Sample delivery group (SDG) J2246 included five (5) environmental air (passivated canister) samples and two (2) QC samples (a field duplicate and a trip blank). Samples were analyzed for volatile organic compounds via EPA Air Method TO-15. The following summarizes the data validation that was performed.

VOLATILE ORGANIC COMPOUND ANALYSIS

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 30 days from sample collection by canister to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. Satisfactory LCS and field duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded a low concentration (less than the reporting limit) of the common laboratory contaminant methylene chloride. The similar concentrations of methylene chloride intwo field samples (including the field blank) were qualified as laboratory artifacts and flagged "U". The reported methylene chloride concentrations above the reporting limit, but less than 10 times the blank concentration, in some samples were qualified as estimated, possibly biased high, and flagged "J" to indicate that. Finally, the concentration in sample WAA-02-SU-PS-20141023 was more than 10 time the blank concentration so it was not qualified.

IV. Laboratory Control Sample (LCS)

Most percent recoveries from the LCS analysis were within established control limits. However, chloroethane (135 percent) and vinyl chloride (131 percent) yielded recoveries above the QC limits (70 to 130 percent). Neither was detected in the field samples so no qualifications were applied.

V. Surrogates

All surrogate recoveries were within QC limits. No qualifications were applied.

VI. Comments

Most detected results were less than reporting limits, which correspond to the lowest calibration standard. The laboratory correctly reported these extrapolations as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with few qualifications added. All data are usable as qualified for their intended purposes.

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

TestAmerica Job ID: 140-2246-1
Client Project/Site: West Lake Landfill

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
11/12/2014 9:41:58 AM

Jamie McKinney, Senior Project Manager
(865)291-3000
jamie.mckinney@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Qualifiers

Air - 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.
*	LCS or LCSD exceeds the control limits
B	Compound was found in the blank and sample.

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

Job ID: 140-2246-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-2246-1

Comments
No additional comments.

Receipt
The samples were received on 10/31/2014 9:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA
Method(s) TO 14A, TO 15 LL, TO-14A, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified “zero air” as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of “zero air” by TestAmerica Knoxville.

Method(s) TO 15 LL, TO-15: The continuing calibration verification (CCV) associated with batch 1885 exhibited % difference of > 30% for the following analyte(s) vinyl chloride, chloroethane, chloromethane, 1,2,4-trichlorobenzene and butane, however the results were within the LCS acceptance limits. The EPA method requires that all target analytes in the continuing calibration verification standard be within 30% difference from the initial calibration. According to the laboratory standard operating procedure, the continuing calibration is acceptable if it meets the laboratory control sample acceptance criteria.

Method(s) TO 15 LL, TO-15: The following analyte(s) recovered outside control limits for the LCS associated with batch 1885: vinyl chloride and chloroethane. This is not indicative of a systematic control problem because these were random marginal exceedances. Qualified results have been reported.

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

Detection Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-01-SU-PS-20141023 — Lab Sample ID: 140-2246-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.077	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
Benzene	0.094	J	0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.079	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.72		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.51		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.50	B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.27		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.59	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
Benzene	0.30	J	0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.49	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.5		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.5		0.99	0.34	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.8	B	1.7	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.5		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-02-SU-PS-20141023 — Lab Sample ID: 140-2246-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.070	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
Benzene	0.25		0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.083	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.65		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.48		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.086	J	0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	4.1	B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.28		0.20	0.12	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.084	J	0.20	0.061	ppb v/v	1		TO-15	Total/NA
Toluene	0.53		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.091	J	0.20	0.036	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.25		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.54	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
Benzene	0.80		0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.52	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.3		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.4		0.99	0.34	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.37	J	0.87	0.30	ug/m3	1		TO-15	Total/NA
Methylene Chloride	14	B	1.7	0.45	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	1.2		0.87	0.52	ug/m3	1		TO-15	Total/NA
o-Xylene	0.37	J	0.87	0.26	ug/m3	1		TO-15	Total/NA
Toluene	2.0		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichloroethene	0.49	J	1.1	0.19	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.4		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-03-SU-PS-20141023 — Lab Sample ID: 140-2246-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.075	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
Benzene	0.21		0.20	0.056	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-03-SU-PS-20141023 (Continued) — Lab Sample ID: 140-2246-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon tetrachloride	0.082	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloroform	0.088	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.90		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.49		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.54	B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.19	J	0.20	0.12	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.072	J	0.20	0.061	ppb v/v	1		TO-15	Total/NA
Toluene	0.37		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.22		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.58	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
Benzene	0.66		0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.52	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloroform	0.43	J	0.98	0.19	ug/m3	1		TO-15	Total/NA
Chloromethane	1.9		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.4		0.99	0.34	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.9	B	1.7	0.45	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.85	J	0.87	0.52	ug/m3	1		TO-15	Total/NA
o-Xylene	0.31	J	0.87	0.26	ug/m3	1		TO-15	Total/NA
Toluene	1.4		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.2		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-04-SU-PS-20141023 — Lab Sample ID: 140-2246-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.077	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
Benzene	0.19	J	0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.078	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.65		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.50		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.47	J B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.21		0.20	0.12	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.076	J	0.20	0.061	ppb v/v	1		TO-15	Total/NA
Toluene	0.41		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.24		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.59	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
Benzene	0.61	J	0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.49	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.3		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.5		0.99	0.34	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.6	J B	1.7	0.45	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.90		0.87	0.52	ug/m3	1		TO-15	Total/NA
o-Xylene	0.33	J	0.87	0.26	ug/m3	1		TO-15	Total/NA
Toluene	1.5		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.3		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-05-SU-PS-20141023 — Lab Sample ID: 140-2246-5

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-05-SU-PS-20141023 (Continued) — Lab Sample ID: 140-2246-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.075	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.072	J	0.20	0.063	ppb v/v	1		TO-15	Total/NA
Benzene	0.24		0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.082	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.68		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.50		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.085	J	0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.70	B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.28		0.20	0.12	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.099	J	0.20	0.061	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.057	J	0.20	0.040	ppb v/v	1		TO-15	Total/NA
Toluene	0.71		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.26		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.58	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.35	J	0.98	0.31	ug/m3	1		TO-15	Total/NA
Benzene	0.76		0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.51	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.4		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.5		0.99	0.34	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.37	J	0.87	0.30	ug/m3	1		TO-15	Total/NA
Methylene Chloride	2.4	B	1.7	0.45	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	1.2		0.87	0.52	ug/m3	1		TO-15	Total/NA
o-Xylene	0.43	J	0.87	0.26	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	0.39	J	1.4	0.27	ug/m3	1		TO-15	Total/NA
Toluene	2.7		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.5		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-04-SU-DU-20141023 — Lab Sample ID: 140-2246-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.079	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
Benzene	0.22		0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.073	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.77		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.52		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.074	J	0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.82	B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.23		0.20	0.12	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.082	J	0.20	0.061	ppb v/v	1		TO-15	Total/NA
Toluene	0.46		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.28		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.61	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
Benzene	0.69		0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.46	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.6		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.6		0.99	0.34	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.32	J	0.87	0.30	ug/m3	1		TO-15	Total/NA
Methylene Chloride	2.9	B	1.7	0.45	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-04-SU-DU-20141023 (Continued) — Lab Sample ID: 140-2246-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
m-Xylene & p-Xylene	0.99		0.87	0.52	ug/m3	1		TO-15	Total/NA
o-Xylene	0.35	J	0.87	0.26	ug/m3	1		TO-15	Total/NA
Toluene	1.7		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.6		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-00-SU-TB-20141023 — Lab Sample ID: 140-2246-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.20	J B	0.50	0.13	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.68	J B	1.7	0.45	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-01-SU-PS-20141023
Date Collected: 10/23/14 14:32
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2246-1
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/03/14 19:47	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/03/14 19:47	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.077**	**J**	0.20	0.031	ppb v/v			11/03/14 19:47	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/03/14 19:47	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/03/14 19:47	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/03/14 19:47	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/03/14 19:47	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/03/14 19:47	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/03/14 19:47	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/03/14 19:47	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/03/14 19:47	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/03/14 19:47	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/03/14 19:47	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/03/14 19:47	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/03/14 19:47	1
Benzene	**0.094**	**J**	0.20	0.056	ppb v/v			11/03/14 19:47	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/03/14 19:47	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/03/14 19:47	1
Carbon tetrachloride	**0.079**	**J**	0.20	0.038	ppb v/v			11/03/14 19:47	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/03/14 19:47	1
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/03/14 19:47	1
Chloroform	ND		0.20	0.038	ppb v/v			11/03/14 19:47	1
Chloromethane	**0.72**		0.50	0.16	ppb v/v			11/03/14 19:47	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/03/14 19:47	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/03/14 19:47	1
Dichlorodifluoromethane	**0.51**		0.20	0.068	ppb v/v			11/03/14 19:47	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/03/14 19:47	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/03/14 19:47	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/03/14 19:47	1
Methylene Chloride	**0.50**	~~B~~ J	0.50	0.13	ppb v/v			11/03/14 19:47	1
m-Xylene & p-Xylene	ND		0.20	0.12	ppb v/v			11/03/14 19:47	1
o-Xylene	ND		0.20	0.061	ppb v/v			11/03/14 19:47	1
Styrene	ND		0.20	0.058	ppb v/v			11/03/14 19:47	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/03/14 19:47	1
Toluene	ND		0.20	0.12	ppb v/v			11/03/14 19:47	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/03/14 19:47	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/03/14 19:47	1
Trichlorofluoromethane	**0.27**		0.20	0.024	ppb v/v			11/03/14 19:47	1
Vinyl chloride	ND	*	0.20	0.071	ppb v/v			11/03/14 19:47	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/03/14 19:47	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/03/14 19:47	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.59**	**J**	1.5	0.24	ug/m3			11/03/14 19:47	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/03/14 19:47	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/03/14 19:47	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/03/14 19:47	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-01-SU-PS-20141023

Lab Sample ID: 140-2246-1
Matrix: Air

Date Collected: 10/23/14 14:32
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/03/14 19:47	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/03/14 19:47	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/03/14 19:47	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/03/14 19:47	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/03/14 19:47	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/03/14 19:47	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/03/14 19:47	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/03/14 19:47	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/03/14 19:47	1
Benzene	**0.30**	J	0.64	0.18	ug/m3			11/03/14 19:47	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/03/14 19:47	1
Bromomethane	ND		0.78	0.12	ug/m3			11/03/14 19:47	1
Carbon tetrachloride	**0.49**	J	1.3	0.24	ug/m3			11/03/14 19:47	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/03/14 19:47	1
Chloroethane	ND	*	0.53	0.092	ug/m3			11/03/14 19:47	1
Chloroform	ND		0.98	0.19	ug/m3			11/03/14 19:47	1
Chloromethane	**1.5**		1.0	0.33	ug/m3			11/03/14 19:47	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/03/14 19:47	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/03/14 19:47	1
Dichlorodifluoromethane	**2.5**		0.99	0.34	ug/m3			11/03/14 19:47	1
Ethylbenzene	ND		0.87	0.30	ug/m3			11/03/14 19:47	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/03/14 19:47	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/03/14 19:47	1
Methylene Chloride	**1.8**	~~B~~ J	1.7	0.45	ug/m3			11/03/14 19:47	1
m-Xylene & p-Xylene	ND		0.87	0.52	ug/m3			11/03/14 19:47	1
o-Xylene	ND		0.87	0.26	ug/m3			11/03/14 19:47	1
Styrene	ND		0.85	0.25	ug/m3			11/03/14 19:47	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/03/14 19:47	1
Toluene	ND		0.75	0.45	ug/m3			11/03/14 19:47	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/03/14 19:47	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/03/14 19:47	1
Trichlorofluoromethane	**1.5**		1.1	0.13	ug/m3			11/03/14 19:47	1
Vinyl chloride	ND	*	0.51	0.18	ug/m3			11/03/14 19:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*96*		*60 - 140*		*11/03/14 19:47*	*1*

Client Sample ID: WAA-02-SU-PS-20141023

Lab Sample ID: 140-2246-2
Matrix: Air

Date Collected: 10/23/14 13:26
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/03/14 20:41	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/03/14 20:41	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.070**	J	0.20	0.031	ppb v/v			11/03/14 20:41	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/03/14 20:41	1

H VG 17 Nov-14

TestAmerica Knoxville

11/12/2014

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-02-SU-PS-20141023
Date Collected: 10/23/14 13:26
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2246-2
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/03/14 20:41	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/03/14 20:41	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/03/14 20:41	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/03/14 20:41	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/03/14 20:41	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/03/14 20:41	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/03/14 20:41	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/03/14 20:41	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/03/14 20:41	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/03/14 20:41	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/03/14 20:41	1
Benzene	**0.25**		0.20	0.056	ppb v/v			11/03/14 20:41	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/03/14 20:41	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/03/14 20:41	1
Carbon tetrachloride	**0.083**	J	0.20	0.038	ppb v/v			11/03/14 20:41	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/03/14 20:41	1
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/03/14 20:41	1
Chloroform	ND		0.20	0.038	ppb v/v			11/03/14 20:41	1
Chloromethane	**0.65**		0.50	0.16	ppb v/v			11/03/14 20:41	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/03/14 20:41	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/03/14 20:41	1
Dichlorodifluoromethane	**0.48**		0.20	0.068	ppb v/v			11/03/14 20:41	1
Ethylbenzene	**0.086**	J	0.20	0.068	ppb v/v			11/03/14 20:41	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/03/14 20:41	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/03/14 20:41	1
Methylene Chloride	**4.1**	~~B~~	0.50	0.13	ppb v/v			11/03/14 20:41	1
m-Xylene & p-Xylene	**0.28**		0.20	0.12	ppb v/v			11/03/14 20:41	1
o-Xylene	**0.084**	J	0.20	0.061	ppb v/v			11/03/14 20:41	1
Styrene	ND		0.20	0.058	ppb v/v			11/03/14 20:41	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/03/14 20:41	1
Toluene	**0.53**		0.20	0.12	ppb v/v			11/03/14 20:41	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/03/14 20:41	1
Trichloroethene	**0.091**	J	0.20	0.036	ppb v/v			11/03/14 20:41	1
Trichlorofluoromethane	**0.25**		0.20	0.024	ppb v/v			11/03/14 20:41	1
Vinyl chloride	ND	*	0.20	0.071	ppb v/v			11/03/14 20:41	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/03/14 20:41	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/03/14 20:41	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.54**	J	1.5	0.24	ug/m3			11/03/14 20:41	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/03/14 20:41	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/03/14 20:41	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/03/14 20:41	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/03/14 20:41	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/03/14 20:41	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/03/14 20:41	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/03/14 20:41	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/03/14 20:41	1

HUG 17 Nov 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-02-SU-PS-20141023

Lab Sample ID: 140-2246-2
Matrix: Air

Date Collected: 10/23/14 13:26
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/03/14 20:41	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/03/14 20:41	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/03/14 20:41	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/03/14 20:41	1
Benzene	**0.80**		0.64	0.18	ug/m3			11/03/14 20:41	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/03/14 20:41	1
Bromomethane	ND		0.78	0.12	ug/m3			11/03/14 20:41	1
Carbon tetrachloride	**0.52**	J	1.3	0.24	ug/m3			11/03/14 20:41	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/03/14 20:41	1
Chloroethane	ND	*	0.53	0.092	ug/m3			11/03/14 20:41	1
Chloroform	ND		0.98	0.19	ug/m3			11/03/14 20:41	1
Chloromethane	**1.3**		1.0	0.33	ug/m3			11/03/14 20:41	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/03/14 20:41	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/03/14 20:41	1
Dichlorodifluoromethane	**2.4**		0.99	0.34	ug/m3			11/03/14 20:41	1
Ethylbenzene	**0.37**	J	0.87	0.30	ug/m3			11/03/14 20:41	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/03/14 20:41	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/03/14 20:41	1
Methylene Chloride	**14**	~~B~~	1.7	0.45	ug/m3			11/03/14 20:41	1
m-Xylene & p-Xylene	**1.2**		0.87	0.52	ug/m3			11/03/14 20:41	1
o-Xylene	**0.37**	J	0.87	0.26	ug/m3			11/03/14 20:41	1
Styrene	ND		0.85	0.25	ug/m3			11/03/14 20:41	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/03/14 20:41	1
Toluene	**2.0**		0.75	0.45	ug/m3			11/03/14 20:41	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/03/14 20:41	1
Trichloroethene	**0.49**	J	1.1	0.19	ug/m3			11/03/14 20:41	1
Trichlorofluoromethane	**1.4**		1.1	0.13	ug/m3			11/03/14 20:41	1
Vinyl chloride	ND	*	0.51	0.18	ug/m3			11/03/14 20:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*60 - 140*		*11/03/14 20:41*	*1*

Client Sample ID: WAA-03-SU-PS-20141023

Lab Sample ID: 140-2246-3
Matrix: Air

Date Collected: 10/23/14 13:59
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/03/14 21:35	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/03/14 21:35	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.075**	J	0.20	0.031	ppb v/v			11/03/14 21:35	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/03/14 21:35	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/03/14 21:35	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/03/14 21:35	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/03/14 21:35	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/03/14 21:35	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/03/14 21:35	1

HVG 17 Nov 14

TestAmerica Knoxville

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-03-SU-PS-20141023
Date Collected: 10/23/14 13:59
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2246-3
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/03/14 21:35	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/03/14 21:35	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/03/14 21:35	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/03/14 21:35	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/03/14 21:35	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/03/14 21:35	1
Benzene	**0.21**		0.20	0.056	ppb v/v			11/03/14 21:35	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/03/14 21:35	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/03/14 21:35	1
Carbon tetrachloride	**0.082**	J	0.20	0.038	ppb v/v			11/03/14 21:35	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/03/14 21:35	1
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/03/14 21:35	1
Chloroform	**0.088**	J	0.20	0.038	ppb v/v			11/03/14 21:35	1
Chloromethane	**0.90**		0.50	0.16	ppb v/v			11/03/14 21:35	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/03/14 21:35	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/03/14 21:35	1
Dichlorodifluoromethane	**0.49**		0.20	0.068	ppb v/v			11/03/14 21:35	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/03/14 21:35	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/03/14 21:35	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/03/14 21:35	1
Methylene Chloride	**0.54**	~~B~~ J	0.50	0.13	ppb v/v			11/03/14 21:35	1
m-Xylene & p-Xylene	**0.19**	J	0.20	0.12	ppb v/v			11/03/14 21:35	1
o-Xylene	**0.072**	J	0.20	0.061	ppb v/v			11/03/14 21:35	1
Styrene	ND		0.20	0.058	ppb v/v			11/03/14 21:35	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/03/14 21:35	1
Toluene	**0.37**		0.20	0.12	ppb v/v			11/03/14 21:35	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/03/14 21:35	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/03/14 21:35	1
Trichlorofluoromethane	**0.22**		0.20	0.024	ppb v/v			11/03/14 21:35	1
Vinyl chloride	ND	*	0.20	0.071	ppb v/v			11/03/14 21:35	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/03/14 21:35	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/03/14 21:35	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.58**	J	1.5	0.24	ug/m3			11/03/14 21:35	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/03/14 21:35	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/03/14 21:35	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/03/14 21:35	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/03/14 21:35	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/03/14 21:35	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/03/14 21:35	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/03/14 21:35	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/03/14 21:35	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/03/14 21:35	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/03/14 21:35	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/03/14 21:35	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/03/14 21:35	1
Benzene	**0.66**		0.64	0.18	ug/m3			11/03/14 21:35	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-03-SU-PS-20141023

Lab Sample ID: 140-2246-3
Matrix: Air

Date Collected: 10/23/14 13:59
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzyl chloride	ND		2.1	0.40	ug/m3			11/03/14 21:35	1
Bromomethane	ND		0.78	0.12	ug/m3			11/03/14 21:35	1
Carbon tetrachloride	**0.52**	J	1.3	0.24	ug/m3			11/03/14 21:35	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/03/14 21:35	1
Chloroethane	ND	*	0.53	0.092	ug/m3			11/03/14 21:35	1
Chloroform	**0.43**	J	0.98	0.19	ug/m3			11/03/14 21:35	1
Chloromethane	**1.9**		1.0	0.33	ug/m3			11/03/14 21:35	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/03/14 21:35	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/03/14 21:35	1
Dichlorodifluoromethane	**2.4**		0.99	0.34	ug/m3			11/03/14 21:35	1
Ethylbenzene	ND		0.87	0.30	ug/m3			11/03/14 21:35	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/03/14 21:35	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/03/14 21:35	1
Methylene Chloride	**1.9**	~~B~~ J	1.7	0.45	ug/m3			11/03/14 21:35	1
m-Xylene & p-Xylene	**0.85**	J	0.87	0.52	ug/m3			11/03/14 21:35	1
o-Xylene	**0.31**	J	0.87	0.26	ug/m3			11/03/14 21:35	1
Styrene	ND		0.85	0.25	ug/m3			11/03/14 21:35	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/03/14 21:35	1
Toluene	**1.4**		0.75	0.45	ug/m3			11/03/14 21:35	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/03/14 21:35	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/03/14 21:35	1
Trichlorofluoromethane	**1.2**		1.1	0.13	ug/m3			11/03/14 21:35	1
Vinyl chloride	ND	*	0.51	0.18	ug/m3			11/03/14 21:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*96*		*60 - 140*		*11/03/14 21:35*	*1*

Client Sample ID: WAA-04-SU-PS-20141023

Lab Sample ID: 140-2246-4
Matrix: Air

Date Collected: 10/23/14 14:16
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/03/14 22:29	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/03/14 22:29	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.077**	J	0.20	0.031	ppb v/v			11/03/14 22:29	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/03/14 22:29	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/03/14 22:29	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/03/14 22:29	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/03/14 22:29	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/03/14 22:29	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/03/14 22:29	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/03/14 22:29	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/03/14 22:29	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/03/14 22:29	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/03/14 22:29	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/03/14 22:29	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-04-SU-PS-20141023
Date Collected: 10/23/14 14:16
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2246-4
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/03/14 22:29	1
Benzene	**0.19**	J	0.20	0.056	ppb v/v			11/03/14 22:29	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/03/14 22:29	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/03/14 22:29	1
Carbon tetrachloride	**0.078**	J	0.20	0.038	ppb v/v			11/03/14 22:29	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/03/14 22:29	1
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/03/14 22:29	1
Chloroform	ND		0.20	0.038	ppb v/v			11/03/14 22:29	1
Chloromethane	**0.65**		0.50	0.16	ppb v/v			11/03/14 22:29	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/03/14 22:29	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/03/14 22:29	1
Dichlorodifluoromethane	**0.50**		0.20	0.068	ppb v/v			11/03/14 22:29	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/03/14 22:29	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/03/14 22:29	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/03/14 22:29	1
Methylene Chloride	~~0.47~~ ~~JB~~ U		0.50	0.13	ppb v/v			11/03/14 22:29	1
m-Xylene & p-Xylene	**0.21**		0.20	0.12	ppb v/v			11/03/14 22:29	1
o-Xylene	**0.076**	J	0.20	0.061	ppb v/v			11/03/14 22:29	1
Styrene	ND		0.20	0.058	ppb v/v			11/03/14 22:29	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/03/14 22:29	1
Toluene	**0.41**		0.20	0.12	ppb v/v			11/03/14 22:29	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/03/14 22:29	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/03/14 22:29	1
Trichlorofluoromethane	**0.24**		0.20	0.024	ppb v/v			11/03/14 22:29	1
Vinyl chloride	ND	*	0.20	0.071	ppb v/v			11/03/14 22:29	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/03/14 22:29	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/03/14 22:29	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.59**	J	1.5	0.24	ug/m3			11/03/14 22:29	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/03/14 22:29	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/03/14 22:29	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/03/14 22:29	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/03/14 22:29	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/03/14 22:29	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/03/14 22:29	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/03/14 22:29	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/03/14 22:29	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/03/14 22:29	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/03/14 22:29	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/03/14 22:29	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/03/14 22:29	1
Benzene	**0.61**	J	0.64	0.18	ug/m3			11/03/14 22:29	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/03/14 22:29	1
Bromomethane	ND		0.78	0.12	ug/m3			11/03/14 22:29	1
Carbon tetrachloride	**0.49**	J	1.3	0.24	ug/m3			11/03/14 22:29	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/03/14 22:29	1
Chloroethane	ND	*	0.53	0.092	ug/m3			11/03/14 22:29	1

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Client Sample ID: WAA-04-SU-PS-20141023

Lab Sample ID: 140-2246-4
Matrix: Air

Date Collected: 10/23/14 14:16
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		0.98	0.19	ug/m3			11/03/14 22:29	1
Chloromethane	**1.3**		1.0	0.33	ug/m3			11/03/14 22:29	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/03/14 22:29	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/03/14 22:29	1
Dichlorodifluoromethane	**2.5**		0.99	0.34	ug/m3			11/03/14 22:29	1
Ethylbenzene	ND		0.87	0.30	ug/m3			11/03/14 22:29	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/03/14 22:29	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/03/14 22:29	1
Methylene Chloride	~~1.6~~ ~~J B~~ U		1.7	0.45	ug/m3			11/03/14 22:29	1
m-Xylene & p-Xylene	**0.90**		0.87	0.52	ug/m3			11/03/14 22:29	1
o-Xylene	**0.33**	J	0.87	0.26	ug/m3			11/03/14 22:29	1
Styrene	ND		0.85	0.25	ug/m3			11/03/14 22:29	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/03/14 22:29	1
Toluene	**1.5**		0.75	0.45	ug/m3			11/03/14 22:29	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/03/14 22:29	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/03/14 22:29	1
Trichlorofluoromethane	**1.3**		1.1	0.13	ug/m3			11/03/14 22:29	1
Vinyl chloride	ND	*	0.51	0.18	ug/m3			11/03/14 22:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*60 - 140*		*11/03/14 22:29*	*1*

Client Sample ID: WAA-05-SU-PS-20141023

Lab Sample ID: 140-2246-5
Matrix: Air

Date Collected: 10/23/14 13:43
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/03/14 23:24	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/03/14 23:24	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.075**	J	0.20	0.031	ppb v/v			11/03/14 23:24	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/03/14 23:24	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/03/14 23:24	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/03/14 23:24	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/03/14 23:24	1
1,2,4-Trimethylbenzene	**0.072**	J	0.20	0.063	ppb v/v			11/03/14 23:24	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/03/14 23:24	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/03/14 23:24	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/03/14 23:24	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/03/14 23:24	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/03/14 23:24	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/03/14 23:24	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/03/14 23:24	1
Benzene	**0.24**		0.20	0.056	ppb v/v			11/03/14 23:24	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/03/14 23:24	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/03/14 23:24	1
Carbon tetrachloride	**0.082**	J	0.20	0.038	ppb v/v			11/03/14 23:24	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-05-SU-PS-20141023

Lab Sample ID: 140-2246-5

Date Collected: 10/23/14 13:43
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/03/14 23:24	1
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/03/14 23:24	1
Chloroform	ND		0.20	0.038	ppb v/v			11/03/14 23:24	1
Chloromethane	**0.68**		0.50	0.16	ppb v/v			11/03/14 23:24	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/03/14 23:24	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/03/14 23:24	1
Dichlorodifluoromethane	**0.50**		0.20	0.068	ppb v/v			11/03/14 23:24	1
Ethylbenzene	**0.085**	J	0.20	0.068	ppb v/v			11/03/14 23:24	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/03/14 23:24	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/03/14 23:24	1
Methylene Chloride	**0.70**	~~B~~ J	0.50	0.13	ppb v/v			11/03/14 23:24	1
m-Xylene & p-Xylene	**0.28**		0.20	0.12	ppb v/v			11/03/14 23:24	1
o-Xylene	**0.099**	J	0.20	0.061	ppb v/v			11/03/14 23:24	1
Styrene	ND		0.20	0.058	ppb v/v			11/03/14 23:24	1
Tetrachloroethene	**0.057**	J	0.20	0.040	ppb v/v			11/03/14 23:24	1
Toluene	**0.71**		0.20	0.12	ppb v/v			11/03/14 23:24	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/03/14 23:24	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/03/14 23:24	1
Trichlorofluoromethane	**0.26**		0.20	0.024	ppb v/v			11/03/14 23:24	1
Vinyl chloride	ND	*	0.20	0.071	ppb v/v			11/03/14 23:24	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/03/14 23:24	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/03/14 23:24	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.58**	J	1.5	0.24	ug/m3			11/03/14 23:24	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/03/14 23:24	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/03/14 23:24	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/03/14 23:24	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/03/14 23:24	1
1,2,4-Trimethylbenzene	**0.35**	J	0.98	0.31	ug/m3			11/03/14 23:24	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/03/14 23:24	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/03/14 23:24	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/03/14 23:24	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/03/14 23:24	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/03/14 23:24	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/03/14 23:24	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/03/14 23:24	1
Benzene	**0.76**		0.64	0.18	ug/m3			11/03/14 23:24	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/03/14 23:24	1
Bromomethane	ND		0.78	0.12	ug/m3			11/03/14 23:24	1
Carbon tetrachloride	**0.51**	J	1.3	0.24	ug/m3			11/03/14 23:24	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/03/14 23:24	1
Chloroethane	ND	*	0.53	0.092	ug/m3			11/03/14 23:24	1
Chloroform	ND		0.98	0.19	ug/m3			11/03/14 23:24	1
Chloromethane	**1.4**		1.0	0.33	ug/m3			11/03/14 23:24	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/03/14 23:24	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/03/14 23:24	1
Dichlorodifluoromethane	**2.5**		0.99	0.34	ug/m3			11/03/14 23:24	1

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TestAmerica Knoxville

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-05-SU-PS-20141023

Lab Sample ID: 140-2246-5
Matrix: Air

Date Collected: 10/23/14 13:43
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**0.37**	J	0.87	0.30	ug/m3			11/03/14 23:24	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/03/14 23:24	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/03/14 23:24	1
Methylene Chloride	**2.4**	~~B~~ J	1.7	0.45	ug/m3			11/03/14 23:24	1
m-Xylene & p-Xylene	**1.2**		0.87	0.52	ug/m3			11/03/14 23:24	1
o-Xylene	**0.43**	J	0.87	0.26	ug/m3			11/03/14 23:24	1
Styrene	ND		0.85	0.25	ug/m3			11/03/14 23:24	1
Tetrachloroethene	**0.39**	J	1.4	0.27	ug/m3			11/03/14 23:24	1
Toluene	**2.7**		0.75	0.45	ug/m3			11/03/14 23:24	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/03/14 23:24	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/03/14 23:24	1
Trichlorofluoromethane	**1.5**		1.1	0.13	ug/m3			11/03/14 23:24	1
Vinyl chloride	ND	*	0.51	0.18	ug/m3			11/03/14 23:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*95*		*60 - 140*		*11/03/14 23:24*	*1*

Client Sample ID: WAA-04-SU-DU-20141023

Lab Sample ID: 140-2246-6
Matrix: Air

Date Collected: 10/23/14 14:16
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/04/14 01:11	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/04/14 01:11	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.079**	J	0.20	0.031	ppb v/v			11/04/14 01:11	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/04/14 01:11	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/04/14 01:11	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/04/14 01:11	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/04/14 01:11	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/04/14 01:11	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/04/14 01:11	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/04/14 01:11	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/04/14 01:11	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/04/14 01:11	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/04/14 01:11	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/04/14 01:11	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/04/14 01:11	1
Benzene	**0.22**		0.20	0.056	ppb v/v			11/04/14 01:11	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/04/14 01:11	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/04/14 01:11	1
Carbon tetrachloride	**0.073**	J	0.20	0.038	ppb v/v			11/04/14 01:11	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/04/14 01:11	1
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/04/14 01:11	1
Chloroform	ND		0.20	0.038	ppb v/v			11/04/14 01:11	1
Chloromethane	**0.77**		0.50	0.16	ppb v/v			11/04/14 01:11	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/04/14 01:11	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-04-SU-DU-20141023

Lab Sample ID: 140-2246-6

Date Collected: 10/23/14 14:16
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/04/14 01:11	1
Dichlorodifluoromethane	**0.52**		0.20	0.068	ppb v/v			11/04/14 01:11	1
Ethylbenzene	**0.074**	J	0.20	0.068	ppb v/v			11/04/14 01:11	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/04/14 01:11	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/04/14 01:11	1
Methylene Chloride	**0.82**	~~B~~ J	0.50	0.13	ppb v/v			11/04/14 01:11	1
m-Xylene & p-Xylene	**0.23**		0.20	0.12	ppb v/v			11/04/14 01:11	1
o-Xylene	**0.082**	J	0.20	0.061	ppb v/v			11/04/14 01:11	1
Styrene	ND		0.20	0.058	ppb v/v			11/04/14 01:11	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/04/14 01:11	1
Toluene	**0.46**		0.20	0.12	ppb v/v			11/04/14 01:11	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/04/14 01:11	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/04/14 01:11	1
Trichlorofluoromethane	**0.28**		0.20	0.024	ppb v/v			11/04/14 01:11	1
Vinyl chloride	ND	*	0.20	0.071	ppb v/v			11/04/14 01:11	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/04/14 01:11	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/04/14 01:11	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.61**	J	1.5	0.24	ug/m3			11/04/14 01:11	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/04/14 01:11	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/04/14 01:11	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/04/14 01:11	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/04/14 01:11	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/04/14 01:11	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/04/14 01:11	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/04/14 01:11	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/04/14 01:11	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/04/14 01:11	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/04/14 01:11	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/04/14 01:11	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/04/14 01:11	1
Benzene	**0.69**		0.64	0.18	ug/m3			11/04/14 01:11	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/04/14 01:11	1
Bromomethane	ND		0.78	0.12	ug/m3			11/04/14 01:11	1
Carbon tetrachloride	**0.46**	J	1.3	0.24	ug/m3			11/04/14 01:11	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/04/14 01:11	1
Chloroethane	ND	*	0.53	0.092	ug/m3			11/04/14 01:11	1
Chloroform	ND		0.98	0.19	ug/m3			11/04/14 01:11	1
Chloromethane	**1.6**		1.0	0.33	ug/m3			11/04/14 01:11	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/04/14 01:11	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/04/14 01:11	1
Dichlorodifluoromethane	**2.6**		0.99	0.34	ug/m3			11/04/14 01:11	1
Ethylbenzene	**0.32**	J	0.87	0.30	ug/m3			11/04/14 01:11	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/04/14 01:11	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/04/14 01:11	1
Methylene Chloride	**2.9**	~~B~~ J	1.7	0.45	ug/m3			11/04/14 01:11	1
m-Xylene & p-Xylene	**0.99**		0.87	0.52	ug/m3			11/04/14 01:11	1

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TestAmerica Knoxville

11/12/2014

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-04-SU-DU-20141023

Lab Sample ID: 140-2246-6
Matrix: Air

Date Collected: 10/23/14 14:16
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Xylene	0.35	J	0.87	0.26	ug/m3			11/04/14 01:11	1
Styrene	ND		0.85	0.25	ug/m3			11/04/14 01:11	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/04/14 01:11	1
Toluene	1.7		0.75	0.45	ug/m3			11/04/14 01:11	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/04/14 01:11	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/04/14 01:11	1
Trichlorofluoromethane	1.6		1.1	0.13	ug/m3			11/04/14 01:11	1
Vinyl chloride	ND	*	0.51	0.18	ug/m3			11/04/14 01:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		60 - 140		11/04/14 01:11	1

Client Sample ID: WAA-00-SU-TB-20141023

Lab Sample ID: 140-2246-7
Matrix: Air

Date Collected: 10/23/14 14:32
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/03/14 18:52	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/03/14 18:52	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.031	ppb v/v			11/03/14 18:52	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/03/14 18:52	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/03/14 18:52	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/03/14 18:52	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/03/14 18:52	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/03/14 18:52	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/03/14 18:52	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/03/14 18:52	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/03/14 18:52	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/03/14 18:52	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/03/14 18:52	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/03/14 18:52	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/03/14 18:52	1
Benzene	ND		0.20	0.056	ppb v/v			11/03/14 18:52	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/03/14 18:52	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/03/14 18:52	1
Carbon tetrachloride	ND		0.20	0.038	ppb v/v			11/03/14 18:52	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/03/14 18:52	1
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/03/14 18:52	1
Chloroform	ND		0.20	0.038	ppb v/v			11/03/14 18:52	1
Chloromethane	ND		0.50	0.16	ppb v/v			11/03/14 18:52	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/03/14 18:52	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/03/14 18:52	1
Dichlorodifluoromethane	ND		0.20	0.068	ppb v/v			11/03/14 18:52	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/03/14 18:52	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/03/14 18:52	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/03/14 18:52	1
Methylene Chloride	0.20	~~J B~~ U	0.50	0.13	ppb v/v			11/03/14 18:52	1

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TestAmerica Knoxville

11/12/2014

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-00-SU-TB-20141023
Date Collected: 10/23/14 14:32
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2246-7
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m-Xylene & p-Xylene	ND		0.20	0.12	ppb v/v			11/03/14 18:52	1
o-Xylene	ND		0.20	0.061	ppb v/v			11/03/14 18:52	1
Styrene	ND		0.20	0.058	ppb v/v			11/03/14 18:52	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/03/14 18:52	1
Toluene	ND		0.20	0.12	ppb v/v			11/03/14 18:52	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/03/14 18:52	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/03/14 18:52	1
Trichlorofluoromethane	ND		0.20	0.024	ppb v/v			11/03/14 18:52	1
Vinyl chloride	ND	*	0.20	0.071	ppb v/v			11/03/14 18:52	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/03/14 18:52	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/03/14 18:52	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.5	0.24	ug/m3			11/03/14 18:52	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/03/14 18:52	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/03/14 18:52	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/03/14 18:52	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/03/14 18:52	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/03/14 18:52	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/03/14 18:52	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/03/14 18:52	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/03/14 18:52	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/03/14 18:52	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/03/14 18:52	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/03/14 18:52	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/03/14 18:52	1
Benzene	ND		0.64	0.18	ug/m3			11/03/14 18:52	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/03/14 18:52	1
Bromomethane	ND		0.78	0.12	ug/m3			11/03/14 18:52	1
Carbon tetrachloride	ND		1.3	0.24	ug/m3			11/03/14 18:52	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/03/14 18:52	1
Chloroethane	ND	*	0.53	0.092	ug/m3			11/03/14 18:52	1
Chloroform	ND		0.98	0.19	ug/m3			11/03/14 18:52	1
Chloromethane	ND		1.0	0.33	ug/m3			11/03/14 18:52	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/03/14 18:52	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/03/14 18:52	1
Dichlorodifluoromethane	ND		0.99	0.34	ug/m3			11/03/14 18:52	1
Ethylbenzene	ND		0.87	0.30	ug/m3			11/03/14 18:52	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/03/14 18:52	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/03/14 18:52	1
Methylene Chloride	~~0.68~~ ~~J B~~ U		1.7	0.45	ug/m3			11/03/14 18:52	1
m-Xylene & p-Xylene	ND		0.87	0.52	ug/m3			11/03/14 18:52	1
o-Xylene	ND		0.87	0.26	ug/m3			11/03/14 18:52	1
Styrene	ND		0.85	0.25	ug/m3			11/03/14 18:52	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/03/14 18:52	1
Toluene	ND		0.75	0.45	ug/m3			11/03/14 18:52	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/03/14 18:52	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/03/14 18:52	1
Trichlorofluoromethane	ND		1.1	0.13	ug/m3			11/03/14 18:52	1

HVG 17 Nov 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-00-SU-TB-20141023

Lab Sample ID: 140-2246-7

Date Collected: 10/23/14 14:32
Date Received: 10/31/14 09:10
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND	*	0.51	0.18	ug/m3			11/03/14 18:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*60 - 140*		*11/03/14 18:52*	*1*

AVE
17 Nov 14

Surrogate Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

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

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**BFB (60-140)**							
140-2246-1	WAA-01-SU-PS-20141023	96							
140-2246-2	WAA-02-SU-PS-20141023	99							
140-2246-3	WAA-03-SU-PS-20141023	96							
140-2246-4	WAA-04-SU-PS-20141023	93							
140-2246-5	WAA-05-SU-PS-20141023	95							
140-2246-6	WAA-04-SU-DU-20141023	97							
140-2246-7	WAA-00-SU-TB-20141023	94							
LCS 140-1885/1002	Lab Control Sample	107							
MB 140-1885/6	Method Blank	97							

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 140-1885/6
Matrix: Air
Analysis Batch: 1885

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		0.20	0.030	ppb v/v			11/03/14 17:59	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/03/14 17:59	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.031	ppb v/v			11/03/14 17:59	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/03/14 17:59	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/03/14 17:59	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/03/14 17:59	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/03/14 17:59	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/03/14 17:59	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/03/14 17:59	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/03/14 17:59	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/03/14 17:59	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/03/14 17:59	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/03/14 17:59	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/03/14 17:59	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/03/14 17:59	1
Benzene	ND		0.20	0.056	ppb v/v			11/03/14 17:59	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/03/14 17:59	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/03/14 17:59	1
Carbon tetrachloride	ND		0.20	0.038	ppb v/v			11/03/14 17:59	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/03/14 17:59	1
Chloroethane	ND		0.20	0.035	ppb v/v			11/03/14 17:59	1
Chloroform	ND		0.20	0.038	ppb v/v			11/03/14 17:59	1
Chloromethane	ND		0.50	0.16	ppb v/v			11/03/14 17:59	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/03/14 17:59	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/03/14 17:59	1
Dichlorodifluoromethane	ND		0.20	0.068	ppb v/v			11/03/14 17:59	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/03/14 17:59	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/03/14 17:59	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/03/14 17:59	1
Methylene Chloride	0.203	J	0.50	0.13	ppb v/v			11/03/14 17:59	1
m-Xylene & p-Xylene	ND		0.20	0.12	ppb v/v			11/03/14 17:59	1
o-Xylene	ND		0.20	0.061	ppb v/v			11/03/14 17:59	1
Styrene	ND		0.20	0.058	ppb v/v			11/03/14 17:59	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/03/14 17:59	1
Toluene	ND		0.20	0.12	ppb v/v			11/03/14 17:59	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/03/14 17:59	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/03/14 17:59	1
Trichlorofluoromethane	ND		0.20	0.024	ppb v/v			11/03/14 17:59	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/03/14 17:59	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/03/14 17:59	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/03/14 17:59	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.5	0.24	ug/m3			11/03/14 17:59	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/03/14 17:59	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/03/14 17:59	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/03/14 17:59	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/03/14 17:59	1

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 140-1885/6
Matrix: Air
Analysis Batch: 1885

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/03/14 17:59	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/03/14 17:59	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/03/14 17:59	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/03/14 17:59	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/03/14 17:59	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/03/14 17:59	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/03/14 17:59	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/03/14 17:59	1
Benzene	ND		0.64	0.18	ug/m3			11/03/14 17:59	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/03/14 17:59	1
Bromomethane	ND		0.78	0.12	ug/m3			11/03/14 17:59	1
Carbon tetrachloride	ND		1.3	0.24	ug/m3			11/03/14 17:59	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/03/14 17:59	1
Chloroethane	ND		0.53	0.092	ug/m3			11/03/14 17:59	1
Chloroform	ND		0.98	0.19	ug/m3			11/03/14 17:59	1
Chloromethane	ND		1.0	0.33	ug/m3			11/03/14 17:59	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/03/14 17:59	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/03/14 17:59	1
Dichlorodifluoromethane	ND		0.99	0.34	ug/m3			11/03/14 17:59	1
Ethylbenzene	ND		0.87	0.30	ug/m3			11/03/14 17:59	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/03/14 17:59	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/03/14 17:59	1
Methylene Chloride	0.704	J	1.7	0.45	ug/m3			11/03/14 17:59	1
m-Xylene & p-Xylene	ND		0.87	0.52	ug/m3			11/03/14 17:59	1
o-Xylene	ND		0.87	0.26	ug/m3			11/03/14 17:59	1
Styrene	ND		0.85	0.25	ug/m3			11/03/14 17:59	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/03/14 17:59	1
Toluene	ND		0.75	0.45	ug/m3			11/03/14 17:59	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/03/14 17:59	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/03/14 17:59	1
Trichlorofluoromethane	ND		1.1	0.13	ug/m3			11/03/14 17:59	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/03/14 17:59	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*60 - 140*		*11/03/14 17:59*	*1*

Lab Sample ID: LCS 140-1885/1002
Matrix: Air
Analysis Batch: 1885

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	2.00	1.88		ppb v/v		94	70 - 130
1,1,2,2-Tetrachloroethane	2.00	1.81		ppb v/v		90	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroetha ne	2.00	2.24		ppb v/v		112	70 - 130
1,1,2-Trichloroethane	2.00	1.71		ppb v/v		86	70 - 130
1,1-Dichloroethane	2.00	1.95		ppb v/v		97	70 - 130
1,1-Dichloroethene	2.00	2.29		ppb v/v		114	70 - 130

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-1885/1002
Matrix: Air
Analysis Batch: 1885

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	2.00	1.25		ppb v/v		62	60 - 140
1,2,4-Trimethylbenzene	2.00	1.88		ppb v/v		94	70 - 130
1,2-Dichloro-1,1,2,2-tetrafluoroethane	2.00	2.50		ppb v/v		125	60 - 140
1,2-Dichlorobenzene	2.00	1.58		ppb v/v		79	70 - 130
1,2-Dichloroethane	2.00	1.88		ppb v/v		94	70 - 130
1,2-Dichloropropane	2.00	1.76		ppb v/v		88	70 - 130
1,3,5-Trimethylbenzene	2.00	1.86		ppb v/v		93	70 - 130
1,3-Dichlorobenzene	2.00	1.53		ppb v/v		76	70 - 130
1,4-Dichlorobenzene	2.00	1.49		ppb v/v		74	70 - 130
Benzene	2.00	1.78		ppb v/v		89	70 - 130
Benzyl chloride	2.00	1.61		ppb v/v		81	70 - 130
Bromomethane	2.00	2.55		ppb v/v		127	70 - 130
Carbon tetrachloride	2.00	2.29		ppb v/v		114	70 - 130
Chlorobenzene	2.00	1.66		ppb v/v		83	70 - 130
Chloroethane	2.00	2.70	*	ppb v/v		135	70 - 130
Chloroform	2.00	1.86		ppb v/v		93	70 - 130
Chloromethane	2.00	2.60		ppb v/v		130	60 - 140
cis-1,2-Dichloroethene	2.00	1.88		ppb v/v		94	70 - 130
cis-1,3-Dichloropropene	2.00	1.80		ppb v/v		90	70 - 130
Dichlorodifluoromethane	2.00	2.48		ppb v/v		124	60 - 140
Ethylbenzene	2.00	1.74		ppb v/v		87	70 - 130
1,2-Dibromoethane (EDB)	2.00	1.59		ppb v/v		79	70 - 130
Hexachlorobutadiene	2.00	1.44		ppb v/v		72	60 - 140
Methylene Chloride	2.00	2.11		ppb v/v		106	70 - 130
m-Xylene & p-Xylene	4.00	3.66		ppb v/v		91	70 - 130
o-Xylene	2.00	1.83		ppb v/v		91	70 - 130
Styrene	2.00	1.69		ppb v/v		85	70 - 130
Tetrachloroethene	2.00	1.75		ppb v/v		88	70 - 130
Toluene	2.00	1.66		ppb v/v		83	70 - 130
trans-1,3-Dichloropropene	2.00	1.66		ppb v/v		83	70 - 130
Trichloroethene	2.00	1.77		ppb v/v		88	70 - 130
Trichlorofluoromethane	2.00	2.40		ppb v/v		120	60 - 140
Vinyl chloride	2.00	2.62	*	ppb v/v		131	70 - 130

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	11	10.3		ug/m3		94	70 - 130
1,1,2,2-Tetrachloroethane	14	12.4		ug/m3		90	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroethane	15	17.2		ug/m3		112	70 - 130
1,1,2-Trichloroethane	11	9.35		ug/m3		86	70 - 130
1,1-Dichloroethane	8.1	7.89		ug/m3		97	70 - 130
1,1-Dichloroethene	7.9	9.08		ug/m3		114	70 - 130
1,2,4-Trichlorobenzene	15	9.24		ug/m3		62	60 - 140
1,2,4-Trimethylbenzene	9.8	9.24		ug/m3		94	70 - 130
1,2-Dichloro-1,1,2,2-tetrafluoroethane	14	17.5		ug/m3		125	60 - 140
1,2-Dichlorobenzene	12	9.48		ug/m3		79	70 - 130
1,2-Dichloroethane	8.1	7.63		ug/m3		94	70 - 130

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-1885/1002
Matrix: Air
Analysis Batch: 1885

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloropropane	9.2	8.13		ug/m3		88	70 - 130
1,3,5-Trimethylbenzene	9.8	9.15		ug/m3		93	70 - 130
1,3-Dichlorobenzene	12	9.19		ug/m3		76	70 - 130
1,4-Dichlorobenzene	12	8.95		ug/m3		74	70 - 130
Benzene	6.4	5.68		ug/m3		89	70 - 130
Benzyl chloride	10	8.34		ug/m3		81	70 - 130
Bromomethane	7.8	9.89		ug/m3		127	70 - 130
Carbon tetrachloride	13	14.4		ug/m3		114	70 - 130
Chlorobenzene	9.2	7.63		ug/m3		83	70 - 130
Chloroethane	5.3	7.12	*	ug/m3		135	70 - 130
Chloroform	9.8	9.06		ug/m3		93	70 - 130
Chloromethane	4.1	5.37		ug/m3		130	60 - 140
cis-1,2-Dichloroethene	7.9	7.45		ug/m3		94	70 - 130
cis-1,3-Dichloropropene	9.1	8.17		ug/m3		90	70 - 130
Dichlorodifluoromethane	9.9	12.2		ug/m3		124	60 - 140
Ethylbenzene	8.7	7.53		ug/m3		87	70 - 130
1,2-Dibromoethane (EDB)	15	12.2		ug/m3		79	70 - 130
Hexachlorobutadiene	21	15.3		ug/m3		72	60 - 140
Methylene Chloride	7.0	7.34		ug/m3		106	70 - 130
m-Xylene & p-Xylene	17	15.9		ug/m3		91	70 - 130
o-Xylene	8.7	7.94		ug/m3		91	70 - 130
Styrene	8.5	7.22		ug/m3		85	70 - 130
Tetrachloroethene	14	11.9		ug/m3		88	70 - 130
Toluene	7.5	6.24		ug/m3		83	70 - 130
trans-1,3-Dichloropropene	9.1	7.55		ug/m3		83	70 - 130
Trichloroethene	11	9.49		ug/m3		88	70 - 130
Trichlorofluoromethane	11	13.5		ug/m3		120	60 - 140
Vinyl chloride	5.1	6.69	*	ug/m3		131	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*107*		*60 - 140*

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Air - GC/MS VOA

Analysis Batch: 1885

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-2246-1	WAA-01-SU-PS-20141023	Total/NA	Air	TO-15	
140-2246-2	WAA-02-SU-PS-20141023	Total/NA	Air	TO-15	
140-2246-3	WAA-03-SU-PS-20141023	Total/NA	Air	TO-15	
140-2246-4	WAA-04-SU-PS-20141023	Total/NA	Air	TO-15	
140-2246-5	WAA-05-SU-PS-20141023	Total/NA	Air	TO-15	
140-2246-6	WAA-04-SU-DU-20141023	Total/NA	Air	TO-15	
140-2246-7	WAA-00-SU-TB-20141023	Total/NA	Air	TO-15	
LCS 140-1885/1002	Lab Control Sample	Total/NA	Air	TO-15	
MB 140-1885/6	Method Blank	Total/NA	Air	TO-15	

Lab Chronicle

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-01-SU-PS-20141023 — Lab Sample ID: 140-2246-1

Date Collected: 10/23/14 14:32 — **Matrix: Air**
Date Received: 10/31/14 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1885	11/03/14 19:47	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: WAA-02-SU-PS-20141023 — Lab Sample ID: 140-2246-2

Date Collected: 10/23/14 13:26 — **Matrix: Air**
Date Received: 10/31/14 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1885	11/03/14 20:41	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: WAA-03-SU-PS-20141023 — Lab Sample ID: 140-2246-3

Date Collected: 10/23/14 13:59 — **Matrix: Air**
Date Received: 10/31/14 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1885	11/03/14 21:35	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: WAA-04-SU-PS-20141023 — Lab Sample ID: 140-2246-4

Date Collected: 10/23/14 14:16 — **Matrix: Air**
Date Received: 10/31/14 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1885	11/03/14 22:29	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: WAA-05-SU-PS-20141023 — Lab Sample ID: 140-2246-5

Date Collected: 10/23/14 13:43 — **Matrix: Air**
Date Received: 10/31/14 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1885	11/03/14 23:24	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: WAA-04-SU-DU-20141023 — Lab Sample ID: 140-2246-6

Date Collected: 10/23/14 14:16 — **Matrix: Air**
Date Received: 10/31/14 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1885	11/04/14 01:11	HMT	TAL KNX
	Instrument ID: MJ									

Lab Chronicle

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Client Sample ID: WAA-00-SU-TB-20141023

Lab Sample ID: 140-2246-7

Date Collected: 10/23/14 14:32

Matrix: Air

Date Received: 10/31/14 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1885	11/03/14 18:52	HMT	TAL KNX
	Instrument ID: MJ									

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Certification Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Laboratory: TestAmerica Knoxville

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

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		N/A	
Arkansas DEQ	State Program	6	88-0688	06-17-15
California	State Program	9	2423	06-30-16
Colorado	State Program	8	N/A	02-28-15
Connecticut	State Program	1	PH-0223	09-30-15
Florida	NELAP	4	E87177	06-30-15
Georgia	State Program	4	906	04-13-17
Hawaii	State Program	9	N/A	04-13-15
Kansas	NELAP	7	E-10349	01-31-15
Kentucky (DW)	State Program	4	90101	12-31-14
L-A-B	DoD ELAP		L2311	02-13-16
Louisiana	NELAP	6	83979	06-30-15
Maryland	State Program	3	277	03-31-15
Michigan	State Program	5	9933	04-13-17
Nevada	State Program	9	TN00009	07-31-15
New Jersey	NELAP	2	TN001	06-30-15
New York	NELAP	2	10781	03-31-15
North Carolina (DW)	State Program	4	21705	07-31-15
Ohio VAP	State Program	5	CL0059	03-26-15
Oklahoma	State Program	6	9415	08-31-15
Pennsylvania	NELAP	3	68-00576	12-31-14
South Carolina	State Program	4	84001	06-30-15
Tennessee	State Program	4	2014	04-13-17
Texas	NELAP	6	T104704380-TX	08-31-15
USDA	Federal		P330-13-00260	08-29-16
Utah	NELAP	8	QUAN3	07-31-15
Virginia	NELAP	3	460176	09-14-15
Virginia	State Program	3	165	06-30-15
Washington	State Program	10	C593	01-19-15
West Virginia (DW)	State Program	3	9955C	12-31-14
West Virginia DEP	State Program	3	345	04-30-15
Wisconsin	State Program	5	998044300	08-31-15

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2246-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-2246-1	WAA-01-SU-PS-20141023	Air	10/23/14 14:32	10/31/14 09:10
140-2246-2	WAA-02-SU-PS-20141023	Air	10/23/14 13:26	10/31/14 09:10
140-2246-3	WAA-03-SU-PS-20141023	Air	10/23/14 13:59	10/31/14 09:10
140-2246-4	WAA-04-SU-PS-20141023	Air	10/23/14 14:16	10/31/14 09:10
140-2246-5	WAA-05-SU-PS-20141023	Air	10/23/14 13:43	10/31/14 09:10
140-2246-6	WAA-04-SU-DU-20141023	Air	10/23/14 14:16	10/31/14 09:10
140-2246-7	WAA-00-SU-TB-20141023	Air	10/23/14 14:32	10/31/14 09:10

TestAmerica Knoxville
5815 Middlebrook Pike

Knoxville, TN 37921
phone 865.291.3000 fax 865.584.4315

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

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TestAmerica Laboratories, Inc.

Client Contact Information	Project Manager: Dave Kinroth	Samples Collected By: Dave Kinroth & Matt Jefferson	COC No:
Company Name: Tetra Tech Inc.	Phone: 314-517-6798		_____ of _____ COCs
Address: 415 Oak Street	Email: emily.fisher@tetratech.com		
City/State/Zip: Kansas City, MO 64106			For Lab Use Only:
Phone: 816-412-1755	Site Contact: Dave Kinroth - 314-517-6787		Walk-in Client:
FAX: 816-410-1748	TA Contact: Emily Fisher/Rob Monnig		Lab Sampling:
Project Name: West Lake Landfill	Anaylsis Turnaround Time		
Site/Location: Bridgeton, MO	Standard (Specific): _____10 days_____		Job / SDG No.:
P O # 1105352	Rush (Specifiy): _____		(See below for Add'l Items)

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, 'Hg (Start)'	Canister Vacuum in Field, 'Hg (Stop)'	Flow Controller ID	Canister ID	TO-15 (Med / Std / Low / SIM)	MA-APH	EPA 3C	EPA 25C / 25.3	ASTM D-1946 / 1945 / 3588	EPA 15/16	TO-3	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)	Sample Specific Notes:
WAA-01-SU-PS-20141023	10/22/14 - 10/23/14	14:55	14:32	-28.7	-3.5	10350	10266	X										X				
WAA-02-SU-PS-20141023	10/22/14 - 10/23/14	14:05	13:26	-28.7	-3.0	10177	10134	X										X				
WAA-03-SU-PS-20141023	10/22/14 - 10/23/14	14:28	13:59	-28.7	-2.5	09955	09760	X										X				
WAA-04-SU-PS-20141023	10/22/14 - 10/23/14	14:41	14:16	-28.7	-3.5	09559	10405	X										X				
WAA-05-SU-PS-20141023	10/22/14 - 10/23/14	14:15	13:43	-28.7	-4.0	10447	10374	X										X				
WAA-04-SU-DU-20141023	10/22/14 - 10/23/14	14:41	14:16	-28.4	-3.0	09713	10362	X										X				
WAA-00-SU-TB-20141023	10/22/14 - 10/23/14	14:05	14:32	-28.7	-28.7	10352	10811	X										X				

140-2246 Chain of Custody

Temperature (Fahrenheit)	Interior	Ambient
Start		60
Stop		64

Pressure (inches of Hg)	Interior	Ambient
Start		30.3
Stop		30.12

Fedex SO, tr# 5799 0208 6670
" " 6669
2 boxes, No custody seal

Special Instructions/QC Requirements & Comments:

7 CANS / 7 FLOWS / 7 C.U

Samples Shipped by:	Date / Time:	Samples Received by:
Samples Relinquished by: Dave Kinroth	Date / Time: 10/27/14 13:30	Received by: 10/27/14 1330
Relinquished by:	Date / Time: 10-27-14 1400	Received by: 10-31-14 09:10
Lab Use Only: Shipper Name:	Opened by:	Condition:

Form No. CA-C-WI-003, Rev. 1.1, dated 05/14/2013

WLLFOIA4312 - 015 - 0155291
11/12/2014

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 140-2246-1

Login Number: 2246

List Source: TestAmerica Knoxville

List Number: 1

Creator: Dameron, Bryan K

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
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.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	N/A	CHECKED IN LAB
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	N/A	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	

TestAmerica Knoxville - Air Canister Initial Pressure Check

Gauge ID: G1

Analyst	Date	Sample ID	6 L	1 L	Pressure @ Receipt (-in Hg or +psig)	Time	Comments
AFB	10/31/2014	140-2246-a-1	X		-2.6	1930	
AFB	10/31/2014	140-2246-a-2	X		-2.3	1931	
AFB	10/31/2014	140-2246-a-3	X		-2.2	1932	
AFB	10/31/2014	140-2246-a-4	X		-2.7	1933	
AFB	10/31/2014	140-2246-a-5	X		-3.3	1934	
AFB	10/31/2014	140-2246-a-6	X		-2.1	1935	
AFB	10/31/2014	140-2246-a-7	X		-28.9	1925	TRIP BLK pressed to 10psi w/N2

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Knoxville, Tennessee)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	November 17, 2014
Sample Delivery Group (SDG):	J2258
Sample Numbers:	WAA-01-SU-PS-20141030, WAA-02-SU-PS-20141030, WAA-03-SU-PS-20141030, WAA-04-SU-PS-20141030, WAA-04-SU-DU-20141030, WAA-05-SU-PS-20141030, and WAA-00-SU-TB-20141030
Matrix / Number of Samples:	5 Air Samples, 1 Field Duplicate Sample, and 1 Trip Blank

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) was used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.

I, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

17 November 2014

Certified by Harry Ellis, Chemist

Date

WLLFOIA4312 - 015 - 0155294

DATA VALIDATION QUALIFIERS

U — The analyte was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

WLLFOIA4312 - 015 - 0155295

DATA ASSESSMENT

Sample delivery group (SDG) J2258 included five (5) environmental air (passivated canister) samples and two (2) QC samples (a field duplicate and a trip blank). Samples were analyzed for volatile organic compounds via EPA Air Method TO-15. The following summarizes the data validation that was performed.

VOLATILE ORGANIC COMPOUND ANALYSIS

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 30 days from sample collection by canister to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. Satisfactory LCS and field duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded a low concentration (less than the reporting limit) of the common laboratory contaminant methylene chloride. The similar concentrations of methylene chloride insome field samples (including the field blank) were qualified as laboratory artifacts and flagged "U". The reported methylene chloride concentrations above the reporting limit, but less than 10 times the blank concentration, in the other field samples were qualified as estimated, possibly biased high, and flagged "J" to indicate that.

IV. Laboratory Control Sample (LCS)

Most percent recoveries from the LCS analysis were within established control limits. However, bromomethane (136) and chloroethane (142 percent) yielded recoveries above the QC limits (70 to 130 percent). Detected results for bromomethane in two samples were qualified as estimated, possibly biased high, and flagged "J". No qualifications were applied for the nondetected results for bromomethane and chloroethane.

V. Surrogates

All surrogate recoveries were within QC limits. No qualifications were applied.

VI. Comments

Most detected results were less than reporting limits, which correspond to the lowest calibration standard. The laboratory correctly reported these extrapolations as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with few qualifications added. All data are usable as qualified for their intended purposes.

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

TestAmerica Job ID: 140-2258-1
Client Project/Site: West Lake Landfill

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
11/12/2014 2:47:28 PM

Jamie McKinney, Senior Project Manager
(865)291-3000
jamie.mckinney@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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

Results relate only to the items tested and the sample(s) as received by the laboratory.

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WLLFOIA4312 - 015 - 0155299

Definitions/Glossary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Qualifiers

Air - 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.
*	LCS or LCSD exceeds the control limits
B	Compound was found in the blank and sample.

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: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Job ID: 140-2258-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-2258-1

Comments
No additional comments.

Receipt
The samples were received on 11/4/2014 10:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA
Method(s) TO 14A, TO 15 LL, TO-14A, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified “zero air” as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of “zero air” by TestAmerica Knoxville.

Method(s) TO 15 LL, TO-15: The laboratory control sample (LCS) and continuing calibration verification standard (CCV) for batch 1893 recovered outside control limits for the following analyte: chloroethane. This analyte was biased high in the LCS/CCV and was not detected above the reporting limit in the associated samples; therefore, the data have been reported.

Method(s) TO 15 LL, TO-15: The following analyte(s) recovered outside control limits for the LCS associated with batch 1893: bromomethane. This is not indicative of a systematic control problem because these were random marginal exceedances. Qualified results have been reported.

Method(s) TO 15 LL, TO-15: The continuing calibration verification (CCV) associated with batch 1893 exhibited % difference of > 30% for the following analyte(s) bromomethane, however the results were within the LCS acceptance limits. The EPA method requires that all target analytes in the continuing calibration verification standard be within 30% difference from the initial calibration. According to the laboratory standard operating procedure, the continuing calibration is acceptable if it meets the laboratory control sample acceptance criteria.

Method(s) TO 15 LL, TO-15: Although the tune is flagged outside control for mass 50 at 14.2% in batch 1893, the mass met the requirement for TO-15 analysis, which has a limit of 8-40%.

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

WLLFOIA4312 - 015 - 0155301

Detection Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-01-SU-PS-20141030 — Lab Sample ID: 140-2258-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.069	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.080	J	0.20	0.063	ppb v/v	1		TO-15	Total/NA
Benzene	0.25		0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.082	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.62		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.47		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.085	J	0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.58	B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.27		0.20	0.12	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.095	J	0.20	0.061	ppb v/v	1		TO-15	Total/NA
Styrene	0.21		0.20	0.058	ppb v/v	1		TO-15	Total/NA
Toluene	0.66		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.25		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.53	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.39	J	0.98	0.31	ug/m3	1		TO-15	Total/NA
Benzene	0.81		0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.51	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.3		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.3		0.99	0.34	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.37	J	0.87	0.30	ug/m3	1		TO-15	Total/NA
Methylene Chloride	2.0	B	1.7	0.45	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	1.2		0.87	0.52	ug/m3	1		TO-15	Total/NA
o-Xylene	0.41	J	0.87	0.26	ug/m3	1		TO-15	Total/NA
Styrene	0.89		0.85	0.25	ug/m3	1		TO-15	Total/NA
Toluene	2.5		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.4		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-02-SU-PS-20141030 — Lab Sample ID: 140-2258-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.075	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.090	J	0.20	0.063	ppb v/v	1		TO-15	Total/NA
Benzene	0.27		0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.079	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloroform	0.039	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.52		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.51		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.11	J	0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	1.6	B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.33		0.20	0.12	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.11	J	0.20	0.061	ppb v/v	1		TO-15	Total/NA
Toluene	0.74		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.039	J	0.20	0.036	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.33		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.58	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.44	J	0.98	0.31	ug/m3	1		TO-15	Total/NA
Benzene	0.85		0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.50	J	1.3	0.24	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-02-SU-PS-20141030 (Continued) — Lab Sample ID: 140-2258-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	0.19	J	0.98	0.19	ug/m3	1		TO-15	Total/NA
Chloromethane	1.1		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.5		0.99	0.34	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.46	J	0.87	0.30	ug/m3	1		TO-15	Total/NA
Methylene Chloride	5.5	B	1.7	0.45	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	1.4		0.87	0.52	ug/m3	1		TO-15	Total/NA
o-Xylene	0.48	J	0.87	0.26	ug/m3	1		TO-15	Total/NA
Toluene	2.8		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichloroethene	0.21	J	1.1	0.19	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.8		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-03-SU-PS-20141030 — Lab Sample ID: 140-2258-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.067	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.067	J	0.20	0.063	ppb v/v	1		TO-15	Total/NA
Benzene	0.25		0.20	0.056	ppb v/v	1		TO-15	Total/NA
Bromomethane	0.074	J *	0.20	0.032	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.087	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.59		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.47		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.071	J	0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.34	J B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.22		0.20	0.12	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.076	J	0.20	0.061	ppb v/v	1		TO-15	Total/NA
Toluene	0.50		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.22		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.51	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.33	J	0.98	0.31	ug/m3	1		TO-15	Total/NA
Benzene	0.81		0.64	0.18	ug/m3	1		TO-15	Total/NA
Bromomethane	0.29	J *	0.78	0.12	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.55	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.2		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.3		0.99	0.34	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.31	J	0.87	0.30	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.2	J B	1.7	0.45	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.94		0.87	0.52	ug/m3	1		TO-15	Total/NA
o-Xylene	0.33	J	0.87	0.26	ug/m3	1		TO-15	Total/NA
Toluene	1.9		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.2		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-04-SU-PS-20141030 — Lab Sample ID: 140-2258-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.071	J	0.20	0.031	ppb v/v	1.44		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.077	J	0.20	0.063	ppb v/v	1.44		TO-15	Total/NA
Benzene	0.23		0.20	0.056	ppb v/v	1.44		TO-15	Total/NA
Bromomethane	0.047	J *	0.20	0.032	ppb v/v	1.44		TO-15	Total/NA
Chloromethane	0.61		0.50	0.16	ppb v/v	1.44		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-04-SU-PS-20141030 (Continued) — Lab Sample ID: 140-2258-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Dichlorodifluoromethane	0.49		0.20	0.068	ppb v/v	1.44		TO-15	Total/NA
Ethylbenzene	0.082	J	0.20	0.068	ppb v/v	1.44		TO-15	Total/NA
Methylene Chloride	0.39	J B	0.50	0.13	ppb v/v	1.44		TO-15	Total/NA
m-Xylene & p-Xylene	0.25		0.20	0.12	ppb v/v	1.44		TO-15	Total/NA
o-Xylene	0.090	J	0.20	0.061	ppb v/v	1.44		TO-15	Total/NA
Toluene	0.56		0.20	0.12	ppb v/v	1.44		TO-15	Total/NA
Trichlorofluoromethane	0.32		0.20	0.024	ppb v/v	1.44		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.55	J	1.5	0.24	ug/m3	1.44		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.38	J	0.98	0.31	ug/m3	1.44		TO-15	Total/NA
Benzene	0.74		0.64	0.18	ug/m3	1.44		TO-15	Total/NA
Bromomethane	0.18	J *	0.78	0.12	ug/m3	1.44		TO-15	Total/NA
Chloromethane	1.3		1.0	0.33	ug/m3	1.44		TO-15	Total/NA
Dichlorodifluoromethane	2.4		0.99	0.34	ug/m3	1.44		TO-15	Total/NA
Ethylbenzene	0.36	J	0.87	0.30	ug/m3	1.44		TO-15	Total/NA
Methylene Chloride	1.3	J B	1.7	0.45	ug/m3	1.44		TO-15	Total/NA
m-Xylene & p-Xylene	1.1		0.87	0.52	ug/m3	1.44		TO-15	Total/NA
o-Xylene	0.39	J	0.87	0.26	ug/m3	1.44		TO-15	Total/NA
Toluene	2.1		0.75	0.45	ug/m3	1.44		TO-15	Total/NA
Trichlorofluoromethane	1.8		1.1	0.13	ug/m3	1.44		TO-15	Total/NA

Client Sample ID: WAA-05-SU-PS-20141030 — Lab Sample ID: 140-2258-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.074	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.098	J	0.20	0.063	ppb v/v	1		TO-15	Total/NA
Benzene	0.25		0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.085	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.64		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.50		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.10	J	0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.35	J B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.33		0.20	0.12	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.11	J	0.20	0.061	ppb v/v	1		TO-15	Total/NA
Toluene	0.91		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.22		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.56	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.48	J	0.98	0.31	ug/m3	1		TO-15	Total/NA
Benzene	0.78		0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.54	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.3		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.5		0.99	0.34	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.44	J	0.87	0.30	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.2	J B	1.7	0.45	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	1.4		0.87	0.52	ug/m3	1		TO-15	Total/NA
o-Xylene	0.50	J	0.87	0.26	ug/m3	1		TO-15	Total/NA
Toluene	3.4		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.3		1.1	0.13	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-04-SU-DU-20141030 — Lab Sample ID: 140-2258-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.076	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.067	J	0.20	0.063	ppb v/v	1		TO-15	Total/NA
Benzene	0.21		0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.075	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.64		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.50		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.070	J	0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.47	J B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.22		0.20	0.12	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.085	J	0.20	0.061	ppb v/v	1		TO-15	Total/NA
Toluene	0.51		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.32		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.58	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.33	J	0.98	0.31	ug/m3	1		TO-15	Total/NA
Benzene	0.67		0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.47	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.3		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.5		0.99	0.34	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.31	J	0.87	0.30	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.6	J B	1.7	0.45	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.96		0.87	0.52	ug/m3	1		TO-15	Total/NA
o-Xylene	0.37	J	0.87	0.26	ug/m3	1		TO-15	Total/NA
Toluene	1.9		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.8		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-00-SU-TB-20141030 — Lab Sample ID: 140-2258-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.19	J B	0.50	0.13	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.65	J B	1.7	0.45	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-01-SU-PS-20141030
Date Collected: 10/30/14 12:23
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2258-1
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/04/14 21:52	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/04/14 21:52	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.069**	**J**	0.20	0.031	ppb v/v			11/04/14 21:52	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/04/14 21:52	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/04/14 21:52	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/04/14 21:52	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/04/14 21:52	1
1,2,4-Trimethylbenzene	**0.080**	**J**	0.20	0.063	ppb v/v			11/04/14 21:52	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/04/14 21:52	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/04/14 21:52	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/04/14 21:52	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/04/14 21:52	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/04/14 21:52	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/04/14 21:52	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/04/14 21:52	1
Benzene	**0.25**		0.20	0.056	ppb v/v			11/04/14 21:52	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/04/14 21:52	1
Bromomethane	ND	*	0.20	0.032	ppb v/v			11/04/14 21:52	1
Carbon tetrachloride	**0.082**	**J**	0.20	0.038	ppb v/v			11/04/14 21:52	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/04/14 21:52	1
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/04/14 21:52	1
Chloroform	ND		0.20	0.038	ppb v/v			11/04/14 21:52	1
Chloromethane	**0.62**		0.50	0.16	ppb v/v			11/04/14 21:52	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/04/14 21:52	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/04/14 21:52	1
Dichlorodifluoromethane	**0.47**		0.20	0.068	ppb v/v			11/04/14 21:52	1
Ethylbenzene	**0.085**	**J**	0.20	0.068	ppb v/v			11/04/14 21:52	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/04/14 21:52	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/04/14 21:52	1
Methylene Chloride	**0.58**	~~B~~ J	0.50	0.13	ppb v/v			11/04/14 21:52	1
m-Xylene & p-Xylene	**0.27**		0.20	0.12	ppb v/v			11/04/14 21:52	1
o-Xylene	**0.095**	**J**	0.20	0.061	ppb v/v			11/04/14 21:52	1
Styrene	**0.21**		0.20	0.058	ppb v/v			11/04/14 21:52	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/04/14 21:52	1
Toluene	**0.66**		0.20	0.12	ppb v/v			11/04/14 21:52	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/04/14 21:52	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/04/14 21:52	1
Trichlorofluoromethane	**0.25**		0.20	0.024	ppb v/v			11/04/14 21:52	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/04/14 21:52	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/04/14 21:52	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/04/14 21:52	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.53**	**J**	1.5	0.24	ug/m3			11/04/14 21:52	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/04/14 21:52	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/04/14 21:52	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/04/14 21:52	1

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Client Sample ID: WAA-01-SU-PS-20141030

Lab Sample ID: 140-2258-1
Matrix: Air

Date Collected: 10/30/14 12:23
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/04/14 21:52	1
1,2,4-Trimethylbenzene	**0.39**	J	0.98	0.31	ug/m3			11/04/14 21:52	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/04/14 21:52	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/04/14 21:52	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/04/14 21:52	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/04/14 21:52	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/04/14 21:52	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/04/14 21:52	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/04/14 21:52	1
Benzene	**0.81**		0.64	0.18	ug/m3			11/04/14 21:52	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/04/14 21:52	1
Bromomethane	ND	*	0.78	0.12	ug/m3			11/04/14 21:52	1
Carbon tetrachloride	**0.51**	J	1.3	0.24	ug/m3			11/04/14 21:52	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/04/14 21:52	1
Chloroethane	ND	*	0.53	0.092	ug/m3			11/04/14 21:52	1
Chloroform	ND		0.98	0.19	ug/m3			11/04/14 21:52	1
Chloromethane	**1.3**		1.0	0.33	ug/m3			11/04/14 21:52	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/04/14 21:52	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/04/14 21:52	1
Dichlorodifluoromethane	**2.3**		0.99	0.34	ug/m3			11/04/14 21:52	1
Ethylbenzene	**0.37**	J	0.87	0.30	ug/m3			11/04/14 21:52	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/04/14 21:52	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/04/14 21:52	1
Methylene Chloride	**2.0**	~~B~~ J	1.7	0.45	ug/m3			11/04/14 21:52	1
m-Xylene & p-Xylene	**1.2**		0.87	0.52	ug/m3			11/04/14 21:52	1
o-Xylene	**0.41**	J	0.87	0.26	ug/m3			11/04/14 21:52	1
Styrene	**0.89**		0.85	0.25	ug/m3			11/04/14 21:52	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/04/14 21:52	1
Toluene	**2.5**		0.75	0.45	ug/m3			11/04/14 21:52	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/04/14 21:52	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/04/14 21:52	1
Trichlorofluoromethane	**1.4**		1.1	0.13	ug/m3			11/04/14 21:52	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/04/14 21:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*60 - 140*		*11/04/14 21:52*	*1*

Client Sample ID: WAA-02-SU-PS-20141030

Lab Sample ID: 140-2258-2
Matrix: Air

Date Collected: 10/30/14 11:16
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/04/14 22:46	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/04/14 22:46	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.075**	J	0.20	0.031	ppb v/v			11/04/14 22:46	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/04/14 22:46	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-02-SU-PS-20141030

Lab Sample ID: 140-2258-2

Date Collected: 10/30/14 11:16
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/04/14 22:46	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/04/14 22:46	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/04/14 22:46	1
1,2,4-Trimethylbenzene	**0.090**	J	0.20	0.063	ppb v/v			11/04/14 22:46	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/04/14 22:46	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/04/14 22:46	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/04/14 22:46	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/04/14 22:46	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/04/14 22:46	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/04/14 22:46	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/04/14 22:46	1
Benzene	**0.27**		0.20	0.056	ppb v/v			11/04/14 22:46	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/04/14 22:46	1
Bromomethane	ND	*	0.20	0.032	ppb v/v			11/04/14 22:46	1
Carbon tetrachloride	**0.079**	J	0.20	0.038	ppb v/v			11/04/14 22:46	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/04/14 22:46	1
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/04/14 22:46	1
Chloroform	**0.039**	J	0.20	0.038	ppb v/v			11/04/14 22:46	1
Chloromethane	**0.52**		0.50	0.16	ppb v/v			11/04/14 22:46	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/04/14 22:46	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/04/14 22:46	1
Dichlorodifluoromethane	**0.51**		0.20	0.068	ppb v/v			11/04/14 22:46	1
Ethylbenzene	**0.11**	J	0.20	0.068	ppb v/v			11/04/14 22:46	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/04/14 22:46	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/04/14 22:46	1
Methylene Chloride	**1.6**	~~B~~ J	0.50	0.13	ppb v/v			11/04/14 22:46	1
m-Xylene & p-Xylene	**0.33**		0.20	0.12	ppb v/v			11/04/14 22:46	1
o-Xylene	**0.11**	J	0.20	0.061	ppb v/v			11/04/14 22:46	1
Styrene	ND		0.20	0.058	ppb v/v			11/04/14 22:46	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/04/14 22:46	1
Toluene	**0.74**		0.20	0.12	ppb v/v			11/04/14 22:46	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/04/14 22:46	1
Trichloroethene	**0.039**	J	0.20	0.036	ppb v/v			11/04/14 22:46	1
Trichlorofluoromethane	**0.33**		0.20	0.024	ppb v/v			11/04/14 22:46	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/04/14 22:46	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/04/14 22:46	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/04/14 22:46	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.58**	J	1.5	0.24	ug/m3			11/04/14 22:46	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/04/14 22:46	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/04/14 22:46	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/04/14 22:46	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/04/14 22:46	1
1,2,4-Trimethylbenzene	**0.44**	J	0.98	0.31	ug/m3			11/04/14 22:46	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/04/14 22:46	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/04/14 22:46	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/04/14 22:46	1

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TestAmerica Knoxville

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-02-SU-PS-20141030

Lab Sample ID: 140-2258-2
Matrix: Air

Date Collected: 10/30/14 11:16
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/04/14 22:46	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/04/14 22:46	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/04/14 22:46	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/04/14 22:46	1
Benzene	**0.85**		0.64	0.18	ug/m3			11/04/14 22:46	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/04/14 22:46	1
Bromomethane	ND	*	0.78	0.12	ug/m3			11/04/14 22:46	1
Carbon tetrachloride	**0.50**	J	1.3	0.24	ug/m3			11/04/14 22:46	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/04/14 22:46	1
Chloroethane	ND	*	0.53	0.092	ug/m3			11/04/14 22:46	1
Chloroform	**0.19**	J	0.98	0.19	ug/m3			11/04/14 22:46	1
Chloromethane	**1.1**		1.0	0.33	ug/m3			11/04/14 22:46	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/04/14 22:46	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/04/14 22:46	1
Dichlorodifluoromethane	**2.5**		0.99	0.34	ug/m3			11/04/14 22:46	1
Ethylbenzene	**0.46**	J	0.87	0.30	ug/m3			11/04/14 22:46	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/04/14 22:46	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/04/14 22:46	1
Methylene Chloride	**5.5**	~~B~~ J	1.7	0.45	ug/m3			11/04/14 22:46	1
m-Xylene & p-Xylene	**1.4**		0.87	0.52	ug/m3			11/04/14 22:46	1
o-Xylene	**0.48**	J	0.87	0.26	ug/m3			11/04/14 22:46	1
Styrene	ND		0.85	0.25	ug/m3			11/04/14 22:46	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/04/14 22:46	1
Toluene	**2.8**		0.75	0.45	ug/m3			11/04/14 22:46	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/04/14 22:46	1
Trichloroethene	**0.21**	J	1.1	0.19	ug/m3			11/04/14 22:46	1
Trichlorofluoromethane	**1.8**		1.1	0.13	ug/m3			11/04/14 22:46	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/04/14 22:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*91*		*60 - 140*		*11/04/14 22:46*	*1*

Client Sample ID: WAA-03-SU-PS-20141030

Lab Sample ID: 140-2258-3
Matrix: Air

Date Collected: 10/30/14 11:50
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/04/14 23:41	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/04/14 23:41	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.067**	J	0.20	0.031	ppb v/v			11/04/14 23:41	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/04/14 23:41	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/04/14 23:41	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/04/14 23:41	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/04/14 23:41	1
1,2,4-Trimethylbenzene	**0.067**	J	0.20	0.063	ppb v/v			11/04/14 23:41	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/04/14 23:41	1

H UG 17 Nov 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-03-SU-PS-20141030

Lab Sample ID: 140-2258-3

Date Collected: 10/30/14 11:50
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/04/14 23:41	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/04/14 23:41	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/04/14 23:41	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/04/14 23:41	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/04/14 23:41	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/04/14 23:41	1
Benzene	**0.25**		0.20	0.056	ppb v/v			11/04/14 23:41	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/04/14 23:41	1
Bromomethane	**0.074**	~~J*~~ J	0.20	0.032	ppb v/v			11/04/14 23:41	1
Carbon tetrachloride	**0.087**	J	0.20	0.038	ppb v/v			11/04/14 23:41	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/04/14 23:41	1
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/04/14 23:41	1
Chloroform	ND		0.20	0.038	ppb v/v			11/04/14 23:41	1
Chloromethane	**0.59**		0.50	0.16	ppb v/v			11/04/14 23:41	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/04/14 23:41	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/04/14 23:41	1
Dichlorodifluoromethane	**0.47**		0.20	0.068	ppb v/v			11/04/14 23:41	1
Ethylbenzene	**0.071**	J	0.20	0.068	ppb v/v			11/04/14 23:41	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/04/14 23:41	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/04/14 23:41	1
Methylene Chloride	~~0.34 JB~~	U	0.50	0.13	ppb v/v			11/04/14 23:41	1
m-Xylene & p-Xylene	**0.22**		0.20	0.12	ppb v/v			11/04/14 23:41	1
o-Xylene	**0.076**	J	0.20	0.061	ppb v/v			11/04/14 23:41	1
Styrene	ND		0.20	0.058	ppb v/v			11/04/14 23:41	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/04/14 23:41	1
Toluene	**0.50**		0.20	0.12	ppb v/v			11/04/14 23:41	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/04/14 23:41	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/04/14 23:41	1
Trichlorofluoromethane	**0.22**		0.20	0.024	ppb v/v			11/04/14 23:41	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/04/14 23:41	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/04/14 23:41	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/04/14 23:41	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.51**	J	1.5	0.24	ug/m3			11/04/14 23:41	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/04/14 23:41	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/04/14 23:41	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/04/14 23:41	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/04/14 23:41	1
1,2,4-Trimethylbenzene	**0.33**	J	0.98	0.31	ug/m3			11/04/14 23:41	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/04/14 23:41	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/04/14 23:41	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/04/14 23:41	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/04/14 23:41	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/04/14 23:41	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/04/14 23:41	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/04/14 23:41	1
Benzene	**0.81**		0.64	0.18	ug/m3			11/04/14 23:41	1

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TestAmerica Knoxville

11/12/2014

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-03-SU-PS-20141030

Lab Sample ID: 140-2258-3
Matrix: Air

Date Collected: 10/30/14 11:50
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzyl chloride	ND		2.1	0.40	ug/m3			11/04/14 23:41	1
Bromomethane	**0.29**	~~J*~~ J	0.78	0.12	ug/m3			11/04/14 23:41	1
Carbon tetrachloride	**0.55**	J	1.3	0.24	ug/m3			11/04/14 23:41	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/04/14 23:41	1
Chloroethane	ND	*	0.53	0.092	ug/m3			11/04/14 23:41	1
Chloroform	ND		0.98	0.19	ug/m3			11/04/14 23:41	1
Chloromethane	**1.2**		1.0	0.33	ug/m3			11/04/14 23:41	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/04/14 23:41	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/04/14 23:41	1
Dichlorodifluoromethane	**2.3**		0.99	0.34	ug/m3			11/04/14 23:41	1
Ethylbenzene	**0.31**	J	0.87	0.30	ug/m3			11/04/14 23:41	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/04/14 23:41	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/04/14 23:41	1
Methylene Chloride	~~**1.2**~~ ~~**J B**~~	4	1.7	0.45	ug/m3			11/04/14 23:41	1
m-Xylene & p-Xylene	**0.94**		0.87	0.52	ug/m3			11/04/14 23:41	1
o-Xylene	**0.33**	J	0.87	0.26	ug/m3			11/04/14 23:41	1
Styrene	ND		0.85	0.25	ug/m3			11/04/14 23:41	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/04/14 23:41	1
Toluene	**1.9**		0.75	0.45	ug/m3			11/04/14 23:41	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/04/14 23:41	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/04/14 23:41	1
Trichlorofluoromethane	**1.2**		1.1	0.13	ug/m3			11/04/14 23:41	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/04/14 23:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*60 - 140*		*11/04/14 23:41*	*1*

Client Sample ID: WAA-04-SU-PS-20141030

Lab Sample ID: 140-2258-4
Matrix: Air

Date Collected: 10/30/14 12:07
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/05/14 00:36	1.44
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/05/14 00:36	1.44
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.071**	J	0.20	0.031	ppb v/v			11/05/14 00:36	1.44
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/05/14 00:36	1.44
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/05/14 00:36	1.44
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/05/14 00:36	1.44
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/05/14 00:36	1.44
1,2,4-Trimethylbenzene	**0.077**	J	0.20	0.063	ppb v/v			11/05/14 00:36	1.44
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/05/14 00:36	1.44
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/05/14 00:36	1.44
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/05/14 00:36	1.44
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/05/14 00:36	1.44
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/05/14 00:36	1.44
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/05/14 00:36	1.44

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-04-SU-PS-20141030

Lab Sample ID: 140-2258-4

Date Collected: 10/30/14 12:07
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/05/14 00:36	1.44
Benzene	**0.23**		0.20	0.056	ppb v/v			11/05/14 00:36	1.44
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/05/14 00:36	1.44
Bromomethane	**0.047**	~~J~~ J	0.20	0.032	ppb v/v			11/05/14 00:36	1.44
Carbon tetrachloride	ND		0.20	0.038	ppb v/v			11/05/14 00:36	1.44
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/05/14 00:36	1.44
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/05/14 00:36	1.44
Chloroform	ND		0.20	0.038	ppb v/v			11/05/14 00:36	1.44
Chloromethane	**0.61**		0.50	0.16	ppb v/v			11/05/14 00:36	1.44
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/05/14 00:36	1.44
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/05/14 00:36	1.44
Dichlorodifluoromethane	**0.49**		0.20	0.068	ppb v/v			11/05/14 00:36	1.44
Ethylbenzene	**0.082**	J	0.20	0.068	ppb v/v			11/05/14 00:36	1.44
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/05/14 00:36	1.44
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/05/14 00:36	1.44
Methylene Chloride	~~0.39~~ ~~JB~~ U		0.50	0.13	ppb v/v			11/05/14 00:36	1.44
m-Xylene & p-Xylene	**0.25**		0.20	0.12	ppb v/v			11/05/14 00:36	1.44
o-Xylene	**0.090**	J	0.20	0.061	ppb v/v			11/05/14 00:36	1.44
Styrene	ND		0.20	0.058	ppb v/v			11/05/14 00:36	1.44
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/05/14 00:36	1.44
Toluene	**0.56**		0.20	0.12	ppb v/v			11/05/14 00:36	1.44
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/05/14 00:36	1.44
Trichloroethene	ND		0.20	0.036	ppb v/v			11/05/14 00:36	1.44
Trichlorofluoromethane	**0.32**		0.20	0.024	ppb v/v			11/05/14 00:36	1.44
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/05/14 00:36	1.44

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/05/14 00:36	1.44
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/05/14 00:36	1.44
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.55**	J	1.5	0.24	ug/m3			11/05/14 00:36	1.44
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/05/14 00:36	1.44
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/05/14 00:36	1.44
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/05/14 00:36	1.44
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/05/14 00:36	1.44
1,2,4-Trimethylbenzene	**0.38**	J	0.98	0.31	ug/m3			11/05/14 00:36	1.44
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/05/14 00:36	1.44
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/05/14 00:36	1.44
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/05/14 00:36	1.44
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/05/14 00:36	1.44
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/05/14 00:36	1.44
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/05/14 00:36	1.44
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/05/14 00:36	1.44
Benzene	**0.74**		0.64	0.18	ug/m3			11/05/14 00:36	1.44
Benzyl chloride	ND		2.1	0.40	ug/m3			11/05/14 00:36	1.44
Bromomethane	**0.18**	~~J~~ J	0.78	0.12	ug/m3			11/05/14 00:36	1.44
Carbon tetrachloride	ND		1.3	0.24	ug/m3			11/05/14 00:36	1.44
Chlorobenzene	ND		0.92	0.23	ug/m3			11/05/14 00:36	1.44
Chloroethane	ND	*	0.53	0.092	ug/m3			11/05/14 00:36	1.44

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TestAmerica Knoxville

Client Sample ID: WAA-04-SU-PS-20141030

Lab Sample ID: 140-2258-4

Date Collected: 10/30/14 12:07
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		0.98	0.19	ug/m3			11/05/14 00:36	1.44
Chloromethane	**1.3**		1.0	0.33	ug/m3			11/05/14 00:36	1.44
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/05/14 00:36	1.44
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/05/14 00:36	1.44
Dichlorodifluoromethane	**2.4**		0.99	0.34	ug/m3			11/05/14 00:36	1.44
Ethylbenzene	**0.36**	J	0.87	0.30	ug/m3			11/05/14 00:36	1.44
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/05/14 00:36	1.44
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/05/14 00:36	1.44
Methylene Chloride	~~4.3 JB~~ U		1.7	0.45	ug/m3			11/05/14 00:36	1.44
m-Xylene & p-Xylene	**1.1**		0.87	0.52	ug/m3			11/05/14 00:36	1.44
o-Xylene	**0.39**	J	0.87	0.26	ug/m3			11/05/14 00:36	1.44
Styrene	ND		0.85	0.25	ug/m3			11/05/14 00:36	1.44
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/05/14 00:36	1.44
Toluene	**2.1**		0.75	0.45	ug/m3			11/05/14 00:36	1.44
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/05/14 00:36	1.44
Trichloroethene	ND		1.1	0.19	ug/m3			11/05/14 00:36	1.44
Trichlorofluoromethane	**1.8**		1.1	0.13	ug/m3			11/05/14 00:36	1.44
Vinyl chloride	ND		0.51	0.18	ug/m3			11/05/14 00:36	1.44

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*95*		*60 - 140*		*11/05/14 00:36*	*1.44*

Client Sample ID: WAA-05-SU-PS-20141030

Lab Sample ID: 140-2258-5

Date Collected: 10/30/14 11:33
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/05/14 01:30	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/05/14 01:30	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.074**	J	0.20	0.031	ppb v/v			11/05/14 01:30	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/05/14 01:30	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/05/14 01:30	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/05/14 01:30	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/05/14 01:30	1
1,2,4-Trimethylbenzene	**0.098**	J	0.20	0.063	ppb v/v			11/05/14 01:30	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/05/14 01:30	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/05/14 01:30	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/05/14 01:30	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/05/14 01:30	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/05/14 01:30	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/05/14 01:30	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/05/14 01:30	1
Benzene	**0.25**		0.20	0.056	ppb v/v			11/05/14 01:30	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/05/14 01:30	1
Bromomethane	ND	*	0.20	0.032	ppb v/v			11/05/14 01:30	1
Carbon tetrachloride	**0.085**	J	0.20	0.038	ppb v/v			11/05/14 01:30	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-05-SU-PS-20141030

Lab Sample ID: 140-2258-5

Date Collected: 10/30/14 11:33
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/05/14 01:30	1
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/05/14 01:30	1
Chloroform	ND		0.20	0.038	ppb v/v			11/05/14 01:30	1
Chloromethane	**0.64**		0.50	0.16	ppb v/v			11/05/14 01:30	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/05/14 01:30	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/05/14 01:30	1
Dichlorodifluoromethane	**0.50**		0.20	0.068	ppb v/v			11/05/14 01:30	1
Ethylbenzene	**0.10**	J	0.20	0.068	ppb v/v			11/05/14 01:30	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/05/14 01:30	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/05/14 01:30	1
Methylene Chloride	~~0.35~~ ~~J B~~ U		0.50	0.13	ppb v/v			11/05/14 01:30	1
m-Xylene & p-Xylene	**0.33**		0.20	0.12	ppb v/v			11/05/14 01:30	1
o-Xylene	**0.11**	J	0.20	0.061	ppb v/v			11/05/14 01:30	1
Styrene	ND		0.20	0.058	ppb v/v			11/05/14 01:30	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/05/14 01:30	1
Toluene	**0.91**		0.20	0.12	ppb v/v			11/05/14 01:30	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/05/14 01:30	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/05/14 01:30	1
Trichlorofluoromethane	**0.22**		0.20	0.024	ppb v/v			11/05/14 01:30	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/05/14 01:30	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/05/14 01:30	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/05/14 01:30	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.56**	J	1.5	0.24	ug/m3			11/05/14 01:30	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/05/14 01:30	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/05/14 01:30	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/05/14 01:30	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/05/14 01:30	1
1,2,4-Trimethylbenzene	**0.48**	J	0.98	0.31	ug/m3			11/05/14 01:30	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/05/14 01:30	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/05/14 01:30	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/05/14 01:30	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/05/14 01:30	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/05/14 01:30	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/05/14 01:30	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/05/14 01:30	1
Benzene	**0.78**		0.64	0.18	ug/m3			11/05/14 01:30	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/05/14 01:30	1
Bromomethane	ND	*	0.78	0.12	ug/m3			11/05/14 01:30	1
Carbon tetrachloride	**0.54**	J	1.3	0.24	ug/m3			11/05/14 01:30	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/05/14 01:30	1
Chloroethane	ND	*	0.53	0.092	ug/m3			11/05/14 01:30	1
Chloroform	ND		0.98	0.19	ug/m3			11/05/14 01:30	1
Chloromethane	**1.3**		1.0	0.33	ug/m3			11/05/14 01:30	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/05/14 01:30	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/05/14 01:30	1
Dichlorodifluoromethane	**2.5**		0.99	0.34	ug/m3			11/05/14 01:30	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-05-SU-PS-20141030

Lab Sample ID: 140-2258-5
Matrix: Air

Date Collected: 10/30/14 11:33
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**0.44**	J	0.87	0.30	ug/m3			11/05/14 01:30	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/05/14 01:30	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/05/14 01:30	1
Methylene Chloride	~~1.2 JB~~ 4		1.7	0.45	ug/m3			11/05/14 01:30	1
m-Xylene & p-Xylene	**1.4**		0.87	0.52	ug/m3			11/05/14 01:30	1
o-Xylene	**0.50**	J	0.87	0.26	ug/m3			11/05/14 01:30	1
Styrene	ND		0.85	0.25	ug/m3			11/05/14 01:30	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/05/14 01:30	1
Toluene	**3.4**		0.75	0.45	ug/m3			11/05/14 01:30	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/05/14 01:30	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/05/14 01:30	1
Trichlorofluoromethane	**1.3**		1.1	0.13	ug/m3			11/05/14 01:30	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/05/14 01:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*88*		*60 - 140*		*11/05/14 01:30*	*1*

Client Sample ID: WAA-04-SU-DU-20141030

Lab Sample ID: 140-2258-6
Matrix: Air

Date Collected: 10/30/14 12:08
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/05/14 03:20	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/05/14 03:20	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.076**	J	0.20	0.031	ppb v/v			11/05/14 03:20	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/05/14 03:20	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/05/14 03:20	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/05/14 03:20	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/05/14 03:20	1
1,2,4-Trimethylbenzene	**0.067**	J	0.20	0.063	ppb v/v			11/05/14 03:20	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/05/14 03:20	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/05/14 03:20	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/05/14 03:20	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/05/14 03:20	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/05/14 03:20	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/05/14 03:20	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/05/14 03:20	1
Benzene	**0.21**		0.20	0.056	ppb v/v			11/05/14 03:20	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/05/14 03:20	1
Bromomethane	ND	*	0.20	0.032	ppb v/v			11/05/14 03:20	1
Carbon tetrachloride	**0.075**	J	0.20	0.038	ppb v/v			11/05/14 03:20	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/05/14 03:20	1
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/05/14 03:20	1
Chloroform	ND		0.20	0.038	ppb v/v			11/05/14 03:20	1
Chloromethane	**0.64**		0.50	0.16	ppb v/v			11/05/14 03:20	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/05/14 03:20	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-04-SU-DU-20141030

Lab Sample ID: 140-2258-6

Date Collected: 10/30/14 12:08
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/05/14 03:20	1
Dichlorodifluoromethane	**0.50**		0.20	0.068	ppb v/v			11/05/14 03:20	1
Ethylbenzene	**0.070**	J	0.20	0.068	ppb v/v			11/05/14 03:20	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/05/14 03:20	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/05/14 03:20	1
Methylene Chloride	~~0.47~~ ~~J B~~ U		0.50	0.13	ppb v/v			11/05/14 03:20	1
m-Xylene & p-Xylene	**0.22**		0.20	0.12	ppb v/v			11/05/14 03:20	1
o-Xylene	**0.085**	J	0.20	0.061	ppb v/v			11/05/14 03:20	1
Styrene	ND		0.20	0.058	ppb v/v			11/05/14 03:20	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/05/14 03:20	1
Toluene	**0.51**		0.20	0.12	ppb v/v			11/05/14 03:20	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/05/14 03:20	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/05/14 03:20	1
Trichlorofluoromethane	**0.32**		0.20	0.024	ppb v/v			11/05/14 03:20	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/05/14 03:20	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/05/14 03:20	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/05/14 03:20	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.58**	J	1.5	0.24	ug/m3			11/05/14 03:20	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/05/14 03:20	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/05/14 03:20	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/05/14 03:20	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/05/14 03:20	1
1,2,4-Trimethylbenzene	**0.33**	J	0.98	0.31	ug/m3			11/05/14 03:20	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/05/14 03:20	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/05/14 03:20	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/05/14 03:20	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/05/14 03:20	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/05/14 03:20	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/05/14 03:20	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/05/14 03:20	1
Benzene	**0.67**		0.64	0.18	ug/m3			11/05/14 03:20	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/05/14 03:20	1
Bromomethane	ND	*	0.78	0.12	ug/m3			11/05/14 03:20	1
Carbon tetrachloride	**0.47**	J	1.3	0.24	ug/m3			11/05/14 03:20	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/05/14 03:20	1
Chloroethane	ND	*	0.53	0.092	ug/m3			11/05/14 03:20	1
Chloroform	ND		0.98	0.19	ug/m3			11/05/14 03:20	1
Chloromethane	**1.3**		1.0	0.33	ug/m3			11/05/14 03:20	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/05/14 03:20	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/05/14 03:20	1
Dichlorodifluoromethane	**2.5**		0.99	0.34	ug/m3			11/05/14 03:20	1
Ethylbenzene	**0.31**	J	0.87	0.30	ug/m3			11/05/14 03:20	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/05/14 03:20	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/05/14 03:20	1
Methylene Chloride	~~1.6~~ ~~J B~~ U		1.7	0.45	ug/m3			11/05/14 03:20	1
m-Xylene & p-Xylene	**0.96**		0.87	0.52	ug/m3			11/05/14 03:20	1

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TestAmerica Knoxville

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-04-SU-DU-20141030

Lab Sample ID: 140-2258-6
Matrix: Air

Date Collected: 10/30/14 12:08
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Xylene	0.37	J	0.87	0.26	ug/m3			11/05/14 03:20	1
Styrene	ND		0.85	0.25	ug/m3			11/05/14 03:20	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/05/14 03:20	1
Toluene	1.9		0.75	0.45	ug/m3			11/05/14 03:20	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/05/14 03:20	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/05/14 03:20	1
Trichlorofluoromethane	1.8		1.1	0.13	ug/m3			11/05/14 03:20	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/05/14 03:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*60 - 140*		*11/05/14 03:20*	*1*

Client Sample ID: WAA-00-SU-TB-20141030

Lab Sample ID: 140-2258-7
Matrix: Air

Date Collected: 10/30/14 12:23
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/04/14 20:58	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/04/14 20:58	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.031	ppb v/v			11/04/14 20:58	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/04/14 20:58	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/04/14 20:58	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/04/14 20:58	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/04/14 20:58	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/04/14 20:58	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/04/14 20:58	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/04/14 20:58	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/04/14 20:58	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/04/14 20:58	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/04/14 20:58	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/04/14 20:58	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/04/14 20:58	1
Benzene	ND		0.20	0.056	ppb v/v			11/04/14 20:58	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/04/14 20:58	1
Bromomethane	ND	*	0.20	0.032	ppb v/v			11/04/14 20:58	1
Carbon tetrachloride	ND		0.20	0.038	ppb v/v			11/04/14 20:58	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/04/14 20:58	1
Chloroethane	ND	*	0.20	0.035	ppb v/v			11/04/14 20:58	1
Chloroform	ND		0.20	0.038	ppb v/v			11/04/14 20:58	1
Chloromethane	ND		0.50	0.16	ppb v/v			11/04/14 20:58	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/04/14 20:58	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/04/14 20:58	1
Dichlorodifluoromethane	ND		0.20	0.068	ppb v/v			11/04/14 20:58	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/04/14 20:58	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/04/14 20:58	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/04/14 20:58	1
Methylene Chloride	~~0.19 J B~~ U		0.50	0.13	ppb v/v			11/04/14 20:58	1

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TestAmerica Knoxville

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-00-SU-TB-20141030

Lab Sample ID: 140-2258-7

Date Collected: 10/30/14 12:23
Date Received: 11/04/14 10:10
Sample Container: Summa Canister 6L

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m-Xylene & p-Xylene	ND		0.20	0.12	ppb v/v			11/04/14 20:58	1
o-Xylene	ND		0.20	0.061	ppb v/v			11/04/14 20:58	1
Styrene	ND		0.20	0.058	ppb v/v			11/04/14 20:58	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/04/14 20:58	1
Toluene	ND		0.20	0.12	ppb v/v			11/04/14 20:58	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/04/14 20:58	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/04/14 20:58	1
Trichlorofluoromethane	ND		0.20	0.024	ppb v/v			11/04/14 20:58	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/04/14 20:58	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/04/14 20:58	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/04/14 20:58	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.5	0.24	ug/m3			11/04/14 20:58	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/04/14 20:58	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/04/14 20:58	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/04/14 20:58	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/04/14 20:58	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/04/14 20:58	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/04/14 20:58	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/04/14 20:58	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/04/14 20:58	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/04/14 20:58	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/04/14 20:58	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/04/14 20:58	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/04/14 20:58	1
Benzene	ND		0.64	0.18	ug/m3			11/04/14 20:58	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/04/14 20:58	1
Bromomethane	ND	*	0.78	0.12	ug/m3			11/04/14 20:58	1
Carbon tetrachloride	ND		1.3	0.24	ug/m3			11/04/14 20:58	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/04/14 20:58	1
Chloroethane	ND	*	0.53	0.092	ug/m3			11/04/14 20:58	1
Chloroform	ND		0.98	0.19	ug/m3			11/04/14 20:58	1
Chloromethane	ND		1.0	0.33	ug/m3			11/04/14 20:58	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/04/14 20:58	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/04/14 20:58	1
Dichlorodifluoromethane	ND		0.99	0.34	ug/m3			11/04/14 20:58	1
Ethylbenzene	ND		0.87	0.30	ug/m3			11/04/14 20:58	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/04/14 20:58	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/04/14 20:58	1
Methylene Chloride	~~0.65~~ ~~J B~~ U		1.7	0.45	ug/m3			11/04/14 20:58	1
m-Xylene & p-Xylene	ND		0.87	0.52	ug/m3			11/04/14 20:58	1
o-Xylene	ND		0.87	0.26	ug/m3			11/04/14 20:58	1
Styrene	ND		0.85	0.25	ug/m3			11/04/14 20:58	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/04/14 20:58	1
Toluene	ND		0.75	0.45	ug/m3			11/04/14 20:58	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/04/14 20:58	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/04/14 20:58	1
Trichlorofluoromethane	ND		1.1	0.13	ug/m3			11/04/14 20:58	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-00-SU-TB-20141030

Lab Sample ID: 140-2258-7

Date Collected: 10/30/14 12:23

Matrix: Air

Date Received: 11/04/14 10:10

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		0.51	0.18	ug/m3			11/04/14 20:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*60 - 140*		*11/04/14 20:58*	*1*

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Surrogate Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

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

		Percent Surrogate Recovery (Acceptance Limits)						
		BFB						
Lab Sample ID	**Client Sample ID**	**(60-140)**						
140-2258-1	WAA-01-SU-PS-20141030	94						
140-2258-2	WAA-02-SU-PS-20141030	91						
140-2258-3	WAA-03-SU-PS-20141030	97						
140-2258-4	WAA-04-SU-PS-20141030	95						
140-2258-5	WAA-05-SU-PS-20141030	88						
140-2258-6	WAA-04-SU-DU-20141030	94						
140-2258-7	WAA-00-SU-TB-20141030	94						
LCS 140-1893/1002	Lab Control Sample	99						
MB 140-1893/5	Method Blank	93						

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 140-1893/5
Matrix: Air
Analysis Batch: 1893

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		0.20	0.030	ppb v/v			11/04/14 20:03	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/04/14 20:03	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.031	ppb v/v			11/04/14 20:03	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/04/14 20:03	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/04/14 20:03	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/04/14 20:03	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/04/14 20:03	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/04/14 20:03	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/04/14 20:03	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/04/14 20:03	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/04/14 20:03	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/04/14 20:03	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/04/14 20:03	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/04/14 20:03	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/04/14 20:03	1
Benzene	ND		0.20	0.056	ppb v/v			11/04/14 20:03	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/04/14 20:03	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/04/14 20:03	1
Carbon tetrachloride	ND		0.20	0.038	ppb v/v			11/04/14 20:03	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/04/14 20:03	1
Chloroethane	ND		0.20	0.035	ppb v/v			11/04/14 20:03	1
Chloroform	ND		0.20	0.038	ppb v/v			11/04/14 20:03	1
Chloromethane	ND		0.50	0.16	ppb v/v			11/04/14 20:03	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/04/14 20:03	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/04/14 20:03	1
Dichlorodifluoromethane	ND		0.20	0.068	ppb v/v			11/04/14 20:03	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/04/14 20:03	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/04/14 20:03	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/04/14 20:03	1
Methylene Chloride	0.183	J	0.50	0.13	ppb v/v			11/04/14 20:03	1
m-Xylene & p-Xylene	ND		0.20	0.12	ppb v/v			11/04/14 20:03	1
o-Xylene	ND		0.20	0.061	ppb v/v			11/04/14 20:03	1
Styrene	ND		0.20	0.058	ppb v/v			11/04/14 20:03	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/04/14 20:03	1
Toluene	ND		0.20	0.12	ppb v/v			11/04/14 20:03	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/04/14 20:03	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/04/14 20:03	1
Trichlorofluoromethane	ND		0.20	0.024	ppb v/v			11/04/14 20:03	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/04/14 20:03	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/04/14 20:03	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/04/14 20:03	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.5	0.24	ug/m3			11/04/14 20:03	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/04/14 20:03	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/04/14 20:03	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/04/14 20:03	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/04/14 20:03	1

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 140-1893/5
Matrix: Air
Analysis Batch: 1893

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/04/14 20:03	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/04/14 20:03	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/04/14 20:03	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/04/14 20:03	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/04/14 20:03	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/04/14 20:03	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/04/14 20:03	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/04/14 20:03	1
Benzene	ND		0.64	0.18	ug/m3			11/04/14 20:03	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/04/14 20:03	1
Bromomethane	ND		0.78	0.12	ug/m3			11/04/14 20:03	1
Carbon tetrachloride	ND		1.3	0.24	ug/m3			11/04/14 20:03	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/04/14 20:03	1
Chloroethane	ND		0.53	0.092	ug/m3			11/04/14 20:03	1
Chloroform	ND		0.98	0.19	ug/m3			11/04/14 20:03	1
Chloromethane	ND		1.0	0.33	ug/m3			11/04/14 20:03	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/04/14 20:03	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/04/14 20:03	1
Dichlorodifluoromethane	ND		0.99	0.34	ug/m3			11/04/14 20:03	1
Ethylbenzene	ND		0.87	0.30	ug/m3			11/04/14 20:03	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/04/14 20:03	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/04/14 20:03	1
Methylene Chloride	0.634	J	1.7	0.45	ug/m3			11/04/14 20:03	1
m-Xylene & p-Xylene	ND		0.87	0.52	ug/m3			11/04/14 20:03	1
o-Xylene	ND		0.87	0.26	ug/m3			11/04/14 20:03	1
Styrene	ND		0.85	0.25	ug/m3			11/04/14 20:03	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/04/14 20:03	1
Toluene	ND		0.75	0.45	ug/m3			11/04/14 20:03	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/04/14 20:03	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/04/14 20:03	1
Trichlorofluoromethane	ND		1.1	0.13	ug/m3			11/04/14 20:03	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/04/14 20:03	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*60 - 140*		*11/04/14 20:03*	*1*

Lab Sample ID: LCS 140-1893/1002
Matrix: Air
Analysis Batch: 1893

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	2.00	1.94		ppb v/v		97	70 - 130
1,1,2,2-Tetrachloroethane	2.00	2.11		ppb v/v		105	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroetha ne	2.00	2.14		ppb v/v		107	70 - 130
1,1,2-Trichloroethane	2.00	1.75		ppb v/v		87	70 - 130
1,1-Dichloroethane	2.00	1.71		ppb v/v		86	70 - 130
1,1-Dichloroethene	2.00	2.18		ppb v/v		109	70 - 130

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-1893/1002
Matrix: Air
Analysis Batch: 1893

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	2.00	2.06		ppb v/v		103	60 - 140
1,2,4-Trimethylbenzene	2.00	2.35		ppb v/v		117	70 - 130
1,2-Dichloro-1,1,2,2-tetrafluoroethane	2.00	2.58		ppb v/v		129	60 - 140
1,2-Dichlorobenzene	2.00	2.10		ppb v/v		105	70 - 130
1,2-Dichloroethane	2.00	1.68		ppb v/v		84	70 - 130
1,2-Dichloropropane	2.00	1.61		ppb v/v		80	70 - 130
1,3,5-Trimethylbenzene	2.00	2.31		ppb v/v		115	70 - 130
1,3-Dichlorobenzene	2.00	1.99		ppb v/v		100	70 - 130
1,4-Dichlorobenzene	2.00	2.03		ppb v/v		101	70 - 130
Benzene	2.00	1.55		ppb v/v		77	70 - 130
Benzyl chloride	2.00	2.22		ppb v/v		111	70 - 130
Bromomethane	2.00	2.73	*	ppb v/v		136	70 - 130
Carbon tetrachloride	2.00	2.30		ppb v/v		115	70 - 130
Chlorobenzene	2.00	1.78		ppb v/v		89	70 - 130
Chloroethane	2.00	2.85	*	ppb v/v		142	70 - 130
Chloroform	2.00	1.92		ppb v/v		96	70 - 130
Chloromethane	2.00	2.34		ppb v/v		117	60 - 140
cis-1,2-Dichloroethene	2.00	1.89		ppb v/v		95	70 - 130
cis-1,3-Dichloropropene	2.00	1.70		ppb v/v		85	70 - 130
Dichlorodifluoromethane	2.00	2.33		ppb v/v		116	60 - 140
Ethylbenzene	2.00	1.99		ppb v/v		99	70 - 130
1,2-Dibromoethane (EDB)	2.00	1.74		ppb v/v		87	70 - 130
Hexachlorobutadiene	2.00	2.01		ppb v/v		101	60 - 140
Methylene Chloride	2.00	1.90	B	ppb v/v		95	70 - 130
m-Xylene & p-Xylene	4.00	4.27		ppb v/v		107	70 - 130
o-Xylene	2.00	2.08		ppb v/v		104	70 - 130
Styrene	2.00	2.11		ppb v/v		106	70 - 130
Tetrachloroethene	2.00	1.90		ppb v/v		95	70 - 130
Toluene	2.00	1.81		ppb v/v		91	70 - 130
trans-1,3-Dichloropropene	2.00	1.78		ppb v/v		89	70 - 130
Trichloroethene	2.00	1.93		ppb v/v		97	70 - 130
Trichlorofluoromethane	2.00	2.36		ppb v/v		118	60 - 140
Vinyl chloride	2.00	2.48		ppb v/v		124	70 - 130

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	11	10.6		ug/m3		97	70 - 130
1,1,2,2-Tetrachloroethane	14	14.5		ug/m3		105	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroethane	15	16.4		ug/m3		107	70 - 130
1,1,2-Trichloroethane	11	9.54		ug/m3		87	70 - 130
1,1-Dichloroethane	8.1	6.93		ug/m3		86	70 - 130
1,1-Dichloroethene	7.9	8.66		ug/m3		109	70 - 130
1,2,4-Trichlorobenzene	15	15.3		ug/m3		103	60 - 140
1,2,4-Trimethylbenzene	9.8	11.6		ug/m3		117	70 - 130
1,2-Dichloro-1,1,2,2-tetrafluoroethane	14	18.0		ug/m3		129	60 - 140
1,2-Dichlorobenzene	12	12.6		ug/m3		105	70 - 130
1,2-Dichloroethane	8.1	6.79		ug/m3		84	70 - 130

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-1893/1002
Matrix: Air
Analysis Batch: 1893

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloropropane	9.2	7.43		ug/m3		80	70 - 130
1,3,5-Trimethylbenzene	9.8	11.3		ug/m3		115	70 - 130
1,3-Dichlorobenzene	12	12.0		ug/m3		100	70 - 130
1,4-Dichlorobenzene	12	12.2		ug/m3		101	70 - 130
Benzene	6.4	4.95		ug/m3		77	70 - 130
Benzyl chloride	10	11.5		ug/m3		111	70 - 130
Bromomethane	7.8	10.6	*	ug/m3		136	70 - 130
Carbon tetrachloride	13	14.4		ug/m3		115	70 - 130
Chlorobenzene	9.2	8.17		ug/m3		89	70 - 130
Chloroethane	5.3	7.52	*	ug/m3		142	70 - 130
Chloroform	9.8	9.37		ug/m3		96	70 - 130
Chloromethane	4.1	4.83		ug/m3		117	60 - 140
cis-1,2-Dichloroethene	7.9	7.51		ug/m3		95	70 - 130
cis-1,3-Dichloropropene	9.1	7.73		ug/m3		85	70 - 130
Dichlorodifluoromethane	9.9	11.5		ug/m3		116	60 - 140
Ethylbenzene	8.7	8.63		ug/m3		99	70 - 130
1,2-Dibromoethane (EDB)	15	13.4		ug/m3		87	70 - 130
Hexachlorobutadiene	21	21.5		ug/m3		101	60 - 140
Methylene Chloride	7.0	6.61	B	ug/m3		95	70 - 130
m-Xylene & p-Xylene	17	18.5		ug/m3		107	70 - 130
o-Xylene	8.7	9.05		ug/m3		104	70 - 130
Styrene	8.5	9.01		ug/m3		106	70 - 130
Tetrachloroethene	14	12.9		ug/m3		95	70 - 130
Toluene	7.5	6.83		ug/m3		91	70 - 130
trans-1,3-Dichloropropene	9.1	8.10		ug/m3		89	70 - 130
Trichloroethene	11	10.4		ug/m3		97	70 - 130
Trichlorofluoromethane	11	13.2		ug/m3		118	60 - 140
Vinyl chloride	5.1	6.35		ug/m3		124	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*99*		*60 - 140*

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Air - GC/MS VOA

Analysis Batch: 1893

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-2258-1	WAA-01-SU-PS-20141030	Total/NA	Air	TO-15	
140-2258-2	WAA-02-SU-PS-20141030	Total/NA	Air	TO-15	
140-2258-3	WAA-03-SU-PS-20141030	Total/NA	Air	TO-15	
140-2258-4	WAA-04-SU-PS-20141030	Total/NA	Air	TO-15	
140-2258-5	WAA-05-SU-PS-20141030	Total/NA	Air	TO-15	
140-2258-6	WAA-04-SU-DU-20141030	Total/NA	Air	TO-15	
140-2258-7	WAA-00-SU-TB-20141030	Total/NA	Air	TO-15	
LCS 140-1893/1002	Lab Control Sample	Total/NA	Air	TO-15	
MB 140-1893/5	Method Blank	Total/NA	Air	TO-15	

Lab Chronicle

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-01-SU-PS-20141030 — Lab Sample ID: 140-2258-1

Date Collected: 10/30/14 12:23 — **Matrix: Air**
Date Received: 11/04/14 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1893	11/04/14 21:52	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: WAA-02-SU-PS-20141030 — Lab Sample ID: 140-2258-2

Date Collected: 10/30/14 11:16 — **Matrix: Air**
Date Received: 11/04/14 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1893	11/04/14 22:46	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: WAA-03-SU-PS-20141030 — Lab Sample ID: 140-2258-3

Date Collected: 10/30/14 11:50 — **Matrix: Air**
Date Received: 11/04/14 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1893	11/04/14 23:41	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: WAA-04-SU-PS-20141030 — Lab Sample ID: 140-2258-4

Date Collected: 10/30/14 12:07 — **Matrix: Air**
Date Received: 11/04/14 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.44	288 mL	500 mL	1893	11/05/14 00:36	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: WAA-05-SU-PS-20141030 — Lab Sample ID: 140-2258-5

Date Collected: 10/30/14 11:33 — **Matrix: Air**
Date Received: 11/04/14 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1893	11/05/14 01:30	HMT	TAL KNX
	Instrument ID: MJ									

Client Sample ID: WAA-04-SU-DU-20141030 — Lab Sample ID: 140-2258-6

Date Collected: 10/30/14 12:08 — **Matrix: Air**
Date Received: 11/04/14 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1893	11/05/14 03:20	HMT	TAL KNX
	Instrument ID: MJ									

Lab Chronicle

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Client Sample ID: WAA-00-SU-TB-20141030

Lab Sample ID: 140-2258-7

Date Collected: 10/30/14 12:23

Matrix: Air

Date Received: 11/04/14 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1893	11/04/14 20:58	HMT	TAL KNX
	Instrument ID: MJ									

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Certification Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Laboratory: TestAmerica Knoxville

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

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		N/A	
Arkansas DEQ	State Program	6	88-0688	06-17-15
California	State Program	9	2423	06-30-16
Colorado	State Program	8	N/A	02-28-15
Connecticut	State Program	1	PH-0223	09-30-15
Florida	NELAP	4	E87177	06-30-15
Georgia	State Program	4	906	04-13-17
Hawaii	State Program	9	N/A	04-13-15
Kansas	NELAP	7	E-10349	01-31-15
Kentucky (DW)	State Program	4	90101	12-31-14
L-A-B	DoD ELAP		L2311	02-13-16
Louisiana	NELAP	6	83979	06-30-15
Maryland	State Program	3	277	03-31-15
Michigan	State Program	5	9933	04-13-17
Nevada	State Program	9	TN00009	07-31-15
New Jersey	NELAP	2	TN001	06-30-15
New York	NELAP	2	10781	03-31-15
North Carolina (DW)	State Program	4	21705	07-31-15
Ohio VAP	State Program	5	CL0059	03-26-15
Oklahoma	State Program	6	9415	08-31-15
Pennsylvania	NELAP	3	68-00576	12-31-14
South Carolina	State Program	4	84001	06-30-15
Tennessee	State Program	4	2014	04-13-17
Texas	NELAP	6	T104704380-TX	08-31-15
USDA	Federal		P330-13-00260	08-29-16
Utah	NELAP	8	QUAN3	07-31-15
Virginia	NELAP	3	460176	09-14-15
Virginia	State Program	3	165	06-30-15
Washington	State Program	10	C593	01-19-15
West Virginia (DW)	State Program	3	9955C	12-31-14
West Virginia DEP	State Program	3	345	04-30-15
Wisconsin	State Program	5	998044300	08-31-15

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2258-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-2258-1	WAA-01-SU-PS-20141030	Air	10/30/14 12:23	11/04/14 10:10
140-2258-2	WAA-02-SU-PS-20141030	Air	10/30/14 11:16	11/04/14 10:10
140-2258-3	WAA-03-SU-PS-20141030	Air	10/30/14 11:50	11/04/14 10:10
140-2258-4	WAA-04-SU-PS-20141030	Air	10/30/14 12:07	11/04/14 10:10
140-2258-5	WAA-05-SU-PS-20141030	Air	10/30/14 11:33	11/04/14 10:10
140-2258-6	WAA-04-SU-DU-20141030	Air	10/30/14 12:08	11/04/14 10:10
140-2258-7	WAA-00-SU-TB-20141030	Air	10/30/14 12:23	11/04/14 10:10

TestAmerica Knoxville
5815 Middlebrook Pike

Knoxville, TN 37921
phone 865.291.3000 fax 865.584.4315

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information	Project Manager: Dave Kinroth	Samples Collected By: Dave Kinroth & James Johnson	COC No:
Company Name: Tetra Tech Inc.	Phone: 314-517-6798		_____ of _____ COCs
Address: 415 Oak Street	Email: emily.fisher@tetratech.com		
City/State/Zip: Kansas City, MO 64106			For Lab Use Only:
Phone: 816-412-1755	Site Contact: Dave Kinroth - 314-517-6787		Walk-in Client:
FAX: 816-410-1748	TA Contact: Emily Fisher/Rob Monnig		Lab Sampling:
Project Name: West Lake Landfill	Anaylsis Turnaround Time		
Site/Location: Bridgeton, MO	Standard (Specific): 10 days		Job / SDG No.:
P O # 1105352	Rush (Specifiy):		(See below for Add'l Items)

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, 'Hg (Start)'	Canister Vacuum in Field, 'Hg (Stop)'	Flow Controller ID	Canister ID	TO-15 (Med / Std / Low / SIM)	MA-APH	EPA 3C	EPA 25C / 25,3	ASTM D-1946 / 1945 / 3588	EPA 15/16	TO-3	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)	Sample Specific Notes:
WAA-01-SU-PS-20141030	10/29/14 - 10/30/14	14:15	12:23	-29.2	-0.5	10625	10424	X										X				
WAA-02-SU-PS-20141030	10/29/14 - 10/30/14	13:33	11:16	-29.2	-6.0	10299	10731	X										X				
WAA-03-SU-PS-20141030	10/29/14 - 10/30/14	13:54	11:50	-29.2	-3.0	09551	09976	X										X				
WAA-04-SU-PS-20141030	10/29/14 - 10/30/14	14:04	12:07	-29.2	-6.5	10205	10185	X										X				
WAA-05-SU-PS-20141030	10/29/14 - 10/30/14	13:43	11:33	-29.2	-4.0	10077	10395	X										X				
WAA-04-SU-DU-20141030	10/29/14 - 10/30/14	14:04	12:08	-29.2	-3.5	10461	10235	X										X				
WAA-00-SU-TB-20141030	10/29/14 - 10/30/14	13:33	12:23	-29.2	-29.2	10455	10409	X										X				

140-2258 Chain of Custody

Temperature (Fahrenheit)	Interior	Ambient
Start		58
Stop		57

Pressure (inches of Hg)	Interior	Ambient
Start		30.17
Stop		30.08

Received @ ambient, 2 boxes, Fedex PO trk# 5399 0208 6864, No custody seal
" " 6853

KW 11/4/14

Special Instructions/QC Requirements & Comments:

Samples Shipped by:	Date / Time:	Samples Received by: 11/4/14 1010	7 cans
Samples Relinquished by: Dave Kinroth	Date / Time: 11/3/14 13	Received by: 11/3/14	7 flows
Relinquished by:	Date / Time: 11-3-14 1200	Received by:	7 cc
Lab Use Only: Shipper Name:	Opened by:	Condition:	

Form No. CA-C-WI-003, Rev. 1.1, dated 05/14/2013

WLLFOIA4312 - 015 - 0155331
11/12/2014

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 140-2258-1

Login Number: 2258

List Number: 1

Creator: Wilson, Ken

List Source: TestAmerica Knoxville

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
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.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	N/A	This is checked in the lab.
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	N/A	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	

TestAmerica Knoxville - Air Canister Initial Pressure Check

Gauge ID: G1

Analyst	Date	Sample ID	6 L	1 L	Pressure @ Receipt (-in Hg or +psig)	Time	Comments
HMT	11/4/2014	140-2258-A-1	X		0.0	13:24	
HMT	11/4/2014	140-2258-A-2	X		-6.1	13:25	
HMT	11/4/2014	140-2258-A-3	X		-4.3	13:26	
HMT	11/4/2014	140-2258-A-4	X		-7.7	13:27	
HMT	11/4/2014	140-2258-A-5	X		-4.1	13:28	
HMT	11/4/2014	140-2258-A-6	X		-3.4	13:29	
HMT	11/4/2014	140-2258-A-7	X		-28.9	13:30	TB pressed up to 3.2

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Knoxville, Tennessee)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	December 1, 2014
Sample Delivery Group (SDG):	J2295
Sample Numbers:	WAA-01-SU-PS-20141106, WAA-01-SU-DU-20141106, WAA-02-SU-PS-20141106, WAA-03-SU-PS-20141106, WAA-04-SU-PS-20141106, WAA-05-SU-PS-20141106, and WAA-00-SU-TB-20141106
Matrix / Number of Samples:	5 Air Samples, 1 Field Duplicate Sample, and 1 Trip Blank

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) was used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.

I, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

1 December 2014

Certified by Harry Ellis, Chemist

Date

WLLFOIA4312 - 015 - 0155334

DATA VALIDATION QUALIFIERS

U — The analyte was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

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DATA ASSESSMENT

Sample delivery group (SDG) J2295 included five (5) environmental air (passivated canister) samples and two (2) QC samples (a field duplicate and a trip blank). Samples were analyzed for volatile organic compounds via EPA Air Method TO-15. The following summarizes the data validation that was performed.

VOLATILE ORGANIC COMPOUND ANALYSIS

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 30 days from sample collection by canister to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. Satisfactory LCS and field duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded a low concentration (less than the reporting limit) of the common laboratory contaminant methylene chloride. The similar concentrations of methylene chloride insome field samples (including the field blank) were qualified as laboratory artifacts and flagged "U". The reported methylene chloride concentrations above the reporting limit, but less than 10 times the blank concentration, in the other field samples were qualified as estimated, possibly biased high, and flagged "J" to indicate that.

IV. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analysis were within established control limits. No qualifications were applied.

V. Surrogates

All surrogate recoveries were within QC limits. No qualifications were applied.

VI. Comments

Most detected results were less than reporting limits, which correspond to the lowest calibration standard. The laboratory correctly reported these extrapolations as estimated (flagged "J"). Almost all results in the field duplicate pair were quite similar. The exception was that the field duplicate sample yielded about 5 times the toluene concentration as the primary sample. No qualifications were applied.

VII. Overall Assessment of Data

Overall data quality is acceptable, with few qualifications added. All data are usable as qualified for their intended purposes.

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

TestAmerica Job ID: 140-2295-1
Client Project/Site: West Lake Landfill

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
11/25/2014 10:06:39 AM

Jamie McKinney, Senior Project Manager
(865)291-3000
jamie.mckinney@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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

Results relate only to the items tested and the sample(s) as received by the laboratory.

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WLLFOIA4312 - 015 - 0155339

Definitions/Glossary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Qualifiers

Air - 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.
B	Compound was found in the blank and sample.

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: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Job ID: 140-2295-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-2295-1

Comments
No additional comments.

Receipt
The samples were received on 11/11/2014 8:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA
Method(s) TO 14A, TO 15 LL, TO-14A, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified “zero air” as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of “zero air” by TestAmerica Knoxville.

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

WLLFOIA4312 - 015 - 0155341

Detection Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-01-SU-PS-20141106 — Lab Sample ID: 140-2295-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.073	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
Benzene	0.14	J	0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.081	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.55		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.44		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.43	J B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
Toluene	0.19	J	0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.22		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.56	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
Benzene	0.44	J	0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.51	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.1		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.2		0.99	0.34	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.5	J B	1.7	0.45	ug/m3	1		TO-15	Total/NA
Toluene	0.71	J	0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.2		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-02-SU-PS-20141106 — Lab Sample ID: 140-2295-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.074	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
Benzene	0.16	J	0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.091	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.54		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.47		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	1.5	B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
Toluene	0.23		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.043	J	0.20	0.036	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.22		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.56	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
Benzene	0.50	J	0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.57	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.1		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.3		0.99	0.34	ug/m3	1		TO-15	Total/NA
Methylene Chloride	5.1	B	1.7	0.45	ug/m3	1		TO-15	Total/NA
Toluene	0.87		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichloroethene	0.23	J	1.1	0.19	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.2		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-03-SU-PS-20141106 — Lab Sample ID: 140-2295-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.073	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
Benzene	0.14	J	0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.073	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.64		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.41		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.40	J B	0.50	0.13	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-03-SU-PS-20141106 (Continued) — Lab Sample ID: 140-2295-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toluene	0.21		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.20		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.56	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
Benzene	0.46	J	0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.46	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.3		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.0		0.99	0.34	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.4	J B	1.7	0.45	ug/m3	1		TO-15	Total/NA
Toluene	0.80		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.1		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-04-SU-PS-20141106 — Lab Sample ID: 140-2295-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.087	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
Benzene	0.14	J	0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.083	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.54		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.49		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.40	J B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
Toluene	0.22		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.23		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.66	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
Benzene	0.44	J	0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.52	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.1		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.4		0.99	0.34	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.4	J B	1.7	0.45	ug/m3	1		TO-15	Total/NA
Toluene	0.84		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.3		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-05-SU-PS-20141106 — Lab Sample ID: 140-2295-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.068	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
Benzene	0.12	J	0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.071	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.54		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.42		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.50	B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
Toluene	0.23		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.19	J	0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.52	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
Benzene	0.38	J	0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.45	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.1		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.1		0.99	0.34	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-05-SU-PS-20141106 (Continued) — Lab Sample ID: 140-2295-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	1.7	B	1.7	0.45	ug/m3	1		TO-15	Total/NA
Toluene	0.85		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.1	J	1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-01-SU-DU-20141106 — Lab Sample ID: 140-2295-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.076	J	0.20	0.031	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.10	J	0.20	0.063	ppb v/v	1		TO-15	Total/NA
1,4-Dichlorobenzene	0.15	J	0.20	0.064	ppb v/v	1		TO-15	Total/NA
Benzene	0.16	J	0.20	0.056	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.074	J	0.20	0.038	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.57		0.50	0.16	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.43		0.20	0.068	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.14	J	0.20	0.068	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.90	B	0.50	0.13	ppb v/v	1		TO-15	Total/NA
m-Xylene & p-Xylene	0.40		0.20	0.12	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.15	J	0.20	0.061	ppb v/v	1		TO-15	Total/NA
Styrene	0.092	J	0.20	0.058	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.049	J	0.20	0.040	ppb v/v	1		TO-15	Total/NA
Toluene	0.98		0.20	0.12	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.20		0.20	0.024	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	0.59	J	1.5	0.24	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.50	J	0.98	0.31	ug/m3	1		TO-15	Total/NA
1,4-Dichlorobenzene	0.89	J	1.2	0.38	ug/m3	1		TO-15	Total/NA
Benzene	0.51	J	0.64	0.18	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.46	J	1.3	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.2		1.0	0.33	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.1		0.99	0.34	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.60	J	0.87	0.30	ug/m3	1		TO-15	Total/NA
Methylene Chloride	3.1	B	1.7	0.45	ug/m3	1		TO-15	Total/NA
m-Xylene & p-Xylene	1.7		0.87	0.52	ug/m3	1		TO-15	Total/NA
o-Xylene	0.64	J	0.87	0.26	ug/m3	1		TO-15	Total/NA
Styrene	0.39	J	0.85	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	0.33	J	1.4	0.27	ug/m3	1		TO-15	Total/NA
Toluene	3.7		0.75	0.45	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.1		1.1	0.13	ug/m3	1		TO-15	Total/NA

Client Sample ID: WAA-00-SU-TB-20141106 — Lab Sample ID: 140-2295-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.28	J B	0.50	0.13	ppb v/v	1		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.98	J B	1.7	0.45	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-01-SU-PS-20141106
Date Collected: 11/06/14 14:13
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2295-1
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/12/14 18:17	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/12/14 18:17	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.073**	**J**	0.20	0.031	ppb v/v			11/12/14 18:17	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/12/14 18:17	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/12/14 18:17	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/12/14 18:17	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/12/14 18:17	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/12/14 18:17	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/12/14 18:17	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/12/14 18:17	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/12/14 18:17	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/12/14 18:17	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/12/14 18:17	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/12/14 18:17	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/12/14 18:17	1
Benzene	**0.14**	**J**	0.20	0.056	ppb v/v			11/12/14 18:17	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/12/14 18:17	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/12/14 18:17	1
Carbon tetrachloride	**0.081**	**J**	0.20	0.038	ppb v/v			11/12/14 18:17	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/12/14 18:17	1
Chloroethane	ND		0.20	0.035	ppb v/v			11/12/14 18:17	1
Chloroform	ND		0.20	0.038	ppb v/v			11/12/14 18:17	1
Chloromethane	**0.55**		0.50	0.16	ppb v/v			11/12/14 18:17	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/12/14 18:17	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/12/14 18:17	1
Dichlorodifluoromethane	**0.44**		0.20	0.068	ppb v/v			11/12/14 18:17	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/12/14 18:17	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/12/14 18:17	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/12/14 18:17	1
Methylene Chloride	~~**0.43**~~	~~**J B**~~ U	0.50	0.13	ppb v/v			11/12/14 18:17	1
m-Xylene & p-Xylene	ND		0.20	0.12	ppb v/v			11/12/14 18:17	1
o-Xylene	ND		0.20	0.061	ppb v/v			11/12/14 18:17	1
Styrene	ND		0.20	0.058	ppb v/v			11/12/14 18:17	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/12/14 18:17	1
Toluene	**0.19**	**J**	0.20	0.12	ppb v/v			11/12/14 18:17	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/12/14 18:17	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/12/14 18:17	1
Trichlorofluoromethane	**0.22**		0.20	0.024	ppb v/v			11/12/14 18:17	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/12/14 18:17	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/12/14 18:17	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/12/14 18:17	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.56**	**J**	1.5	0.24	ug/m3			11/12/14 18:17	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/12/14 18:17	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/12/14 18:17	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/12/14 18:17	1

HVE 1 Dec 2014

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-01-SU-PS-20141106

Lab Sample ID: 140-2295-1
Matrix: Air

Date Collected: 11/06/14 14:13
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/12/14 18:17	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/12/14 18:17	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/12/14 18:17	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/12/14 18:17	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/12/14 18:17	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/12/14 18:17	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/12/14 18:17	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/12/14 18:17	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/12/14 18:17	1
Benzene	**0.44**	J	0.64	0.18	ug/m3			11/12/14 18:17	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/12/14 18:17	1
Bromomethane	ND		0.78	0.12	ug/m3			11/12/14 18:17	1
Carbon tetrachloride	**0.51**	J	1.3	0.24	ug/m3			11/12/14 18:17	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/12/14 18:17	1
Chloroethane	ND		0.53	0.092	ug/m3			11/12/14 18:17	1
Chloroform	ND		0.98	0.19	ug/m3			11/12/14 18:17	1
Chloromethane	**1.1**		1.0	0.33	ug/m3			11/12/14 18:17	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/12/14 18:17	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/12/14 18:17	1
Dichlorodifluoromethane	**2.2**		0.99	0.34	ug/m3			11/12/14 18:17	1
Ethylbenzene	ND		0.87	0.30	ug/m3			11/12/14 18:17	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/12/14 18:17	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/12/14 18:17	1
Methylene Chloride	~~1.5~~ ~~J B~~ U		1.7	0.45	ug/m3			11/12/14 18:17	1
m-Xylene & p-Xylene	ND		0.87	0.52	ug/m3			11/12/14 18:17	1
o-Xylene	ND		0.87	0.26	ug/m3			11/12/14 18:17	1
Styrene	ND		0.85	0.25	ug/m3			11/12/14 18:17	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/12/14 18:17	1
Toluene	**0.71**	J	0.75	0.45	ug/m3			11/12/14 18:17	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/12/14 18:17	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/12/14 18:17	1
Trichlorofluoromethane	**1.2**		1.1	0.13	ug/m3			11/12/14 18:17	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/12/14 18:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*102*		*60 - 140*		*11/12/14 18:17*	*1*

Client Sample ID: WAA-02-SU-PS-20141106

Lab Sample ID: 140-2295-2
Matrix: Air

Date Collected: 11/06/14 13:06
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/12/14 18:59	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/12/14 18:59	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.074**	J	0.20	0.031	ppb v/v			11/12/14 18:59	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/12/14 18:59	1

HVE 1 Dec 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-02-SU-PS-20141106
Date Collected: 11/06/14 13:06
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2295-2
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/12/14 18:59	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/12/14 18:59	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/12/14 18:59	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/12/14 18:59	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/12/14 18:59	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/12/14 18:59	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/12/14 18:59	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/12/14 18:59	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/12/14 18:59	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/12/14 18:59	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/12/14 18:59	1
Benzene	**0.16**	J	0.20	0.056	ppb v/v			11/12/14 18:59	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/12/14 18:59	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/12/14 18:59	1
Carbon tetrachloride	**0.091**	J	0.20	0.038	ppb v/v			11/12/14 18:59	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/12/14 18:59	1
Chloroethane	ND		0.20	0.035	ppb v/v			11/12/14 18:59	1
Chloroform	ND		0.20	0.038	ppb v/v			11/12/14 18:59	1
Chloromethane	**0.54**		0.50	0.16	ppb v/v			11/12/14 18:59	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/12/14 18:59	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/12/14 18:59	1
Dichlorodifluoromethane	**0.47**		0.20	0.068	ppb v/v			11/12/14 18:59	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/12/14 18:59	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/12/14 18:59	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/12/14 18:59	1
Methylene Chloride	**1.5**	~~B~~ J	0.50	0.13	ppb v/v			11/12/14 18:59	1
m-Xylene & p-Xylene	ND		0.20	0.12	ppb v/v			11/12/14 18:59	1
o-Xylene	ND		0.20	0.061	ppb v/v			11/12/14 18:59	1
Styrene	ND		0.20	0.058	ppb v/v			11/12/14 18:59	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/12/14 18:59	1
Toluene	**0.23**		0.20	0.12	ppb v/v			11/12/14 18:59	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/12/14 18:59	1
Trichloroethene	**0.043**	J	0.20	0.036	ppb v/v			11/12/14 18:59	1
Trichlorofluoromethane	**0.22**		0.20	0.024	ppb v/v			11/12/14 18:59	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/12/14 18:59	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/12/14 18:59	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/12/14 18:59	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.56**	J	1.5	0.24	ug/m3			11/12/14 18:59	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/12/14 18:59	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/12/14 18:59	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/12/14 18:59	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/12/14 18:59	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/12/14 18:59	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/12/14 18:59	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/12/14 18:59	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/12/14 18:59	1

HVE 12/2/14

TestAmerica Knoxville

Client Sample ID: WAA-02-SU-PS-20141106

Lab Sample ID: 140-2295-2
Matrix: Air

Date Collected: 11/06/14 13:06
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/12/14 18:59	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/12/14 18:59	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/12/14 18:59	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/12/14 18:59	1
Benzene	**0.50**	J	0.64	0.18	ug/m3			11/12/14 18:59	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/12/14 18:59	1
Bromomethane	ND		0.78	0.12	ug/m3			11/12/14 18:59	1
Carbon tetrachloride	**0.57**	J	1.3	0.24	ug/m3			11/12/14 18:59	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/12/14 18:59	1
Chloroethane	ND		0.53	0.092	ug/m3			11/12/14 18:59	1
Chloroform	ND		0.98	0.19	ug/m3			11/12/14 18:59	1
Chloromethane	**1.1**		1.0	0.33	ug/m3			11/12/14 18:59	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/12/14 18:59	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/12/14 18:59	1
Dichlorodifluoromethane	**2.3**		0.99	0.34	ug/m3			11/12/14 18:59	1
Ethylbenzene	ND		0.87	0.30	ug/m3			11/12/14 18:59	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/12/14 18:59	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/12/14 18:59	1
Methylene Chloride	**5.1**	~~B~~ J	1.7	0.45	ug/m3			11/12/14 18:59	1
m-Xylene & p-Xylene	ND		0.87	0.52	ug/m3			11/12/14 18:59	1
o-Xylene	ND		0.87	0.26	ug/m3			11/12/14 18:59	1
Styrene	ND		0.85	0.25	ug/m3			11/12/14 18:59	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/12/14 18:59	1
Toluene	**0.87**		0.75	0.45	ug/m3			11/12/14 18:59	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/12/14 18:59	1
Trichloroethene	**0.23**	J	1.1	0.19	ug/m3			11/12/14 18:59	1
Trichlorofluoromethane	**1.2**		1.1	0.13	ug/m3			11/12/14 18:59	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/12/14 18:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*60 - 140*		*11/12/14 18:59*	*1*

Client Sample ID: WAA-03-SU-PS-20141106

Lab Sample ID: 140-2295-3
Matrix: Air

Date Collected: 11/06/14 13:41
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/12/14 19:46	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/12/14 19:46	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.073**	J	0.20	0.031	ppb v/v			11/12/14 19:46	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/12/14 19:46	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/12/14 19:46	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/12/14 19:46	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/12/14 19:46	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/12/14 19:46	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/12/14 19:46	1

HVE 1 Dec 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-03-SU-PS-20141106
Date Collected: 11/06/14 13:41
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2295-3
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/12/14 19:46	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/12/14 19:46	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/12/14 19:46	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/12/14 19:46	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/12/14 19:46	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/12/14 19:46	1
Benzene	**0.14**	J	0.20	0.056	ppb v/v			11/12/14 19:46	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/12/14 19:46	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/12/14 19:46	1
Carbon tetrachloride	**0.073**	J	0.20	0.038	ppb v/v			11/12/14 19:46	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/12/14 19:46	1
Chloroethane	ND		0.20	0.035	ppb v/v			11/12/14 19:46	1
Chloroform	ND		0.20	0.038	ppb v/v			11/12/14 19:46	1
Chloromethane	**0.64**		0.50	0.16	ppb v/v			11/12/14 19:46	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/12/14 19:46	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/12/14 19:46	1
Dichlorodifluoromethane	**0.41**		0.20	0.068	ppb v/v			11/12/14 19:46	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/12/14 19:46	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/12/14 19:46	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/12/14 19:46	1
Methylene Chloride	~~0.40~~	~~JB~~ U	0.50	0.13	ppb v/v			11/12/14 19:46	1
m-Xylene & p-Xylene	ND		0.20	0.12	ppb v/v			11/12/14 19:46	1
o-Xylene	ND		0.20	0.061	ppb v/v			11/12/14 19:46	1
Styrene	ND		0.20	0.058	ppb v/v			11/12/14 19:46	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/12/14 19:46	1
Toluene	**0.21**		0.20	0.12	ppb v/v			11/12/14 19:46	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/12/14 19:46	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/12/14 19:46	1
Trichlorofluoromethane	**0.20**		0.20	0.024	ppb v/v			11/12/14 19:46	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/12/14 19:46	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/12/14 19:46	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/12/14 19:46	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.56**	J	1.5	0.24	ug/m3			11/12/14 19:46	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/12/14 19:46	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/12/14 19:46	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/12/14 19:46	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/12/14 19:46	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/12/14 19:46	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/12/14 19:46	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/12/14 19:46	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/12/14 19:46	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/12/14 19:46	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/12/14 19:46	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/12/14 19:46	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/12/14 19:46	1
Benzene	**0.46**	J	0.64	0.18	ug/m3			11/12/14 19:46	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-03-SU-PS-20141106

Lab Sample ID: 140-2295-3
Matrix: Air

Date Collected: 11/06/14 13:41
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzyl chloride	ND		2.1	0.40	ug/m3			11/12/14 19:46	1
Bromomethane	ND		0.78	0.12	ug/m3			11/12/14 19:46	1
Carbon tetrachloride	**0.46**	J	1.3	0.24	ug/m3			11/12/14 19:46	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/12/14 19:46	1
Chloroethane	ND		0.53	0.092	ug/m3			11/12/14 19:46	1
Chloroform	ND		0.98	0.19	ug/m3			11/12/14 19:46	1
Chloromethane	**1.3**		1.0	0.33	ug/m3			11/12/14 19:46	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/12/14 19:46	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/12/14 19:46	1
Dichlorodifluoromethane	**2.0**		0.99	0.34	ug/m3			11/12/14 19:46	1
Ethylbenzene	ND		0.87	0.30	ug/m3			11/12/14 19:46	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/12/14 19:46	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/12/14 19:46	1
Methylene Chloride	~~1.4 JB~~	U	1.7	0.45	ug/m3			11/12/14 19:46	1
m-Xylene & p-Xylene	ND		0.87	0.52	ug/m3			11/12/14 19:46	1
o-Xylene	ND		0.87	0.26	ug/m3			11/12/14 19:46	1
Styrene	ND		0.85	0.25	ug/m3			11/12/14 19:46	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/12/14 19:46	1
Toluene	**0.80**		0.75	0.45	ug/m3			11/12/14 19:46	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/12/14 19:46	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/12/14 19:46	1
Trichlorofluoromethane	**1.1**		1.1	0.13	ug/m3			11/12/14 19:46	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/12/14 19:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*103*		*60 - 140*		*11/12/14 19:46*	*1*

Client Sample ID: WAA-04-SU-PS-20141106

Lab Sample ID: 140-2295-4
Matrix: Air

Date Collected: 11/06/14 13:57
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/12/14 22:37	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/12/14 22:37	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.087**	J	0.20	0.031	ppb v/v			11/12/14 22:37	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/12/14 22:37	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/12/14 22:37	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/12/14 22:37	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/12/14 22:37	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/12/14 22:37	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/12/14 22:37	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/12/14 22:37	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/12/14 22:37	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/12/14 22:37	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/12/14 22:37	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/12/14 22:37	1

AVG 1 Dec 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-04-SU-PS-20141106
Date Collected: 11/06/14 13:57
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2295-4
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/12/14 22:37	1
Benzene	**0.14**	**J**	0.20	0.056	ppb v/v			11/12/14 22:37	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/12/14 22:37	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/12/14 22:37	1
Carbon tetrachloride	**0.083**	**J**	0.20	0.038	ppb v/v			11/12/14 22:37	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/12/14 22:37	1
Chloroethane	ND		0.20	0.035	ppb v/v			11/12/14 22:37	1
Chloroform	ND		0.20	0.038	ppb v/v			11/12/14 22:37	1
Chloromethane	**0.54**		0.50	0.16	ppb v/v			11/12/14 22:37	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/12/14 22:37	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/12/14 22:37	1
Dichlorodifluoromethane	**0.49**		0.20	0.068	ppb v/v			11/12/14 22:37	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/12/14 22:37	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/12/14 22:37	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/12/14 22:37	1
Methylene Chloride	~~0.40~~	~~J B~~ 4	0.50	0.13	ppb v/v			11/12/14 22:37	1
m-Xylene & p-Xylene	ND		0.20	0.12	ppb v/v			11/12/14 22:37	1
o-Xylene	ND		0.20	0.061	ppb v/v			11/12/14 22:37	1
Styrene	ND		0.20	0.058	ppb v/v			11/12/14 22:37	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/12/14 22:37	1
Toluene	**0.22**		0.20	0.12	ppb v/v			11/12/14 22:37	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/12/14 22:37	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/12/14 22:37	1
Trichlorofluoromethane	**0.23**		0.20	0.024	ppb v/v			11/12/14 22:37	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/12/14 22:37	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/12/14 22:37	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/12/14 22:37	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.66**	**J**	1.5	0.24	ug/m3			11/12/14 22:37	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/12/14 22:37	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/12/14 22:37	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/12/14 22:37	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/12/14 22:37	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/12/14 22:37	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/12/14 22:37	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/12/14 22:37	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/12/14 22:37	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/12/14 22:37	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/12/14 22:37	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/12/14 22:37	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/12/14 22:37	1
Benzene	**0.44**	**J**	0.64	0.18	ug/m3			11/12/14 22:37	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/12/14 22:37	1
Bromomethane	ND		0.78	0.12	ug/m3			11/12/14 22:37	1
Carbon tetrachloride	**0.52**	**J**	1.3	0.24	ug/m3			11/12/14 22:37	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/12/14 22:37	1
Chloroethane	ND		0.53	0.092	ug/m3			11/12/14 22:37	1

HVG 1 Dec 14

TestAmerica Knoxville

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-04-SU-PS-20141106

Lab Sample ID: 140-2295-4
Matrix: Air

Date Collected: 11/06/14 13:57
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		0.98	0.19	ug/m3			11/12/14 22:37	1
Chloromethane	**1.1**		1.0	0.33	ug/m3			11/12/14 22:37	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/12/14 22:37	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/12/14 22:37	1
Dichlorodifluoromethane	**2.4**		0.99	0.34	ug/m3			11/12/14 22:37	1
Ethylbenzene	ND		0.87	0.30	ug/m3			11/12/14 22:37	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/12/14 22:37	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/12/14 22:37	1
Methylene Chloride	~~1.4~~ ~~J B~~ U		1.7	0.45	ug/m3			11/12/14 22:37	1
m-Xylene & p-Xylene	ND		0.87	0.52	ug/m3			11/12/14 22:37	1
o-Xylene	ND		0.87	0.26	ug/m3			11/12/14 22:37	1
Styrene	ND		0.85	0.25	ug/m3			11/12/14 22:37	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/12/14 22:37	1
Toluene	**0.84**		0.75	0.45	ug/m3			11/12/14 22:37	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/12/14 22:37	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/12/14 22:37	1
Trichlorofluoromethane	**1.3**		1.1	0.13	ug/m3			11/12/14 22:37	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/12/14 22:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*103*		*60 - 140*		*11/12/14 22:37*	*1*

Client Sample ID: WAA-05-SU-PS-20141106

Lab Sample ID: 140-2295-5
Matrix: Air

Date Collected: 11/06/14 13:24
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/12/14 23:23	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/12/14 23:23	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.068**	**J**	0.20	0.031	ppb v/v			11/12/14 23:23	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/12/14 23:23	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/12/14 23:23	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/12/14 23:23	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/12/14 23:23	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/12/14 23:23	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/12/14 23:23	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/12/14 23:23	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/12/14 23:23	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/12/14 23:23	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/12/14 23:23	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/12/14 23:23	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/12/14 23:23	1
Benzene	**0.12**	**J**	0.20	0.056	ppb v/v			11/12/14 23:23	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/12/14 23:23	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/12/14 23:23	1
Carbon tetrachloride	**0.071**	**J**	0.20	0.038	ppb v/v			11/12/14 23:23	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-05-SU-PS-20141106
Date Collected: 11/06/14 13:24
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2295-5
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/12/14 23:23	1
Chloroethane	ND		0.20	0.035	ppb v/v			11/12/14 23:23	1
Chloroform	ND		0.20	0.038	ppb v/v			11/12/14 23:23	1
Chloromethane	**0.54**		0.50	0.16	ppb v/v			11/12/14 23:23	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/12/14 23:23	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/12/14 23:23	1
Dichlorodifluoromethane	**0.42**		0.20	0.068	ppb v/v			11/12/14 23:23	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/12/14 23:23	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/12/14 23:23	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/12/14 23:23	1
Methylene Chloride	**0.50**	~~B~~ J	0.50	0.13	ppb v/v			11/12/14 23:23	1
m-Xylene & p-Xylene	ND		0.20	0.12	ppb v/v			11/12/14 23:23	1
o-Xylene	ND		0.20	0.061	ppb v/v			11/12/14 23:23	1
Styrene	ND		0.20	0.058	ppb v/v			11/12/14 23:23	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/12/14 23:23	1
Toluene	**0.23**		0.20	0.12	ppb v/v			11/12/14 23:23	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/12/14 23:23	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/12/14 23:23	1
Trichlorofluoromethane	**0.19**	J	0.20	0.024	ppb v/v			11/12/14 23:23	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/12/14 23:23	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/12/14 23:23	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/12/14 23:23	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.52**	J	1.5	0.24	ug/m3			11/12/14 23:23	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/12/14 23:23	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/12/14 23:23	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/12/14 23:23	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/12/14 23:23	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/12/14 23:23	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/12/14 23:23	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/12/14 23:23	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/12/14 23:23	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/12/14 23:23	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/12/14 23:23	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/12/14 23:23	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/12/14 23:23	1
Benzene	**0.38**	J	0.64	0.18	ug/m3			11/12/14 23:23	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/12/14 23:23	1
Bromomethane	ND		0.78	0.12	ug/m3			11/12/14 23:23	1
Carbon tetrachloride	**0.45**	J	1.3	0.24	ug/m3			11/12/14 23:23	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/12/14 23:23	1
Chloroethane	ND		0.53	0.092	ug/m3			11/12/14 23:23	1
Chloroform	ND		0.98	0.19	ug/m3			11/12/14 23:23	1
Chloromethane	**1.1**		1.0	0.33	ug/m3			11/12/14 23:23	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/12/14 23:23	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/12/14 23:23	1
Dichlorodifluoromethane	**2.1**		0.99	0.34	ug/m3			11/12/14 23:23	1

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Client Sample ID: WAA-05-SU-PS-20141106

Lab Sample ID: 140-2295-5
Matrix: Air

Date Collected: 11/06/14 13:24
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.87	0.30	ug/m3			11/12/14 23:23	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/12/14 23:23	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/12/14 23:23	1
Methylene Chloride	**1.7**	~~B~~ J	1.7	0.45	ug/m3			11/12/14 23:23	1
m-Xylene & p-Xylene	ND		0.87	0.52	ug/m3			11/12/14 23:23	1
o-Xylene	ND		0.87	0.26	ug/m3			11/12/14 23:23	1
Styrene	ND		0.85	0.25	ug/m3			11/12/14 23:23	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/12/14 23:23	1
Toluene	**0.85**		0.75	0.45	ug/m3			11/12/14 23:23	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/12/14 23:23	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/12/14 23:23	1
Trichlorofluoromethane	**1.1**	J	1.1	0.13	ug/m3			11/12/14 23:23	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/12/14 23:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*103*		*60 - 140*		*11/12/14 23:23*	*1*

Client Sample ID: WAA-01-SU-DU-20141106

Lab Sample ID: 140-2295-6
Matrix: Air

Date Collected: 11/06/14 14:13
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/13/14 00:53	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/13/14 00:53	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.076**	J	0.20	0.031	ppb v/v			11/13/14 00:53	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/13/14 00:53	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/13/14 00:53	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/13/14 00:53	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/13/14 00:53	1
1,2,4-Trimethylbenzene	**0.10**	J	0.20	0.063	ppb v/v			11/13/14 00:53	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/13/14 00:53	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/13/14 00:53	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/13/14 00:53	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/13/14 00:53	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/13/14 00:53	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/13/14 00:53	1
1,4-Dichlorobenzene	**0.15**	J	0.20	0.064	ppb v/v			11/13/14 00:53	1
Benzene	**0.16**	J	0.20	0.056	ppb v/v			11/13/14 00:53	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/13/14 00:53	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/13/14 00:53	1
Carbon tetrachloride	**0.074**	J	0.20	0.038	ppb v/v			11/13/14 00:53	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/13/14 00:53	1
Chloroethane	ND		0.20	0.035	ppb v/v			11/13/14 00:53	1
Chloroform	ND		0.20	0.038	ppb v/v			11/13/14 00:53	1
Chloromethane	**0.57**		0.50	0.16	ppb v/v			11/13/14 00:53	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/13/14 00:53	1

HVG 1 Dec 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-01-SU-DU-20141106
Date Collected: 11/06/14 14:13
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2295-6
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/13/14 00:53	1
Dichlorodifluoromethane	**0.43**		0.20	0.068	ppb v/v			11/13/14 00:53	1
Ethylbenzene	**0.14**	J	0.20	0.068	ppb v/v			11/13/14 00:53	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/13/14 00:53	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/13/14 00:53	1
Methylene Chloride	**0.90**	~~B~~ J	0.50	0.13	ppb v/v			11/13/14 00:53	1
m-Xylene & p-Xylene	**0.40**		0.20	0.12	ppb v/v			11/13/14 00:53	1
o-Xylene	**0.15**	J	0.20	0.061	ppb v/v			11/13/14 00:53	1
Styrene	**0.092**	J	0.20	0.058	ppb v/v			11/13/14 00:53	1
Tetrachloroethene	**0.049**	J	0.20	0.040	ppb v/v			11/13/14 00:53	1
Toluene	**0.98**		0.20	0.12	ppb v/v			11/13/14 00:53	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/13/14 00:53	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/13/14 00:53	1
Trichlorofluoromethane	**0.20**		0.20	0.024	ppb v/v			11/13/14 00:53	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/13/14 00:53	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/13/14 00:53	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/13/14 00:53	1
1,1,2-Trichloro-1,2,2-trifluoroetha ne	**0.59**	J	1.5	0.24	ug/m3			11/13/14 00:53	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/13/14 00:53	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/13/14 00:53	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/13/14 00:53	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/13/14 00:53	1
1,2,4-Trimethylbenzene	**0.50**	J	0.98	0.31	ug/m3			11/13/14 00:53	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/13/14 00:53	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/13/14 00:53	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/13/14 00:53	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/13/14 00:53	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/13/14 00:53	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/13/14 00:53	1
1,4-Dichlorobenzene	**0.89**	J	1.2	0.38	ug/m3			11/13/14 00:53	1
Benzene	**0.51**	J	0.64	0.18	ug/m3			11/13/14 00:53	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/13/14 00:53	1
Bromomethane	ND		0.78	0.12	ug/m3			11/13/14 00:53	1
Carbon tetrachloride	**0.46**	J	1.3	0.24	ug/m3			11/13/14 00:53	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/13/14 00:53	1
Chloroethane	ND		0.53	0.092	ug/m3			11/13/14 00:53	1
Chloroform	ND		0.98	0.19	ug/m3			11/13/14 00:53	1
Chloromethane	**1.2**		1.0	0.33	ug/m3			11/13/14 00:53	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/13/14 00:53	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/13/14 00:53	1
Dichlorodifluoromethane	**2.1**		0.99	0.34	ug/m3			11/13/14 00:53	1
Ethylbenzene	**0.60**	J	0.87	0.30	ug/m3			11/13/14 00:53	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/13/14 00:53	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/13/14 00:53	1
Methylene Chloride	**3.1**	~~B~~ J	1.7	0.45	ug/m3			11/13/14 00:53	1
m-Xylene & p-Xylene	**1.7**		0.87	0.52	ug/m3			11/13/14 00:53	1

HVE 1Dg 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-01-SU-DU-20141106

Lab Sample ID: 140-2295-6
Matrix: Air

Date Collected: 11/06/14 14:13
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Xylene	0.64	J	0.87	0.26	ug/m3			11/13/14 00:53	1
Styrene	0.39	J	0.85	0.25	ug/m3			11/13/14 00:53	1
Tetrachloroethene	0.33	J	1.4	0.27	ug/m3			11/13/14 00:53	1
Toluene	3.7		0.75	0.45	ug/m3			11/13/14 00:53	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/13/14 00:53	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/13/14 00:53	1
Trichlorofluoromethane	1.1		1.1	0.13	ug/m3			11/13/14 00:53	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/13/14 00:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		60 - 140		11/13/14 00:53	1

Client Sample ID: WAA-00-SU-TB-20141106

Lab Sample ID: 140-2295-7
Matrix: Air

Date Collected: 11/06/14 14:13
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.20	0.030	ppb v/v			11/12/14 17:33	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/12/14 17:33	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.031	ppb v/v			11/12/14 17:33	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/12/14 17:33	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/12/14 17:33	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/12/14 17:33	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/12/14 17:33	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/12/14 17:33	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/12/14 17:33	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/12/14 17:33	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/12/14 17:33	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/12/14 17:33	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/12/14 17:33	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/12/14 17:33	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/12/14 17:33	1
Benzene	ND		0.20	0.056	ppb v/v			11/12/14 17:33	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/12/14 17:33	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/12/14 17:33	1
Carbon tetrachloride	ND		0.20	0.038	ppb v/v			11/12/14 17:33	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/12/14 17:33	1
Chloroethane	ND		0.20	0.035	ppb v/v			11/12/14 17:33	1
Chloroform	ND		0.20	0.038	ppb v/v			11/12/14 17:33	1
Chloromethane	ND		0.50	0.16	ppb v/v			11/12/14 17:33	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/12/14 17:33	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/12/14 17:33	1
Dichlorodifluoromethane	ND		0.20	0.068	ppb v/v			11/12/14 17:33	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/12/14 17:33	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/12/14 17:33	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/12/14 17:33	1
Methylene Chloride	0.28	~~J B~~ 4	0.50	0.13	ppb v/v			11/12/14 17:33	1

HVE 1 Daily

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-00-SU-TB-20141106
Date Collected: 11/06/14 14:13
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2295-7
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m-Xylene & p-Xylene	ND		0.20	0.12	ppb v/v			11/12/14 17:33	1
o-Xylene	ND		0.20	0.061	ppb v/v			11/12/14 17:33	1
Styrene	ND		0.20	0.058	ppb v/v			11/12/14 17:33	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/12/14 17:33	1
Toluene	ND		0.20	0.12	ppb v/v			11/12/14 17:33	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/12/14 17:33	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/12/14 17:33	1
Trichlorofluoromethane	ND		0.20	0.024	ppb v/v			11/12/14 17:33	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/12/14 17:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/12/14 17:33	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/12/14 17:33	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.5	0.24	ug/m3			11/12/14 17:33	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/12/14 17:33	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/12/14 17:33	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/12/14 17:33	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/12/14 17:33	1
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/12/14 17:33	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/12/14 17:33	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/12/14 17:33	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/12/14 17:33	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/12/14 17:33	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/12/14 17:33	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/12/14 17:33	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/12/14 17:33	1
Benzene	ND		0.64	0.18	ug/m3			11/12/14 17:33	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/12/14 17:33	1
Bromomethane	ND		0.78	0.12	ug/m3			11/12/14 17:33	1
Carbon tetrachloride	ND		1.3	0.24	ug/m3			11/12/14 17:33	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/12/14 17:33	1
Chloroethane	ND		0.53	0.092	ug/m3			11/12/14 17:33	1
Chloroform	ND		0.98	0.19	ug/m3			11/12/14 17:33	1
Chloromethane	ND		1.0	0.33	ug/m3			11/12/14 17:33	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/12/14 17:33	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/12/14 17:33	1
Dichlorodifluoromethane	ND		0.99	0.34	ug/m3			11/12/14 17:33	1
Ethylbenzene	ND		0.87	0.30	ug/m3			11/12/14 17:33	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/12/14 17:33	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/12/14 17:33	1
Methylene Chloride	**0.98**	~~JB~~ 4	1.7	0.45	ug/m3			11/12/14 17:33	1
m-Xylene & p-Xylene	ND		0.87	0.52	ug/m3			11/12/14 17:33	1
o-Xylene	ND		0.87	0.26	ug/m3			11/12/14 17:33	1
Styrene	ND		0.85	0.25	ug/m3			11/12/14 17:33	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/12/14 17:33	1
Toluene	ND		0.75	0.45	ug/m3			11/12/14 17:33	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/12/14 17:33	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/12/14 17:33	1
Trichlorofluoromethane	ND		1.1	0.13	ug/m3			11/12/14 17:33	1

HVG 1 Dain

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-00-SU-TB-20141106
Date Collected: 11/06/14 14:13
Date Received: 11/11/14 08:40
Sample Container: Summa Canister 6L

Lab Sample ID: 140-2295-7
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		0.51	0.18	ug/m3			11/12/14 17:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*95*		*60 - 140*		*11/12/14 17:33*	*1*

HUG

1 Dec 14

Surrogate Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

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

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	**Client Sample ID**	**BFB (60-140)**						
140-2295-1	WAA-01-SU-PS-20141106	102						
140-2295-2	WAA-02-SU-PS-20141106	101						
140-2295-3	WAA-03-SU-PS-20141106	103						
140-2295-4	WAA-04-SU-PS-20141106	103						
140-2295-5	WAA-05-SU-PS-20141106	103						
140-2295-6	WAA-01-SU-DU-20141106	102						
140-2295-7	WAA-00-SU-TB-20141106	95						
LCS 140-1925/1002	Lab Control Sample	102						
MB 140-1925/5	Method Blank	99						

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 140-1925/5
Matrix: Air
Analysis Batch: 1925

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		0.20	0.030	ppb v/v			11/12/14 15:20	1
1,1,2,2-Tetrachloroethane	ND		0.20	0.061	ppb v/v			11/12/14 15:20	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.031	ppb v/v			11/12/14 15:20	1
1,1,2-Trichloroethane	ND		0.20	0.054	ppb v/v			11/12/14 15:20	1
1,1-Dichloroethane	ND		0.20	0.026	ppb v/v			11/12/14 15:20	1
1,1-Dichloroethene	ND		0.20	0.034	ppb v/v			11/12/14 15:20	1
1,2,4-Trichlorobenzene	ND		1.0	0.098	ppb v/v			11/12/14 15:20	1
1,2,4-Trimethylbenzene	ND		0.20	0.063	ppb v/v			11/12/14 15:20	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.20	0.032	ppb v/v			11/12/14 15:20	1
1,2-Dichlorobenzene	ND		0.20	0.070	ppb v/v			11/12/14 15:20	1
1,2-Dichloroethane	ND		0.20	0.047	ppb v/v			11/12/14 15:20	1
1,2-Dichloropropane	ND		0.20	0.052	ppb v/v			11/12/14 15:20	1
1,3,5-Trimethylbenzene	ND		0.20	0.065	ppb v/v			11/12/14 15:20	1
1,3-Dichlorobenzene	ND		0.20	0.065	ppb v/v			11/12/14 15:20	1
1,4-Dichlorobenzene	ND		0.20	0.064	ppb v/v			11/12/14 15:20	1
Benzene	ND		0.20	0.056	ppb v/v			11/12/14 15:20	1
Benzyl chloride	ND		0.40	0.078	ppb v/v			11/12/14 15:20	1
Bromomethane	ND		0.20	0.032	ppb v/v			11/12/14 15:20	1
Carbon tetrachloride	ND		0.20	0.038	ppb v/v			11/12/14 15:20	1
Chlorobenzene	ND		0.20	0.049	ppb v/v			11/12/14 15:20	1
Chloroethane	ND		0.20	0.035	ppb v/v			11/12/14 15:20	1
Chloroform	ND		0.20	0.038	ppb v/v			11/12/14 15:20	1
Chloromethane	ND		0.50	0.16	ppb v/v			11/12/14 15:20	1
cis-1,2-Dichloroethene	ND		0.20	0.060	ppb v/v			11/12/14 15:20	1
cis-1,3-Dichloropropene	ND		0.20	0.074	ppb v/v			11/12/14 15:20	1
Dichlorodifluoromethane	ND		0.20	0.068	ppb v/v			11/12/14 15:20	1
Ethylbenzene	ND		0.20	0.068	ppb v/v			11/12/14 15:20	1
1,2-Dibromoethane (EDB)	ND		0.20	0.044	ppb v/v			11/12/14 15:20	1
Hexachlorobutadiene	ND		1.0	0.078	ppb v/v			11/12/14 15:20	1
Methylene Chloride	0.293	J	0.50	0.13	ppb v/v			11/12/14 15:20	1
m-Xylene & p-Xylene	ND		0.20	0.12	ppb v/v			11/12/14 15:20	1
o-Xylene	ND		0.20	0.061	ppb v/v			11/12/14 15:20	1
Styrene	ND		0.20	0.058	ppb v/v			11/12/14 15:20	1
Tetrachloroethene	ND		0.20	0.040	ppb v/v			11/12/14 15:20	1
Toluene	ND		0.20	0.12	ppb v/v			11/12/14 15:20	1
trans-1,3-Dichloropropene	ND		0.20	0.048	ppb v/v			11/12/14 15:20	1
Trichloroethene	ND		0.20	0.036	ppb v/v			11/12/14 15:20	1
Trichlorofluoromethane	ND		0.20	0.024	ppb v/v			11/12/14 15:20	1
Vinyl chloride	ND		0.20	0.071	ppb v/v			11/12/14 15:20	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.16	ug/m3			11/12/14 15:20	1
1,1,2,2-Tetrachloroethane	ND		1.4	0.42	ug/m3			11/12/14 15:20	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.5	0.24	ug/m3			11/12/14 15:20	1
1,1,2-Trichloroethane	ND		1.1	0.29	ug/m3			11/12/14 15:20	1
1,1-Dichloroethane	ND		0.81	0.11	ug/m3			11/12/14 15:20	1
1,1-Dichloroethene	ND		0.79	0.13	ug/m3			11/12/14 15:20	1
1,2,4-Trichlorobenzene	ND		7.4	0.73	ug/m3			11/12/14 15:20	1

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 140-1925/5
Matrix: Air
Analysis Batch: 1925

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trimethylbenzene	ND		0.98	0.31	ug/m3			11/12/14 15:20	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.22	ug/m3			11/12/14 15:20	1
1,2-Dichlorobenzene	ND		1.2	0.42	ug/m3			11/12/14 15:20	1
1,2-Dichloroethane	ND		0.81	0.19	ug/m3			11/12/14 15:20	1
1,2-Dichloropropane	ND		0.92	0.24	ug/m3			11/12/14 15:20	1
1,3,5-Trimethylbenzene	ND		0.98	0.32	ug/m3			11/12/14 15:20	1
1,3-Dichlorobenzene	ND		1.2	0.39	ug/m3			11/12/14 15:20	1
1,4-Dichlorobenzene	ND		1.2	0.38	ug/m3			11/12/14 15:20	1
Benzene	ND		0.64	0.18	ug/m3			11/12/14 15:20	1
Benzyl chloride	ND		2.1	0.40	ug/m3			11/12/14 15:20	1
Bromomethane	ND		0.78	0.12	ug/m3			11/12/14 15:20	1
Carbon tetrachloride	ND		1.3	0.24	ug/m3			11/12/14 15:20	1
Chlorobenzene	ND		0.92	0.23	ug/m3			11/12/14 15:20	1
Chloroethane	ND		0.53	0.092	ug/m3			11/12/14 15:20	1
Chloroform	ND		0.98	0.19	ug/m3			11/12/14 15:20	1
Chloromethane	ND		1.0	0.33	ug/m3			11/12/14 15:20	1
cis-1,2-Dichloroethene	ND		0.79	0.24	ug/m3			11/12/14 15:20	1
cis-1,3-Dichloropropene	ND		0.91	0.34	ug/m3			11/12/14 15:20	1
Dichlorodifluoromethane	ND		0.99	0.34	ug/m3			11/12/14 15:20	1
Ethylbenzene	ND		0.87	0.30	ug/m3			11/12/14 15:20	1
1,2-Dibromoethane (EDB)	ND		1.5	0.34	ug/m3			11/12/14 15:20	1
Hexachlorobutadiene	ND		11	0.83	ug/m3			11/12/14 15:20	1
Methylene Chloride	1.02	J	1.7	0.45	ug/m3			11/12/14 15:20	1
m-Xylene & p-Xylene	ND		0.87	0.52	ug/m3			11/12/14 15:20	1
o-Xylene	ND		0.87	0.26	ug/m3			11/12/14 15:20	1
Styrene	ND		0.85	0.25	ug/m3			11/12/14 15:20	1
Tetrachloroethene	ND		1.4	0.27	ug/m3			11/12/14 15:20	1
Toluene	ND		0.75	0.45	ug/m3			11/12/14 15:20	1
trans-1,3-Dichloropropene	ND		0.91	0.22	ug/m3			11/12/14 15:20	1
Trichloroethene	ND		1.1	0.19	ug/m3			11/12/14 15:20	1
Trichlorofluoromethane	ND		1.1	0.13	ug/m3			11/12/14 15:20	1
Vinyl chloride	ND		0.51	0.18	ug/m3			11/12/14 15:20	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*60 - 140*		*11/12/14 15:20*	*1*

Lab Sample ID: LCS 140-1925/1002
Matrix: Air
Analysis Batch: 1925

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	2.00	2.14		ppb v/v		107	70 - 130
1,1,2,2-Tetrachloroethane	2.00	2.27		ppb v/v		114	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroetha ne	2.00	2.36		ppb v/v		118	70 - 130
1,1,2-Trichloroethane	2.00	2.17		ppb v/v		108	70 - 130
1,1-Dichloroethane	2.00	2.19		ppb v/v		110	70 - 130
1,1-Dichloroethene	2.00	2.44		ppb v/v		122	70 - 130

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-1925/1002
Matrix: Air
Analysis Batch: 1925

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	2.00	1.73		ppb v/v		86	60 - 140
1,2,4-Trimethylbenzene	2.00	2.20		ppb v/v		110	70 - 130
1,2-Dichloro-1,1,2,2-tetrafluoroethane	2.00	2.02		ppb v/v		101	60 - 140
1,2-Dichlorobenzene	2.00	1.94		ppb v/v		97	70 - 130
1,2-Dichloroethane	2.00	2.18		ppb v/v		109	70 - 130
1,2-Dichloropropane	2.00	2.16		ppb v/v		108	70 - 130
1,3,5-Trimethylbenzene	2.00	2.29		ppb v/v		114	70 - 130
1,3-Dichlorobenzene	2.00	2.06		ppb v/v		103	70 - 130
1,4-Dichlorobenzene	2.00	2.06		ppb v/v		103	70 - 130
Benzene	2.00	2.19		ppb v/v		110	70 - 130
Benzyl chloride	2.00	2.14		ppb v/v		107	70 - 130
Bromomethane	2.00	1.95		ppb v/v		97	70 - 130
Carbon tetrachloride	2.00	2.39		ppb v/v		120	70 - 130
Chlorobenzene	2.00	2.08		ppb v/v		104	70 - 130
Chloroethane	2.00	2.00		ppb v/v		100	70 - 130
Chloroform	2.00	2.14		ppb v/v		107	70 - 130
Chloromethane	2.00	1.94		ppb v/v		97	60 - 140
cis-1,2-Dichloroethene	2.00	2.22		ppb v/v		111	70 - 130
cis-1,3-Dichloropropene	2.00	2.13		ppb v/v		107	70 - 130
Dichlorodifluoromethane	2.00	2.03		ppb v/v		101	60 - 140
Ethylbenzene	2.00	2.24		ppb v/v		112	70 - 130
1,2-Dibromoethane (EDB)	2.00	2.23		ppb v/v		111	70 - 130
Hexachlorobutadiene	2.00	2.00		ppb v/v		100	60 - 140
Methylene Chloride	2.00	2.29		ppb v/v		114	70 - 130
m-Xylene & p-Xylene	4.00	4.37		ppb v/v		109	70 - 130
o-Xylene	2.00	2.21		ppb v/v		111	70 - 130
Styrene	2.00	2.35		ppb v/v		118	70 - 130
Tetrachloroethene	2.00	2.05		ppb v/v		103	70 - 130
Toluene	2.00	2.31		ppb v/v		116	70 - 130
trans-1,3-Dichloropropene	2.00	2.11		ppb v/v		106	70 - 130
Trichloroethene	2.00	2.08		ppb v/v		104	70 - 130
Trichlorofluoromethane	2.00	2.07		ppb v/v		103	60 - 140
Vinyl chloride	2.00	2.05		ppb v/v		102	70 - 130

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	11	11.7		ug/m3		107	70 - 130
1,1,2,2-Tetrachloroethane	14	15.6		ug/m3		114	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroethane	15	18.1		ug/m3		118	70 - 130
1,1,2-Trichloroethane	11	11.8		ug/m3		108	70 - 130
1,1-Dichloroethane	8.1	8.88		ug/m3		110	70 - 130
1,1-Dichloroethene	7.9	9.66		ug/m3		122	70 - 130
1,2,4-Trichlorobenzene	15	12.8		ug/m3		86	60 - 140
1,2,4-Trimethylbenzene	9.8	10.8		ug/m3		110	70 - 130
1,2-Dichloro-1,1,2,2-tetrafluoroethane	14	14.1		ug/m3		101	60 - 140
1,2-Dichlorobenzene	12	11.7		ug/m3		97	70 - 130
1,2-Dichloroethane	8.1	8.81		ug/m3		109	70 - 130

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 140-1925/1002
Matrix: Air
Analysis Batch: 1925

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloropropane	9.2	9.99		ug/m3		108	70 - 130
1,3,5-Trimethylbenzene	9.8	11.3		ug/m3		114	70 - 130
1,3-Dichlorobenzene	12	12.4		ug/m3		103	70 - 130
1,4-Dichlorobenzene	12	12.4		ug/m3		103	70 - 130
Benzene	6.4	7.01		ug/m3		110	70 - 130
Benzyl chloride	10	11.1		ug/m3		107	70 - 130
Bromomethane	7.8	7.56		ug/m3		97	70 - 130
Carbon tetrachloride	13	15.0		ug/m3		120	70 - 130
Chlorobenzene	9.2	9.56		ug/m3		104	70 - 130
Chloroethane	5.3	5.27		ug/m3		100	70 - 130
Chloroform	9.8	10.5		ug/m3		107	70 - 130
Chloromethane	4.1	4.00		ug/m3		97	60 - 140
cis-1,2-Dichloroethene	7.9	8.78		ug/m3		111	70 - 130
cis-1,3-Dichloropropene	9.1	9.68		ug/m3		107	70 - 130
Dichlorodifluoromethane	9.9	10.0		ug/m3		101	60 - 140
Ethylbenzene	8.7	9.72		ug/m3		112	70 - 130
1,2-Dibromoethane (EDB)	15	17.1		ug/m3		111	70 - 130
Hexachlorobutadiene	21	21.4		ug/m3		100	60 - 140
Methylene Chloride	7.0	7.94		ug/m3		114	70 - 130
m-Xylene & p-Xylene	17	19.0		ug/m3		109	70 - 130
o-Xylene	8.7	9.61		ug/m3		111	70 - 130
Styrene	8.5	10.0		ug/m3		118	70 - 130
Tetrachloroethene	14	13.9		ug/m3		103	70 - 130
Toluene	7.5	8.71		ug/m3		116	70 - 130
trans-1,3-Dichloropropene	9.1	9.58		ug/m3		106	70 - 130
Trichloroethene	11	11.2		ug/m3		104	70 - 130
Trichlorofluoromethane	11	11.6		ug/m3		103	60 - 140
Vinyl chloride	5.1	5.24		ug/m3		102	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*102*		*60 - 140*

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Air - GC/MS VOA

Analysis Batch: 1925

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-2295-1	WAA-01-SU-PS-20141106	Total/NA	Air	TO-15	
140-2295-2	WAA-02-SU-PS-20141106	Total/NA	Air	TO-15	
140-2295-3	WAA-03-SU-PS-20141106	Total/NA	Air	TO-15	
140-2295-4	WAA-04-SU-PS-20141106	Total/NA	Air	TO-15	
140-2295-5	WAA-05-SU-PS-20141106	Total/NA	Air	TO-15	
140-2295-6	WAA-01-SU-DU-20141106	Total/NA	Air	TO-15	
140-2295-7	WAA-00-SU-TB-20141106	Total/NA	Air	TO-15	
LCS 140-1925/1002	Lab Control Sample	Total/NA	Air	TO-15	
MB 140-1925/5	Method Blank	Total/NA	Air	TO-15	

Lab Chronicle

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-01-SU-PS-20141106 — Lab Sample ID: 140-2295-1

Date Collected: 11/06/14 14:13 — **Matrix: Air**
Date Received: 11/11/14 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1925	11/12/14 18:17	AFB	TAL KNX
	Instrument ID: MG									

Client Sample ID: WAA-02-SU-PS-20141106 — Lab Sample ID: 140-2295-2

Date Collected: 11/06/14 13:06 — **Matrix: Air**
Date Received: 11/11/14 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1925	11/12/14 18:59	AFB	TAL KNX
	Instrument ID: MG									

Client Sample ID: WAA-03-SU-PS-20141106 — Lab Sample ID: 140-2295-3

Date Collected: 11/06/14 13:41 — **Matrix: Air**
Date Received: 11/11/14 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1925	11/12/14 19:46	AFB	TAL KNX
	Instrument ID: MG									

Client Sample ID: WAA-04-SU-PS-20141106 — Lab Sample ID: 140-2295-4

Date Collected: 11/06/14 13:57 — **Matrix: Air**
Date Received: 11/11/14 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1925	11/12/14 22:37	AFB	TAL KNX
	Instrument ID: MG									

Client Sample ID: WAA-05-SU-PS-20141106 — Lab Sample ID: 140-2295-5

Date Collected: 11/06/14 13:24 — **Matrix: Air**
Date Received: 11/11/14 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1925	11/12/14 23:23	AFB	TAL KNX
	Instrument ID: MG									

Client Sample ID: WAA-01-SU-DU-20141106 — Lab Sample ID: 140-2295-6

Date Collected: 11/06/14 14:13 — **Matrix: Air**
Date Received: 11/11/14 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1925	11/13/14 00:53	AFB	TAL KNX
	Instrument ID: MG									

Lab Chronicle

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Client Sample ID: WAA-00-SU-TB-20141106

Lab Sample ID: 140-2295-7

Date Collected: 11/06/14 14:13

Matrix: Air

Date Received: 11/11/14 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	1925	11/12/14 17:33	AFB	TAL KNX
	Instrument ID: MG									

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Certification Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Laboratory: TestAmerica Knoxville

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

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		N/A	
Arkansas DEQ	State Program	6	88-0688	06-17-15
California	State Program	9	2423	06-30-16
Colorado	State Program	8	N/A	02-28-15
Connecticut	State Program	1	PH-0223	09-30-15
Florida	NELAP	4	E87177	06-30-15
Georgia	State Program	4	906	04-13-17
Hawaii	State Program	9	N/A	04-13-15
Kansas	NELAP	7	E-10349	01-31-15
Kentucky (DW)	State Program	4	90101	12-31-14
L-A-B	DoD ELAP		L2311	02-13-16
Louisiana	NELAP	6	83979	06-30-15
Maryland	State Program	3	277	03-31-15
Michigan	State Program	5	9933	04-13-17
Nevada	State Program	9	TN00009	07-31-15
New Jersey	NELAP	2	TN001	06-30-15
New York	NELAP	2	10781	03-31-15
North Carolina (DW)	State Program	4	21705	07-31-15
Ohio VAP	State Program	5	CL0059	03-26-15
Oklahoma	State Program	6	9415	08-31-15
Pennsylvania	NELAP	3	68-00576	12-31-14
South Carolina	State Program	4	84001	06-30-15
Tennessee	State Program	4	2014	04-13-17
Texas	NELAP	6	T104704380-TX	08-31-15
USDA	Federal		P330-13-00260	08-29-16
Utah	NELAP	8	QUAN3	07-31-15
Virginia	NELAP	3	460176	09-14-15
Virginia	State Program	3	165	06-30-15
Washington	State Program	10	C593	01-19-15
West Virginia (DW)	State Program	3	9955C	12-31-14
West Virginia DEP	State Program	3	345	04-30-15
Wisconsin	State Program	5	998044300	08-31-15

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill

TestAmerica Job ID: 140-2295-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-2295-1	WAA-01-SU-PS-20141106	Air	11/06/14 14:13	11/11/14 08:40
140-2295-2	WAA-02-SU-PS-20141106	Air	11/06/14 13:06	11/11/14 08:40
140-2295-3	WAA-03-SU-PS-20141106	Air	11/06/14 13:41	11/11/14 08:40
140-2295-4	WAA-04-SU-PS-20141106	Air	11/06/14 13:57	11/11/14 08:40
140-2295-5	WAA-05-SU-PS-20141106	Air	11/06/14 13:24	11/11/14 08:40
140-2295-6	WAA-01-SU-DU-20141106	Air	11/06/14 14:13	11/11/14 08:40
140-2295-7	WAA-00-SU-TB-20141106	Air	11/06/14 14:13	11/11/14 08:40

TestAmerica Knoxville
5815 Middlebrook Pike

Knoxville, TN 37921
phone 865.291.3000 fax 865.584.4315

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information	**Project Manager: Dave Kinroth**	**Samples Collected By: Dave Kinroth**	COC No:
Company Name: Tetra Tech Inc.	**Phone: 314-517-6798**		_____ of _____ COCs
Address: 415 Oak Street	**Email: emily.fisher@tetratech.com**		
City/State/Zip: Kansas City, MO 64106			**For Lab Use Only:**
Phone: 816-412-1755	**Site Contact: Dave Kinroth - 314-517-6787**		Walk-in Client:
FAX: 816-410-1748	**TA Contact: Emily Fisher/Rob Monnig**		Lab Sampling:
Project Name: West Lake Landfill	**Anaylsis Turnaround Time**		
Site/Location: Bridgeton, MO	Standard (Specific): 10 days		Job / SDG No.:
P O # 1105352	Rush (Specifiy):		(See below for Add'l Items)

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, 'Hg (Start)'	Canister Vacuum in Field, 'Hg (Stop)'	Flow Controller ID	Canister ID	TO-15 (Med / Std / Low / SIM)	MA-APH	EPA 3C	EPA 25C / 25.3	ASTM D-1946 / 1945 / 3588	EPA 15/16	TO-3	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)	Sample Specific Notes:
WAA-01-SU-PS-20141106	11/5/14 - 11/6/14	14:30	14:13	-29.2	-4.0	09653	09605	X										X				
WAA-02-SU-PS-20141106	11/5/14 - 11/6/14	13:50	13:06	-29.2	-3.0	10149	10826	X										X				
WAA-03-SU-PS-20141106	11/5/14 - 11/6/14	14:11	13:41	-29.2	-2.5	10140	34001420	X										X				
WAA-04-SU-PS-20141106	11/5/14 - 11/6/14	14:20	13:57	-29.2	-2.0	10657	10248	X										X				
WAA-05-SU-PS-20141106	11/5/14 - 11/6/14	14:00	13:24	-29.2	-3.0	10163	10512	X										X				
WAA-01-SU-DU-20141106	11/5/14 - 11/6/14	14:30	14:13	-29.1	-4.0	09866	10727	X										X				
WAA-00-SU-TB-20141106	11/5/14 - 11/6/14	13:50	14:13	-29.2	-29.2	11054	09876	X										X				

140-2295 Chain of Custody

Temperature (Fahrenheit)	Interior	Ambient
Start		61
Stop		50

Pressure (inches of Hg)	Interior	Ambient
Start		30.16
Stop		30.21

Received @ ambient, 2 boxes, No custody seals
Fedex PO, trk# 5399 0208 7172, KW 11/11/14
" " 7161

Special Instructions/QC Requirements & Comments:

Samples Shipped by:	**Date / Time:**	**Samples Received by:**	7 cans
Samples Relinquished by: Dave Kinroth	**Date / Time:** 11-10-14 1:29	**Received by:** [signature] 11-10-14 1329	7 flows
Relinquished by: [signature]	**Date / Time:** 11-10-14 1329	**Received by:**	7 cc
Lab Use Only: **Shipper Name:**	**Opened by:**	**Condition:**	

Form No. CA-C-WI-003, Rev. 1.1, dated 05/14/2013

11/25/2014
WLLFOIA4312 - 015 - 0155370

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 140-2295-1

Login Number: 2295

List Source: TestAmerica Knoxville

List Number: 1

Creator: Wilson, Ken

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
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.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	N/A	This is checked in the lab.
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	N/A	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	

TestAmerica Knoxville - Air Canister Initial Pressure Check

Gauge ID: G1

Analyst	Date	Sample ID	6 L	1 L	Pressure @ Receipt (-in Hg or +psig)	Time	Comments
HMT	11/11/2014	140-2295-A-1	x		-2.6	13:26	
HMT	11/11/2014	140-2295-A-2	x		-2.2	13:27	
HMT	11/11/2014	140-2295-A-3	x		-2.2	13:28	
HMT	11/11/2014	140-2295-A-4	x		-1.3	13:29	
HMT	11/11/2014	140-2295-A-5	x		-1.6	13:30	
HMT	11/11/2014	140-2295-A-6	x		-2.2	13:31	
HMT	11/11/2014	140-2295-A-7	x		-28.9	-28.9	TB pressed up to 10

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	November 12, 2014
Sample Delivery Group (SDG):	J8366
Sample Numbers:	WAA-01-AF-PS-20140911, WAA-02-AF-PS-20140911, WAA-03-AF-PS-20140911, WAA-04-AF-PS-20140911, WAA-05-AF-PS-20140911, and WAA-00-AF-FB-20140911
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) and the EPA and others document "Multi-Agency Radiological Laboratory Analytical Protocols Manual" (July 2004) were used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.

I, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

12 November 2014

Certified by Harry Ellis, Chemist

Date

WLLFOIA4312 - 015 - 0155373

DATA VALIDATION QUALIFIERS

U — The analyte was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

WLLFOIA4312 - 015 - 0155374

DATA ASSESSMENT

Sample delivery group (SDG) J8366 included five (5) environmental air (filter) samples and one (1) QC sample (a field blank). Samples were analyzed for total alpha-emitting radium by EPA SW-846 Method 9315 and for isotopic (alpha-emitting) thorium and uranium by Department of Energy (DOE) Method A-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Insufficient sample was available for MS/MSD analyses. Duplicate LCS analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded a low activity for one (of three) thorium isotope and none of the three uranium isotopes. The field blank yielded a greater activity for the same thorium isotope and a low activity for one uranium isotope. The blank activity was similar to those seen in the other field samples. No qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries and the relative percent differences from the duplicate LCS analyses were within established control limits. No qualifications were applied.

V. Surrogates

These radioanalytical methods use a "carrier" or "tracer", whose recovery serves the same functions as surrogate recoveries. All carrier and tracer recoveries were within the laboratory's QC limits. No qualifications were applied.

VI. Comments

Almost all detected results were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with few qualifications applied. All data are usable as qualified for their intended purposes.

WLLFOIA4312 - 015 - 0155375

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TestAmerica

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-8366-1
Client Project/Site: West Lake Landfill - Filters

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
10/13/2014 10:36:57 AM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Tracer Carrier Summary 18

Job ID: 160-8366-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-8366-1

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 9/15/2014 1:30 PM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

TOTAL ALPHA RADIUM (GFPC)

Samples WAA-01-AF-PS-20140911 (160-8366-1), WAA-02-AF-PS-20140911 (160-8366-2), WAA-03-AF-PS-20140911 (160-8366-3), WAA-04-AF-PS-20140911 (160-8366-4), WAA-05-AF-PS-20140911 (160-8366-5) and WAA-00-AF-FB-20140911 (160-8366-6) were analyzed for Total Alpha Radium (GFPC) in accordance with SW- 846 Method 9315. The samples were prepared on 09/29/2014 and analyzed on 10/01/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). Samples are filters that are to be split among different analyses. A LCS/LCSD was used instead of a sample duplicate.

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

Job ID: 160-8366-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20140911 (160-8366-1), WAA-02-AF-PS-20140911 (160-8366-2), WAA-03-AF-PS-20140911 (160-8366-3), WAA-04-AF-PS-20140911 (160-8366-4), WAA-05-AF-PS-20140911 (160-8366-5) and WAA-00-AF-FB-20140911 (160-8366-6) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared on 09/26/2014 and analyzed on 09/30/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). Samples are filters that are to be split among different analyses. A LCS/LCSD was used instead of a sample duplicate.

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

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20140911 (160-8366-1), WAA-02-AF-PS-20140911 (160-8366-2), WAA-03-AF-PS-20140911 (160-8366-3), WAA-04-AF-PS-20140911 (160-8366-4), WAA-05-AF-PS-20140911 (160-8366-5) and WAA-00-AF-FB-20140911 (160-8366-6) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared on 09/26/2014 and analyzed on 09/30/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with batch 146177.Samples are filters that are to be split among different analyses. A LCS/LCSD was used instead of a sample duplicate.

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

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Dave Kinroth	Site Contact: Dave Kinroth	Date: 9-15-14	COC No:
Tetra Tech, Inc.	Tel/Fax: 314-517-6798	Lab Contact: Mike Franks	Carrier: NA	1 of 1 COCs
415 Oak Street	Analysis Turnaround Time			Sampler:
Kansas City, MO 64106	☐ CALENDAR DAYS ☑ WORKING DAYS			For Lab Use Only:
(816) 412-1786 Phone	TAT if different from Below 20			Walk-in Client:
(816) 816-410-1748 FAX	☐ 2 weeks			Lab Sampling:
Project Name: West Lake Landfill Site	☐ 1 week			
Site: Bridgeton, MO	☐ 2 days			Job / SDG No.:
P O # 1105610	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	9310 Gross Alpha/Beta	GA-01-R Gamm Spec	9315 Total Alpha Radium	A-01-R Isotopic Thorium	A-01-R Isotopic Uranium	* 9315 Radium-226 (GFPC)	Sample Specific Notes:
WAA-01-AF-PS-20140911	9/11/14	10:25	Filter	Air	1			X	X	X	X	X	X	* 9315 Radium-226 (GFPC)
WAA-02-AF-PS-20140911	9/11/14	11:30	Filter	Air	1			X	X	X	X	X	X	contingent upon TAR results
WAA-03-AF-PS-20140911	9/11/14	12:00	Filter	Air	1			X	X	X	X	X	X	for all samples
WAA-04-AF-PS-20140911	9/11/14	12:13	Filter	Air	1			X	X	X	X	X	X	
WAA-05-AF-PS-20140911	9/11/14	11:45	Filter	Air	1			X	X	X	X	X	X	
WAA-00-AF-FB-20140911	9/11/14	NA	Filter	Air	1			X	X	X	X	X	X	

160-8366 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Dave Kinroth	Tetra Tech START	9-15-14	[illegible]	TA Stl	9-15-14 / 1330
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

WLLFOIA4312 - 015 - 0155381
10/13/2014

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-8366-1

Login Number: 8366

List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian J

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.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8366-1

Qualifiers

Rad

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

Glossary

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

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8366-1

Method	Method Description	Protocol	Laboratory
9315	Total Apha Radium (GFPC)	SW846	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	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: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8366-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-8366-1	WAA-01-AF-PS-20140911	Filter	09/11/14 10:25	09/15/14 13:30
160-8366-2	WAA-02-AF-PS-20140911	Filter	09/11/14 11:30	09/15/14 13:30
160-8366-3	WAA-03-AF-PS-20140911	Filter	09/11/14 12:00	09/15/14 13:30
160-8366-4	WAA-04-AF-PS-20140911	Filter	09/11/14 12:13	09/15/14 13:30
160-8366-5	WAA-05-AF-PS-20140911	Filter	09/11/14 11:45	09/15/14 13:30
160-8366-6	WAA-00-AF-FB-20140911	Filter	09/11/14 00:00	09/15/14 13:30

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8366-1

Client Sample ID: WAA-01-AF-PS-20140911

Date Collected: 09/11/14 10:25
Date Received: 09/15/14 13:30

Lab Sample ID: 160-8366-1
Matrix: Filter

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.409	U	0.505	0.507	1.00	0.837	pCi/Sample	09/29/14 13:42	10/01/14 10:06	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	103		40 - 110	09/29/14 13:42	10/01/14 10:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0238	U	0.104	0.104	1.00	0.189	pCi/Sample	09/26/14 10:04	09/30/14 19:06	1
Thorium-230	0.429	J	0.118	0.123	1.00	0.0596	pCi/Sample	09/26/14 10:04	09/30/14 19:06	1
Thorium-232	0.0310	J	0.0310	0.0311	1.00	0.0232	pCi/Sample	09/26/14 10:04	09/30/14 19:06	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	94.1		30 - 110	09/26/14 10:04	09/30/14 19:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0593	U	0.0698	0.0700	1.00	0.113	pCi/Sample	09/26/14 10:04	09/30/14 19:13	1
Uranium-235/236	0.0316	J	0.0365	0.0366	1.00	0.0316	pCi/Sample	09/26/14 10:04	09/30/14 19:13	1
Uranium-238	0.0592	J	0.0447	0.0450	1.00	0.0254	pCi/Sample	09/26/14 10:04	09/30/14 19:13	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	86.6		30 - 110	09/26/14 10:04	09/30/14 19:13	1

Client Sample ID: WAA-02-AF-PS-20140911

Date Collected: 09/11/14 11:30
Date Received: 09/15/14 13:30

Lab Sample ID: 160-8366-2
Matrix: Filter

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.370	U	0.412	0.413	1.00	0.671	pCi/Sample	09/29/14 13:42	10/01/14 10:07	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110	09/29/14 13:42	10/01/14 10:07	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.300	U	0.238	0.239	1.00	0.369	pCi/Sample	09/26/14 10:04	09/30/14 19:06	1
Thorium-230	0.751	J	0.215	0.225	1.00	0.114	pCi/Sample	09/26/14 10:04	09/30/14 19:06	1
Thorium-232	0.104	J	0.0783	0.0788	1.00	0.0444	pCi/Sample	09/26/14 10:04	09/30/14 19:06	1

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TestAmerica St. Louis

10/13/2014

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8366-1

Client Sample ID: WAA-02-AF-PS-20140911

Date Collected: 09/11/14 11:30
Date Received: 09/15/14 13:30

Lab Sample ID: 160-8366-2
Matrix: Filter

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	48.6		30 - 110	09/26/14 10:04	09/30/14 19:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.103	J	0.0727	0.0732	1.00	0.0948	pCi/Sample	09/26/14 10:04	09/30/14 19:13	1
Uranium-235/236	0.000	U	0.0302	0.0302	1.00	0.0816	pCi/Sample	09/26/14 10:04	09/30/14 19:13	1
Uranium-238	0.0684	J	0.0541	0.0544	1.00	0.0655	pCi/Sample	09/26/14 10:04	09/30/14 19:13	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	86.3		30 - 110	09/26/14 10:04	09/30/14 19:13	1

Client Sample ID: WAA-03-AF-PS-20140911

Date Collected: 09/11/14 12:00
Date Received: 09/15/14 13:30

Lab Sample ID: 160-8366-3
Matrix: Filter

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.367	U	0.373	0.374	1.00	0.591	pCi/Sample	09/29/14 13:42	10/01/14 10:07	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	101		40 - 110	09/29/14 13:42	10/01/14 10:07	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.115	U	0.115	0.116	1.00	0.186	pCi/Sample	09/26/14 10:04	09/30/14 19:06	1
Thorium-230	0.476	J	0.121	0.127	1.00	0.0230	pCi/Sample	09/26/14 10:04	09/30/14 19:06	1
Thorium-232	0.0685	J	0.0505	0.0508	1.00	0.0583	pCi/Sample	09/26/14 10:04	09/30/14 19:06	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	92.7		30 - 110	09/26/14 10:04	09/30/14 19:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.102	J	0.0638	0.0644	1.00	0.0653	pCi/Sample	09/26/14 10:04	09/30/14 19:13	1
Uranium-235/236	0.0106	U	0.0212	0.0212	1.00	0.0318	pCi/Sample	09/26/14 10:04	09/30/14 19:13	1
Uranium-238	0.0851	J	0.0590	0.0594	1.00	0.0651	pCi/Sample	09/26/14 10:04	09/30/14 19:13	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	83.7		30 - 110	09/26/14 10:04	09/30/14 19:13	1

HU E 12 Nov 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8366-1

Client Sample ID: WAA-04-AF-PS-20140911

Date Collected: 09/11/14 12:13
Date Received: 09/15/14 13:30

Lab Sample ID: 160-8366-4
Matrix: Filter

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.0564	U	0.360	0.360	1.00	0.679	pCi/Sample	09/29/14 13:42	10/01/14 10:08	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110	09/29/14 13:42	10/01/14 10:08	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.117	U	0.0975	0.0980	1.00	0.148	pCi/Sample	09/26/14 10:05	09/30/14 19:06	1
Thorium-230	0.553	J	0.138	0.146	1.00	0.0640	pCi/Sample	09/26/14 10:05	09/30/14 19:06	1
Thorium-232	0.0416	J	0.0372	0.0374	1.00	0.0250	pCi/Sample	09/26/14 10:05	09/30/14 19:06	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	85.2		30 - 110	09/26/14 10:05	09/30/14 19:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0492	U	0.0696	0.0697	1.00	0.118	pCi/Sample	09/26/14 10:05	09/30/14 19:13	1
Uranium-235/236	0.0153	U	0.0306	0.0306	1.00	0.0459	pCi/Sample	09/26/14 10:05	09/30/14 19:13	1
Uranium-238	0.0491	J	0.0491	0.0493	1.00	0.0368	pCi/Sample	09/26/14 10:05	09/30/14 19:13	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	60.6		30 - 110	09/26/14 10:05	09/30/14 19:13	1

Client Sample ID: WAA-05-AF-PS-20140911

Date Collected: 09/11/14 11:45
Date Received: 09/15/14 13:30

Lab Sample ID: 160-8366-5
Matrix: Filter

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.455	U	0.401	0.403	1.00	0.615	pCi/Sample	09/29/14 13:42	10/01/14 10:08	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	100		40 - 110	09/29/14 13:42	10/01/14 10:08	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0951	U	0.119	0.119	1.00	0.197	pCi/Sample	09/26/14 10:05	09/30/14 19:06	1
Thorium-230	0.460	J	0.131	0.136	1.00	0.0829	pCi/Sample	09/26/14 10:05	09/30/14 19:06	1
Thorium-232	0.0430	U	0.0571	0.0572	1.00	0.0952	pCi/Sample	09/26/14 10:05	09/30/14 19:06	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	85.8		30 - 110	09/26/14 10:05	09/30/14 19:06	1

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12 Nov 14

TestAmerica St. Louis

10/13/2014

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8366-1

Client Sample ID: WAA-05-AF-PS-20140911

Lab Sample ID: 160-8366-5
Matrix: Filter

Date Collected: 09/11/14 11:45
Date Received: 09/15/14 13:30

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0961	J	0.0630	0.0635	1.00	0.0669	pCi/Sample	09/26/14 10:05	09/30/14 19:13	1
Uranium-235/236	0.0109	U	0.0377	0.0377	1.00	0.0832	pCi/Sample	09/26/14 10:05	09/30/14 19:13	1
Uranium-238	0.122	J	0.0652	0.0660	1.00	0.0262	pCi/Sample	09/26/14 10:05	09/30/14 19:13	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*80.8*		*30 - 110*	*09/26/14 10:05*	*09/30/14 19:13*	*1*

Client Sample ID: WAA-00-AF-FB-20140911

Lab Sample ID: 160-8366-6
Matrix: Filter

Date Collected: 09/11/14 00:00
Date Received: 09/15/14 13:30

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.218	U	0.407	0.407	1.00	0.711	pCi/Sample	09/29/14 13:42	10/01/14 10:08	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*103*		*40 - 110*	*09/29/14 13:42*	*10/01/14 10:08*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.211	U	0.304	0.305	1.00	0.513	pCi/Sample	09/26/14 10:05	09/30/14 19:06	1
Thorium-230	1.04		0.302	0.315	1.00	0.161	pCi/Sample	09/26/14 10:05	09/30/14 19:06	1
Thorium-232	0.00892	U	0.136	0.136	1.00	0.281	pCi/Sample	09/26/14 10:05	09/30/14 19:06	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*34.7*		*30 - 110*	*09/26/14 10:05*	*09/30/14 19:06*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0877	J	0.0646	0.0650	1.00	0.0746	pCi/Sample	09/26/14 10:05	09/30/14 19:13	1
Uranium-235/236	-0.0121	U	0.0420	0.0420	1.00	0.116	pCi/Sample	09/26/14 10:05	09/30/14 19:13	1
Uranium-238	0.0486	U	0.0514	0.0516	1.00	0.0744	pCi/Sample	09/26/14 10:05	09/30/14 19:13	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*73.1*		*30 - 110*	*09/26/14 10:05*	*09/30/14 19:13*	*1*

HUF 12 Nov 14

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8366-1

Method: 9315 - Total Apha Radium (GFPC)

Lab Sample ID: MB 160-146509/1-A
Matrix: Filter
Analysis Batch: 146821

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 146509

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.4351	U	0.427	0.429	1.00	0.675	pCi/Sample	09/29/14 13:42	10/01/14 10:05	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*96.2*		*40 - 110*	*09/29/14 13:42*	*10/01/14 10:05*	*1*

Lab Sample ID: LCS 160-146509/2-A
Matrix: Filter
Analysis Batch: 146821

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 146509

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Total Alpha Radium			45.0	41.08		4.50	1.00	1.00	pCi/Samp	91	65 - 150		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*96.5*		*40 - 110*

Lab Sample ID: LCSD 160-146509/3-A
Matrix: Filter
Analysis Batch: 146821

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 146509

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Total Alpha Radium			45.0	41.23		4.48	1.00	0.633	pCi/Samp	92	65 - 150	0.02	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*99.1*		*40 - 110*

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

Lab Sample ID: MB 160-146176/1-A
Matrix: Filter
Analysis Batch: 146716

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 146176

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0000	U	0.0937	0.0937	1.00	0.179	pCi/Sample	09/26/14 10:04	09/30/14 19:06	1
Thorium-230	0.3720		0.111	0.115	1.00	0.0249	pCi/Sample	09/26/14 10:04	09/30/14 19:06	1
Thorium-232	0.01649	U	0.0330	0.0330	1.00	0.0631	pCi/Sample	09/26/14 10:04	09/30/14 19:06	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.1*		*30 - 110*	*09/26/14 10:04*	*09/30/14 19:06*	*1*

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

Lab Sample ID: LCS 160-146176/2-A
Matrix: Filter
Analysis Batch: 146717

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 146176

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			17.3	19.86		1.85	1.00	0.0629	pCi/Samp	115	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*84.1*		*30 - 110*

Lab Sample ID: LCSD 160-146176/3-A
Matrix: Filter
Analysis Batch: 146718

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 146176

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Thorium-230			17.3	19.00		1.79	1.00	0.0643	pCi/Samp	110	81 - 118	0.24	1

Tracer	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Thorium-229	*84.9*		*30 - 110*

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

Lab Sample ID: MB 160-146177/1-A
Matrix: Filter
Analysis Batch: 146747

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 146177

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.06260	U	0.0593	0.0595	1.00	0.0857	pCi/Sample	09/26/14 10:04	09/30/14 19:13	1
Uranium-235/236	0.01113	U	0.0498	0.0498	1.00	0.107	pCi/Sample	09/26/14 10:04	09/30/14 19:13	1
Uranium-238	0.02677	U	0.0309	0.0310	1.00	0.0268	pCi/Sample	09/26/14 10:04	09/30/14 19:13	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*79.3*		*30 - 110*	*09/26/14 10:04*	*09/30/14 19:13*	*1*

Lab Sample ID: LCS 160-146177/2-A
Matrix: Filter
Analysis Batch: 146748

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 146177

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-233/234			25.5	25.82		2.37	1.00	0.0980	pCi/Samp	101	84 - 120		
Uranium-238			26.0	26.10		2.39	1.00	0.0677	pCi/Samp	100	82 - 122		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*77.6*		*30 - 110*

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8366-1

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

Lab Sample ID: LCSD 160-146177/3-A
Matrix: Filter
Analysis Batch: 146749

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 146177

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Uranium-233/234			25.5	25.15		2.32	1.00	0.0885	pCi/Samp	99	84 - 120	0.14	1
Uranium-238			26.0	26.33		2.42	1.00	0.0706	pCi/Samp	101	82 - 122	0.05	1

Tracer	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Uranium-232	*77.6*		*30 - 110*

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8366-1

Rad

Prep Batch: 146176

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8366-1	WAA-01-AF-PS-20140911	Total/NA	Filter	ExtChrom	
160-8366-2	WAA-02-AF-PS-20140911	Total/NA	Filter	ExtChrom	
160-8366-3	WAA-03-AF-PS-20140911	Total/NA	Filter	ExtChrom	
160-8366-4	WAA-04-AF-PS-20140911	Total/NA	Filter	ExtChrom	
160-8366-5	WAA-05-AF-PS-20140911	Total/NA	Filter	ExtChrom	
160-8366-6	WAA-00-AF-FB-20140911	Total/NA	Filter	ExtChrom	
LCS 160-146176/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
LCSD 160-146176/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-146176/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Prep Batch: 146177

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8366-1	WAA-01-AF-PS-20140911	Total/NA	Filter	ExtChrom	
160-8366-2	WAA-02-AF-PS-20140911	Total/NA	Filter	ExtChrom	
160-8366-3	WAA-03-AF-PS-20140911	Total/NA	Filter	ExtChrom	
160-8366-4	WAA-04-AF-PS-20140911	Total/NA	Filter	ExtChrom	
160-8366-5	WAA-05-AF-PS-20140911	Total/NA	Filter	ExtChrom	
160-8366-6	WAA-00-AF-FB-20140911	Total/NA	Filter	ExtChrom	
LCS 160-146177/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
LCSD 160-146177/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-146177/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Prep Batch: 146509

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8366-1	WAA-01-AF-PS-20140911	Total/NA	Filter	DPS-0	
160-8366-2	WAA-02-AF-PS-20140911	Total/NA	Filter	DPS-0	
160-8366-3	WAA-03-AF-PS-20140911	Total/NA	Filter	DPS-0	
160-8366-4	WAA-04-AF-PS-20140911	Total/NA	Filter	DPS-0	
160-8366-5	WAA-05-AF-PS-20140911	Total/NA	Filter	DPS-0	
160-8366-6	WAA-00-AF-FB-20140911	Total/NA	Filter	DPS-0	
LCS 160-146509/2-A	Lab Control Sample	Total/NA	Filter	DPS-0	
LCSD 160-146509/3-A	Lab Control Sample Dup	Total/NA	Filter	DPS-0	
MB 160-146509/1-A	Method Blank	Total/NA	Filter	DPS-0	

Tracer/Carrier Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8366-1

Method: 9315 - Total Apha Radium (GFPC)

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

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(40-110)
160-8366-1	WAA-01-AF-PS-20140911	103
160-8366-2	WAA-02-AF-PS-20140911	104
160-8366-3	WAA-03-AF-PS-20140911	101
160-8366-4	WAA-04-AF-PS-20140911	104
160-8366-5	WAA-05-AF-PS-20140911	100
160-8366-6	WAA-00-AF-FB-20140911	103
LCS 160-146509/2-A	Lab Control Sample	96.5
LCSD 160-146509/3-A	Lab Control Sample Dup	99.1
MB 160-146509/1-A	Method Blank	96.2

Tracer/Carrier Legend

Ba = Ba Carrier

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

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

		Percent Yield (Acceptance Limits)
		Th-229
Lab Sample ID	Client Sample ID	(30-110)
160-8366-1	WAA-01-AF-PS-20140911	94.1
160-8366-2	WAA-02-AF-PS-20140911	48.6
160-8366-3	WAA-03-AF-PS-20140911	92.7
160-8366-4	WAA-04-AF-PS-20140911	85.2
160-8366-5	WAA-05-AF-PS-20140911	85.8
160-8366-6	WAA-00-AF-FB-20140911	34.7
LCS 160-146176/2-A	Lab Control Sample	84.1
LCSD 160-146176/3-A	Lab Control Sample Dup	84.9
MB 160-146176/1-A	Method Blank	85.1

Tracer/Carrier Legend

Th-229 = Thorium-229

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

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

		Percent Yield (Acceptance Limits)
		U-232
Lab Sample ID	Client Sample ID	(30-110)
160-8366-1	WAA-01-AF-PS-20140911	86.6
160-8366-2	WAA-02-AF-PS-20140911	86.3
160-8366-3	WAA-03-AF-PS-20140911	83.7
160-8366-4	WAA-04-AF-PS-20140911	60.6
160-8366-5	WAA-05-AF-PS-20140911	80.8
160-8366-6	WAA-00-AF-FB-20140911	73.1
LCS 160-146177/2-A	Lab Control Sample	77.6
LCSD 160-146177/3-A	Lab Control Sample Dup	77.6
MB 160-146177/1-A	Method Blank	79.3

Tracer/Carrier Legend

U-232 = Uranium-232

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	November 13, 2014
Sample Delivery Group (SDG):	J8468
Sample Numbers:	WAA-01-AF-PS-20140917, WAA-02-AF-PS-20140917, WAA-03-AF-PS-20140917, WAA-04-AF-PS-20140917, WAA-05-AF-PS-20140917, and WAA-00-AF-FB-20140917
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) and the EPA and others document "Multi-Agency Radiological Laboratory Analytical Protocols Manual" (July 2004) were used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.

I, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

13 October 2014

Certified by Harry Ellis, Chemist

Date

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DATA VALIDATION QUALIFIERS

U — The analyte was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

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DATA ASSESSMENT

Sample delivery group (SDG) J8468 included five (5) environmental air (filter) samples and one (1) QC samples (a field blank). Samples were analyzed for gross alpha and beta radiation by EPA SW-846 Method 9310 and for cesium-137 and other gamma-emitters by Department of Energy (DOE) Method Ga-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. LCS and duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blanks yielded a low activity of gross alpha. The similar activities in some field samples were qualified as laboratory contamination and flagged "U". The field blank yielded a low beta activity. The other field samples yielded more than 5 times the field blank beta activity, so no further qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analyses were within established control limits. No qualifications were applied.

V. Surrogates

Surrogates are not used in these radioanalytical methods.

VI. Comments

Some detected gross beta activities were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with no significant qualifications applied. All data are usable as qualified for their intended purposes.

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-8468-2
Client Project/Site: West Lake Landfill - Filters

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
9/30/2014 1:15:59 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 160-8468-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-8468-2

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 9/22/2014 12:52 PM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 21.3° C.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples WAA-01-AF-PS-20140917 (160-8468-1), WAA-02-AF-PS-20140917 (160-8468-2), WAA-03-AF-PS-20140917 (160-8468-3), WAA-04-AF-PS-20140917 (160-8468-4), WAA-05-AF-PS-20140917 (160-8468-5) and WAA-00-AF-FB-20140917 (160-8468-6) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with SW846 9310. The samples were prepared and analyzed on 09/24/2014.

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

RADIUM-226 & OTHER GAMMA EMITTERS (GS)

Samples WAA-01-AF-PS-20140917 (160-8468-1), WAA-02-AF-PS-20140917 (160-8468-2), WAA-03-AF-PS-20140917 (160-8468-3), WAA-04-AF-PS-20140917 (160-8468-4), WAA-05-AF-PS-20140917 (160-8468-5) and WAA-00-AF-FB-20140917 (160-8468-6) were

Job ID: 160-8468-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with GA-01-R. The samples were prepared on 09/24/2014 and analyzed on 09/25/2014 and 09/26/2014.

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

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Dave Kinroth	Site Contact: Dave Kinroth	Date: 9-18-14	COC No:
Tetra Tech, Inc.	Tel/Fax: 314-517-6798	Lab Contact: Mike Franks	Carrier: NA	1 of 1 COCs
415 Oak Street	Analysis Turnaround Time			Sampler:
Kansas City, MO 64106	☐ CALENDAR DAYS ☑ WORKING DAYS			For Lab Use Only:
(816) 412-1786 Phone	TAT if different from Below 20			Walk-in Client:
(816) 816-410-1748 FAX	☐ 2 weeks			Lab Sampling:
Project Name: West Lake Landfill Site	☐ 1 week			
Site: Bridgeton, MO	☐ 2 days			Job / SDG No.:
P O # 1105610	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	9310 Gross Alpha/Beta	GA-01-R Gamm Spec	9315 Total Alpha Radium	A-01-R Isotopic Thorium	A-01-R Isotopic Uranium	* 9315 Radium-226 (GFPC)	Sample Specific Notes:
WAA-01-AF-PS-20140917	9/17/14	10:57	Filter	Air	1			X	X	X	X	X	X	* 9315 Radium-226 (GFPC)
WAA-02-AF-PS-20140917	9/17/14	11:19	Filter	Air	1			X	X	X	X	X	X	contingent upon TAR results
WAA-03-AF-PS-20140917	9/17/14	11:49	Filter	Air	1			X	X	X	X	X	X	for all samples
WAA-04-AF-PS-20140917	9/17/14	12:05	Filter	Air	1			X	X	X	X	X	X	
WAA-05-AF-PS-20140917	9/17/14	11:33	Filter	Air	1			X	X	X	X	X	X	
WAA-00-AF-FB-20140917	9/17/14	NA	Filter	Air	1			X	X	X	X	X	X	

160-8468 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Dave Kinroth	Tetra Tech START	9-22-14 1252	[signature]	TA St Louis	9-22-14 / 1252
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

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Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-8468-2

Login Number: 8468

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8468-2

Qualifiers

Rad

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

Glossary

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

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8468-2

Method	Method Description	Protocol	Laboratory
9310	Gross Alpha / Beta (GFPC)	SW846	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	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: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8468-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-8468-1	WAA-01-AF-PS-20140917	Filter	09/17/14 10:57	09/22/14 12:52
160-8468-2	WAA-02-AF-PS-20140917	Filter	09/17/14 11:19	09/22/14 12:52
160-8468-3	WAA-03-AF-PS-20140917	Filter	09/17/14 11:49	09/22/14 12:52
160-8468-4	WAA-04-AF-PS-20140917	Filter	09/17/14 12:05	09/22/14 12:52
160-8468-5	WAA-05-AF-PS-20140917	Filter	09/17/14 11:33	09/22/14 12:52
160-8468-6	WAA-00-AF-FB-20140917	Filter	09/17/14 00:00	09/22/14 12:52

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8468-2

Client Sample ID: WAA-01-AF-PS-20140917

Date Collected: 09/17/14 10:57
Date Received: 09/22/14 12:52

Lab Sample ID: 160-8468-1
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.366	U	0.237	0.241	10.0	0.284	pCi/Sample	09/24/14 13:33	09/24/14 20:26	1
Gross Beta	11.8		0.985	1.54	10.0	0.409	pCi/Sample	09/24/14 13:33	09/24/14 20:26	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-0.601	U	4.93	4.93	20.0	9.02	pCi/Sample	09/24/14 13:36	09/25/14 17:16	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Be-7	*96.4*		*42.0*	*43.2*		*40.2*	*pCi/Sample*	*09/24/14 13:36*	*09/25/14 17:16*	*1*

Client Sample ID: WAA-02-AF-PS-20140917

Date Collected: 09/17/14 11:19
Date Received: 09/22/14 12:52

Lab Sample ID: 160-8468-2
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.272	U	0.223	0.225	10.0	0.311	pCi/Sample	09/24/14 13:33	09/24/14 20:26	1
Gross Beta	10.5		0.916	1.39	10.0	0.433	pCi/Sample	09/24/14 13:33	09/24/14 20:26	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-2.50	U	20.1	20.2	20.0	18.1	pCi/Sample	09/24/14 13:36	09/25/14 17:51	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*09/24/14 13:36*	*09/25/14 17:51*	*1*

Client Sample ID: WAA-03-AF-PS-20140917

Date Collected: 09/17/14 11:49
Date Received: 09/22/14 12:52

Lab Sample ID: 160-8468-3
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.463	U	0.255	0.260	10.0	0.269	pCi/Sample	09/24/14 13:33	09/24/14 20:26	1
Gross Beta	11.0		0.946	1.45	10.0	0.426	pCi/Sample	09/24/14 13:33	09/24/14 20:26	1

HUE 13 November 2014

TestAmerica St. Louis

9/30/2014

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8468-2

Client Sample ID: WAA-03-AF-PS-20140917

Date Collected: 09/17/14 11:49
Date Received: 09/22/14 12:52

Lab Sample ID: 160-8468-3
Matrix: Filter

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0.880	U	4.95	4.95	20.0	9.11	pCi/Sample	09/24/14 13:36	09/25/14 17:54	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*09/24/14 13:36*	*09/25/14 17:54*	*1*

Client Sample ID: WAA-04-AF-PS-20140917

Date Collected: 09/17/14 12:05
Date Received: 09/22/14 12:52

Lab Sample ID: 160-8468-4
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.341	U	0.243	0.246	10.0	0.316	pCi/Sample	09/24/14 13:33	09/24/14 20:26	1
Gross Beta	9.90	J	0.896	1.34	10.0	0.435	pCi/Sample	09/24/14 13:33	09/24/14 20:26	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-0.0667	U	3.15	3.15	20.0	6.22	pCi/Sample	09/24/14 13:36	09/25/14 18:31	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*09/24/14 13:36*	*09/25/14 18:31*	*1*

Client Sample ID: WAA-05-AF-PS-20140917

Date Collected: 09/17/14 11:33
Date Received: 09/22/14 12:52

Lab Sample ID: 160-8468-5
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.183	U	0.204	0.205	10.0	0.322	pCi/Sample	09/24/14 13:33	09/24/14 20:26	1
Gross Beta	9.59	J	0.886	1.31	10.0	0.425	pCi/Sample	09/24/14 13:33	09/24/14 20:26	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0.355	U	5.12	5.12	20.0	9.56	pCi/Sample	09/24/14 13:36	09/26/14 09:11	1

HUG 13 Nov 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8468-2

Client Sample ID: WAA-05-AF-PS-20140917

Date Collected: 09/17/14 11:33
Date Received: 09/22/14 12:52

Lab Sample ID: 160-8468-5
Matrix: Filter

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/Sample	09/24/14 13:36	09/26/14 09:11	1

Client Sample ID: WAA-00-AF-FB-20140917

Date Collected: 09/17/14 00:00
Date Received: 09/22/14 12:52

Lab Sample ID: 160-8468-6
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.00450	U	0.116	0.116	10.0	0.271	pCi/Sample	09/24/14 13:33	09/24/14 21:34	1
Gross Beta	1.62	J	0.422	0.453	10.0	0.446	pCi/Sample	09/24/14 13:33	09/24/14 21:34	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-8.00	U	320	320	20.0	14.8	pCi/Sample	09/24/14 13:36	09/25/14 18:45	1

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/Sample	09/24/14 13:36	09/25/14 18:45	1

HVG

13 Nov 14

TestAmerica St. Louis

9/30/2014

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8468-2

Method: 9310 - Gross Alpha / Beta (GFPC)

Lab Sample ID: MB 160-145866/1-A
Matrix: Filter
Analysis Batch: 145846

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 145866

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.3779		0.237	0.241	10.0	0.280	pCi/Sample	09/24/14 13:33	09/24/14 20:25	1
Gross Beta	0.09239	U	0.266	0.266	10.0	0.472	pCi/Sample	09/24/14 13:33	09/24/14 20:25	1

Lab Sample ID: LCS 160-145866/2-A
Matrix: Filter
Analysis Batch: 145846

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 145866

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Gross Alpha			5.37	5.427		1.00	10.0	0.271	pCi/Samp	101	75 - 125		

Lab Sample ID: LCSB 160-145866/3-A
Matrix: Filter
Analysis Batch: 145846

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 145866

Analyte			Spike Added	LCSB Result	LCSB Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Gross Beta			19.2	18.20		2.18	10.0	0.450	pCi/Samp	95	75 - 125		

Lab Sample ID: 160-8468-1 DU
Matrix: Filter
Analysis Batch: 145846

Client Sample ID: WAA-01-AF-PS-20140917
Prep Type: Total/NA
Prep Batch: 145866

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Gross Alpha	0.366			0.5998		0.292	10.0	0.280	pCi/Samp			0.44	1
Gross Beta	11.8			12.35		1.59	10.0	0.472	pCi/Samp			0.17	1

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

Lab Sample ID: MB 160-145868/1-A
Matrix: Filter
Analysis Batch: 146050

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 145868

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.738	U	8.23	8.24	20.0	12.8	pCi/Sample	09/24/14 13:36	09/25/14 17:14	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*09/24/14 13:36*	*09/25/14 17:14*	*1*

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8468-2

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

Lab Sample ID: LCS 160-145868/2-A
Matrix: Filter
Analysis Batch: 146049

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 145868

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	32000	32200		3360		165	pCi/Samp	101	87 - 116
Cesium-137	11200	10830		1150	20.0	103	pCi/Samp	97	87 - 120
Cobalt-60	12300	12150		1240		50.5	pCi/Samp	99	87 - 115

Lab Sample ID: 160-8468-1 DU
Matrix: Filter
Analysis Batch: 146058

Client Sample ID: WAA-01-AF-PS-20140917
Prep Type: Total/NA
Prep Batch: 145868

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Cesium-137	-0.601	U	1.605	U	3.74	20.0	6.76	pCi/Samp	0.25	1

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8468-2

Rad

Prep Batch: 145866

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8468-1	WAA-01-AF-PS-20140917	Total/NA	Filter	None	
160-8468-1 DU	WAA-01-AF-PS-20140917	Total/NA	Filter	None	
160-8468-2	WAA-02-AF-PS-20140917	Total/NA	Filter	None	
160-8468-3	WAA-03-AF-PS-20140917	Total/NA	Filter	None	
160-8468-4	WAA-04-AF-PS-20140917	Total/NA	Filter	None	
160-8468-5	WAA-05-AF-PS-20140917	Total/NA	Filter	None	
160-8468-6	WAA-00-AF-FB-20140917	Total/NA	Filter	None	
LCS 160-145866/2-A	Lab Control Sample	Total/NA	Filter	None	
LCSB 160-145866/3-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-145866/1-A	Method Blank	Total/NA	Filter	None	

Prep Batch: 145868

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8468-1	WAA-01-AF-PS-20140917	Total/NA	Filter	None	
160-8468-1 DU	WAA-01-AF-PS-20140917	Total/NA	Filter	None	
160-8468-2	WAA-02-AF-PS-20140917	Total/NA	Filter	None	
160-8468-3	WAA-03-AF-PS-20140917	Total/NA	Filter	None	
160-8468-4	WAA-04-AF-PS-20140917	Total/NA	Filter	None	
160-8468-5	WAA-05-AF-PS-20140917	Total/NA	Filter	None	
160-8468-6	WAA-00-AF-FB-20140917	Total/NA	Filter	None	
LCS 160-145868/2-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-145868/1-A	Method Blank	Total/NA	Filter	None	

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	November 13, 2014
Sample Delivery Group (SDG):	J8693
Sample Numbers:	WAA-01-AF-PS-20141001, WAA-02-AF-PS-20141001, WAA-03-AF-PS-20141001, WAA-04-AF-PS-20141001, WAA-05-AF-PS-20141001, and WAA-00-AF-FB-20141001
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) and the EPA and others document "Multi-Agency Radiological Laboratory Analytical Protocols Manual" (July 2004) were used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.

I, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

13 November 2014

Certified by Harry Ellis, Chemist

Date

WLLFOIA4312 - 015 - 0155414

DATA VALIDATION QUALIFIERS

U — The analyte was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

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DATA ASSESSMENT

Sample delivery group (SDG) J8693 included five (5) environmental air (filter) samples and one (1) QC sample (a field blank). Samples were analyzed for total alpha-emitting radium by EPA SW-846 Method 9315 and for isotopic (alpha-emitting) thorium and uranium by Department of Energy (DOE) Method A-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Insufficient sample was available for MS/MSD analyses. Duplicate LCS analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded a low activity for two (of three) thorium isotope and one (of three) uranium isotopes. The field blank yielded low activities for all thorium isotopes and two uranium isotopes. The blank activity was similar to those seen in the other field samples. No qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries from the duplicate LCS analyses were within established control limits. However, the difference (expressed as "relative error ratio", RER) for total alpha radium recoveries was 1.73, well above the QC limit of 1.0. No qualifications were applied.

V. Surrogates

These radioanalytical methods use a "carrier" or "tracer", whose recovery serves the same functions as surrogate recoveries. All carrier and tracer recoveries were within the laboratory's QC limits. No qualifications were applied.

VI. Comments

All detected results were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J"). For the field blank and most other samples, the minimal detectable concentration (MDC) for total alpha radium exceeded its RL, due to insufficient sample. No qualifications were applied for this, but the MDC's for these samples should be used in lieu of the RL.

VII. Overall Assessment of Data

Overall data quality is acceptable, with few qualifications applied. All data are usable as qualified for their intended purposes.

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-8693-1
Client Project/Site: West Lake Landfill - Filters

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
10/31/2014 9:51:25 AM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

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

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 160-8693-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-8693-1

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 10/6/2014 1:25 PM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.6° C.

TOTAL ALPHA RADIUM (GFPC)

Samples WAA-01-AF-PS-20141001 (160-8693-1), WAA-02-AF-PS-20141001 (160-8693-2), WAA-03-AF-PS-20141001 (160-8693-3), WAA-04-AF-PS-20141001 (160-8693-4), WAA-05-AF-PS-20141001 (160-8693-5) and WAA-00-AF-FB-20141001 (160-8693-6) were analyzed for Total Alpha Radium (GFPC) in accordance with SW- 846 Method 9315. The samples were prepared on 10/14/2014 and analyzed on 10/16/2014.

The sample duplicate replicate error ratio (RER) value (1.73) associated with the following samples was greater than the limit of 1.0: (LCS 160-149536/2-A), (LCSD 160-149536/3-A), (MB 160-149536/1-A), WAA-00-AF-FB-20141001 (160-8693-6), WAA-01-AF-PS-20141001 (160-8693-1), WAA-02-AF-PS-20141001 (160-8693-2), WAA-03-AF-PS-20141001 (160-8693-3), WAA-04-AF-PS-20141001 (160-8693-4), WAA-05-AF-PS-20141001 (160-8693-5). Duplicate precision is demonstrated by an acceptable relative percent difference (RPD) of less than 40% (39%).

Job ID: 160-8693-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). A LCS/LCSD was used instead.

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

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20141001 (160-8693-1), WAA-02-AF-PS-20141001 (160-8693-2), WAA-03-AF-PS-20141001 (160-8693-3), WAA-04-AF-PS-20141001 (160-8693-4), WAA-05-AF-PS-20141001 (160-8693-5) and WAA-00-AF-FB-20141001 (160-8693-6) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared on 10/14/2014 and analyzed on 10/21/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). A LCS/LCSD was used instead.

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

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20141001 (160-8693-1), WAA-02-AF-PS-20141001 (160-8693-2), WAA-03-AF-PS-20141001 (160-8693-3), WAA-04-AF-PS-20141001 (160-8693-4), WAA-05-AF-PS-20141001 (160-8693-5) and WAA-00-AF-FB-20141001 (160-8693-6) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared on 10/14/2014 and analyzed on 10/21/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). A LCS/LCSD was used instead.

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

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Dave Kinroth	Site Contact: Dave Kinroth	Date: 10-1-14	COC No:
Tetra Tech, Inc.	Tel/Fax: 314-517-6798	Lab Contact: Mike Franks	Carrier: NA	1 of 1 COCs
415 Oak Street	Analysis Turnaround Time			Sampler:
Kansas City, MO 64106	☐ CALENDAR DAYS ☑ WORKING DAYS			For Lab Use Only:
(816) 412-1786 Phone	TAT if different from Below 20			Walk-in Client:
(816) 816-410-1748 FAX	☐ 2 weeks			Lab Sampling:
Project Name: West Lake Landfill Site	☐ 1 week			
Site: Bridgeton, MO	☐ 2 days			Job / SDG No.:
P O # 1105610	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	9310 Gross Alpha/Beta	GA-01-R Gamm Spec	9315 Total Alpha Radium	A-01-R Isotopic Thorium	A-01-R Isotopic Uranium	* 9315 Radium-226 (GFPC)	Sample Specific Notes:
WAA-01-AF-PS-20141001	10/1/14	12:13	Filter	Air	1			X	X	X	X	X	X	* 9315 Radium-226 (GFPC)
WAA-02-AF-PS-20141001	10/1/14	11:18	Filter	Air	1			X	X	X	X	X	X	contingent upon TAR results
WAA-03-AF-PS-20141001	10/1/14	11:47	Filter	Air	1			X	X	X	X	X	X	for all samples
WAA-04-AF-PS-20141001	10/1/14	12:01	Filter	Air	1			X	X	X	X	X	X	
WAA-05-AF-PS-20141001	10/1/14	11:32	Filter	Air	1			X	X	X	X	X	X	
WAA-00-AF-FB-20141001	10/1/14	NA	Filter	Air	1			X	X	X	X	X	X	

160-8693 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Dave Kinroth	Tetra Tech START	10-6-14			
Relinquished by:	Company:	Date/Time:	Received by: [signature]	Company: TA Silver	Date/Time: 10-6-14 - 1325
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

WLLFOIA4312 - 015 - 0155422
10/31/2014

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-8693-1

Login Number: 8693

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8693-1

Qualifiers

Rad

Qualifier	Qualifier Description
*	RPD of the LCS and LCSD exceeds the control limits
U	Result is less than the sample detection limit.
G	The Sample MDC is greater than the requested RL.

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)

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8693-1

Method	Method Description	Protocol	Laboratory
9315	Total Apha Radium (GFPC)	SW846	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	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: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8693-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-8693-1	WAA-01-AF-PS-20141001	Filter	10/01/14 12:13	10/06/14 13:25
160-8693-2	WAA-02-AF-PS-20141001	Filter	10/01/14 11:18	10/06/14 13:25
160-8693-3	WAA-03-AF-PS-20141001	Filter	10/01/14 11:47	10/06/14 13:25
160-8693-4	WAA-04-AF-PS-20141001	Filter	10/01/14 12:01	10/06/14 13:25
160-8693-5	WAA-05-AF-PS-20141001	Filter	10/01/14 11:32	10/06/14 13:25
160-8693-6	WAA-00-AF-FB-20141001	Filter	10/01/14 00:00	10/06/14 13:25

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8693-1

Client Sample ID: WAA-01-AF-PS-20141001

Date Collected: 10/01/14 12:13
Date Received: 10/06/14 13:25

Lab Sample ID: 160-8693-1
Matrix: Filter

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.878	J	0.589	0.594	1.00	0.845	pCi/Sample	10/14/14 10:59	10/16/14 17:36	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	103		40 - 110	10/14/14 10:59	10/16/14 17:36	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.270	J	0.122	0.124	1.00	0.157	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-230	0.253	J	0.0911	0.0936	1.00	0.0595	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-232	0.0230	J	0.0266	0.0266	1.00	0.0230	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	92.6		30 - 110	10/14/14 11:43	10/21/14 20:49	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.114	J	0.0763	0.0769	1.00	0.100	pCi/Sample	10/14/14 11:43	10/21/14 20:44	1
Uranium-235/236	0.0607	U	0.0573	0.0575	1.00	0.0775	pCi/Sample	10/14/14 11:43	10/21/14 20:44	1
Uranium-238	0.0730	J	0.0487	0.0491	1.00	0.0243	pCi/Sample	10/14/14 11:43	10/21/14 20:44	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	87.8		30 - 110	10/14/14 11:43	10/21/14 20:44	1

Client Sample ID: WAA-02-AF-PS-20141001

Date Collected: 10/01/14 11:18
Date Received: 10/06/14 13:25

Lab Sample ID: 160-8693-2
Matrix: Filter

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.355	U	0.655	0.655	1.00	1.13	pCi/Sample	10/14/14 10:59	10/16/14 17:36	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	97.3		40 - 110	10/14/14 10:59	10/16/14 17:36	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.249	J	0.122	0.124	1.00	0.159	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-230	0.281	J	0.0967	0.0995	1.00	0.0249	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-232	0.0401	U	0.0432	0.0434	1.00	0.0632	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1

HVE 13 November 2014

TestAmerica St. Louis

10/31/2014

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8693-1

Client Sample ID: WAA-02-AF-PS-20141001

Date Collected: 10/01/14 11:18
Date Received: 10/06/14 13:25

Lab Sample ID: 160-8693-2
Matrix: Filter

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	84.9		30 - 110	10/14/14 11:43	10/21/14 20:49	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0492	U	0.0614	0.0615	1.00	0.101	pCi/Sample	10/14/14 11:43	10/21/14 20:44	1
Uranium-235/236	0.0102	U	0.0204	0.0204	1.00	0.0306	pCi/Sample	10/14/14 11:43	10/21/14 20:44	1
Uranium-238	-0.0491	U	0.0768	0.0769	1.00	0.167	pCi/Sample	10/14/14 11:43	10/21/14 20:44	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	86.6		30 - 110	10/14/14 11:43	10/21/14 20:44	1

Client Sample ID: WAA-03-AF-PS-20141001

Date Collected: 10/01/14 11:47
Date Received: 10/06/14 13:25

Lab Sample ID: 160-8693-3
Matrix: Filter

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.385	U B	0.599	0.600	1.00	1.02	pCi/Sample	10/14/14 10:59	10/16/14 17:36	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	99.4		40 - 110	10/14/14 10:59	10/16/14 17:36	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.193	J	0.114	0.115	1.00	0.159	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-230	0.426	J	0.119	0.124	1.00	0.0615	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-232	0.0400	U	0.0423	0.0425	1.00	0.0612	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	82.5		30 - 110	10/14/14 11:43	10/21/14 20:49	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0752	U	0.0689	0.0692	1.00	0.103	pCi/Sample	10/14/14 11:43	10/21/14 20:45	1
Uranium-235/236	0.0208	U	0.0294	0.0295	1.00	0.0312	pCi/Sample	10/14/14 11:43	10/21/14 20:45	1
Uranium-238	0.0417	U	0.0501	0.0502	1.00	0.0799	pCi/Sample	10/14/14 11:43	10/21/14 20:45	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	85.4		30 - 110	10/14/14 11:43	10/21/14 20:45	1

HUE 13 Nov 14

TestAmerica St. Louis

10/31/2014

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8693-1

Client Sample ID: WAA-04-AF-PS-20141001

Date Collected: 10/01/14 12:01
Date Received: 10/06/14 13:25

Lab Sample ID: 160-8693-4
Matrix: Filter

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.846	J	0.548	0.553	1.00	0.762	pCi/Sample	10/14/14 10:59	10/16/14 17:36	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	101		40 - 110	10/14/14 10:59	10/16/14 17:36	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.305	J	0.126	0.129	1.00	0.149	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-230	0.354	J	0.114	0.118	1.00	0.0807	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-232	0.0503	U	0.0530	0.0532	1.00	0.0803	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	85.1		30 - 110	10/14/14 11:43	10/21/14 20:49	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.109	U	0.0806	0.0811	1.00	0.113	pCi/Sample	10/14/14 11:43	10/21/14 20:45	1
Uranium-235/236	0.000	U	0.0296	0.0296	1.00	0.0800	pCi/Sample	10/14/14 11:43	10/21/14 20:45	1
Uranium-238	0.0671	U	0.0628	0.0630	1.00	0.0928	pCi/Sample	10/14/14 11:43	10/21/14 20:45	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	87.8		30 - 110	10/14/14 11:43	10/21/14 20:45	1

Client Sample ID: WAA-05-AF-PS-20141001

Date Collected: 10/01/14 11:32
Date Received: 10/06/14 13:25

Lab Sample ID: 160-8693-5
Matrix: Filter

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.833	U/G	0.672	0.677	1.00	1.03	pCi/Sample	10/14/14 10:59	10/16/14 17:36	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	97.1		40 - 110	10/14/14 10:59	10/16/14 17:36	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.246	J	0.132	0.134	1.00	0.180	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-230	0.346	J	0.116	0.120	1.00	0.0846	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-232	0.0399	U	0.0480	0.0481	1.00	0.0757	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	80.9		30 - 110	10/14/14 11:43	10/21/14 20:49	1

HUE 13 Nov 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8693-1

Client Sample ID: WAA-05-AF-PS-20141001

Lab Sample ID: 160-8693-5
Matrix: Filter

Date Collected: 10/01/14 11:32
Date Received: 10/06/14 13:25

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0634	U	0.0593	0.0596	1.00	0.0877	pCi/Sample	10/14/14 11:43	10/21/14 20:45	1
Uranium-235/236	0.000	U	0.0279	0.0279	1.00	0.0755	pCi/Sample	10/14/14 11:43	10/21/14 20:45	1
Uranium-238	0.0633	U	0.0633	0.0635	1.00	0.0974	pCi/Sample	10/14/14 11:43	10/21/14 20:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*85.5*		*30 - 110*	*10/14/14 11:43*	*10/21/14 20:45*	*1*

Client Sample ID: WAA-00-AF-FB-20141001

Lab Sample ID: 160-8693-6
Matrix: Filter

Date Collected: 10/01/14 00:00
Date Received: 10/06/14 13:25

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.877	U * G	0.753	0.757	1.00	1.17	pCi/Sample	10/14/14 10:59	10/16/14 17:36	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*98.5*		*40 - 110*	*10/14/14 10:59*	*10/16/14 17:36*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.295	J	0.110	0.112	1.00	0.0959	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-230	0.258	J	0.0947	0.0971	1.00	0.0331	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-232	0.0471	J	0.0403	0.0405	1.00	0.0259	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.4*		*30 - 110*	*10/14/14 11:43*	*10/21/14 20:49*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0164	U	0.0403	0.0403	1.00	0.0788	pCi/Sample	10/14/14 11:43	10/21/14 20:45	1
Uranium-235/236	0.0307	* J	0.0354	0.0355	1.00	0.0307	pCi/Sample	10/14/14 11:43	10/21/14 20:45	1
Uranium-238	0.0574	J	0.0434	0.0437	1.00	0.0246	pCi/Sample	10/14/14 11:43	10/21/14 20:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*84.3*		*30 - 110*	*10/14/14 11:43*	*10/21/14 20:45*	*1*

HUG 13 Nov 14

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8693-1

Method: 9315 - Total Apha Radium (GFPC)

Lab Sample ID: MB 160-149536/1-A
Matrix: Filter
Analysis Batch: 150111

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 149536

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.2740	U	0.526	0.526	1.00	0.923	pCi/Sample	10/14/14 10:59	10/16/14 17:36	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*91.7*		*40 - 110*	*10/14/14 10:59*	*10/16/14 17:36*	*1*

Lab Sample ID: LCS 160-149536/2-A
Matrix: Filter
Analysis Batch: 150111

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 149536

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Total Alpha Radium			45.0	60.39		6.79	1.00	1.28	pCi/Samp	134	65 - 150		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*92.0*		*40 - 110*

Lab Sample ID: LCSD 160-149536/3-A
Matrix: Filter
Analysis Batch: 150111

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 149536

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Total Alpha Radium			45.0	40.55	*	4.68	1.00	1.41	pCi/Samp	90	65 - 150	1.73	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*92.9*		*40 - 110*

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

Lab Sample ID: MB 160-149545/1-A
Matrix: Filter
Analysis Batch: 151182

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 149545

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.1926		0.101	0.103	1.00	0.130	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-230	0.3297		0.103	0.107	1.00	0.0241	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1
Thorium-232	-0.02030	U	0.0297	0.0298	1.00	0.0883	pCi/Sample	10/14/14 11:43	10/21/14 20:49	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.0*		*30 - 110*	*10/14/14 11:43*	*10/21/14 20:49*	*1*

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

Lab Sample ID: LCS 160-149545/2-A
Matrix: Filter
Analysis Batch: 151183

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 149545

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			17.3	18.37		1.73	1.00	0.0645	pCi/Samp	106	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*84.5*		*30 - 110*

Lab Sample ID: LCSD 160-149545/3-A
Matrix: Filter
Analysis Batch: 151184

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 149545

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Thorium-230			17.3	19.21		1.80	1.00	0.0254	pCi/Samp	111	81 - 118	0.24	1

Tracer	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Thorium-229	*84.3*		*30 - 110*

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

Lab Sample ID: MB 160-149546/1-A
Matrix: Filter
Analysis Batch: 151153

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 149546

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.1017		0.0645	0.0651	1.00	0.0750	pCi/Sample	10/14/14 11:43	10/21/14 20:44	1
Uranium-235/236	0.009739	U	0.0337	0.0337	1.00	0.0745	pCi/Sample	10/14/14 11:43	10/21/14 20:44	1
Uranium-238	0.03905	U	0.0413	0.0415	1.00	0.0598	pCi/Sample	10/14/14 11:43	10/21/14 20:44	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*92.1*		*30 - 110*	*10/14/14 11:43*	*10/21/14 20:44*	*1*

Lab Sample ID: LCS 160-149546/2-A
Matrix: Filter
Analysis Batch: 151154

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 149546

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-233/234			25.5	25.55		2.34	1.00	0.105	pCi/Samp	100	84 - 120		
Uranium-238			26.0	25.82		2.36	1.00	0.0938	pCi/Samp	99	82 - 122		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*82.8*		*30 - 110*

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8693-1

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

Lab Sample ID: LCSD 160-149546/3-A
Matrix: Filter
Analysis Batch: 151155

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 149546

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Uranium-233/234			25.5	25.63		2.34	1.00	0.0930	pCi/Samp	101	84 - 120	0.02	1
Uranium-238			26.0	26.75		2.44	1.00	0.103	pCi/Samp	103	82 - 122	0.19	1

Tracer	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Uranium-232	*84.2*		*30 - 110*

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8693-1

Rad

Prep Batch: 149536

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8693-1	WAA-01-AF-PS-20141001	Total/NA	Filter	DPS-0	
160-8693-2	WAA-02-AF-PS-20141001	Total/NA	Filter	DPS-0	
160-8693-3	WAA-03-AF-PS-20141001	Total/NA	Filter	DPS-0	
160-8693-4	WAA-04-AF-PS-20141001	Total/NA	Filter	DPS-0	
160-8693-5	WAA-05-AF-PS-20141001	Total/NA	Filter	DPS-0	
160-8693-6	WAA-00-AF-FB-20141001	Total/NA	Filter	DPS-0	
LCS 160-149536/2-A	Lab Control Sample	Total/NA	Filter	DPS-0	
LCSD 160-149536/3-A	Lab Control Sample Dup	Total/NA	Filter	DPS-0	
MB 160-149536/1-A	Method Blank	Total/NA	Filter	DPS-0	

Prep Batch: 149545

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8693-1	WAA-01-AF-PS-20141001	Total/NA	Filter	ExtChrom	
160-8693-2	WAA-02-AF-PS-20141001	Total/NA	Filter	ExtChrom	
160-8693-3	WAA-03-AF-PS-20141001	Total/NA	Filter	ExtChrom	
160-8693-4	WAA-04-AF-PS-20141001	Total/NA	Filter	ExtChrom	
160-8693-5	WAA-05-AF-PS-20141001	Total/NA	Filter	ExtChrom	
160-8693-6	WAA-00-AF-FB-20141001	Total/NA	Filter	ExtChrom	
LCS 160-149545/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
LCSD 160-149545/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-149545/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Prep Batch: 149546

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8693-1	WAA-01-AF-PS-20141001	Total/NA	Filter	ExtChrom	
160-8693-2	WAA-02-AF-PS-20141001	Total/NA	Filter	ExtChrom	
160-8693-3	WAA-03-AF-PS-20141001	Total/NA	Filter	ExtChrom	
160-8693-4	WAA-04-AF-PS-20141001	Total/NA	Filter	ExtChrom	
160-8693-5	WAA-05-AF-PS-20141001	Total/NA	Filter	ExtChrom	
160-8693-6	WAA-00-AF-FB-20141001	Total/NA	Filter	ExtChrom	
LCS 160-149546/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
LCSD 160-149546/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-149546/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Tracer/Carrier Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8693-1

Method: 9315 - Total Apha Radium (GFPC)

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

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Ba (40-110)
160-8693-1	WAA-01-AF-PS-20141001	103
160-8693-2	WAA-02-AF-PS-20141001	97.3
160-8693-3	WAA-03-AF-PS-20141001	99.4
160-8693-4	WAA-04-AF-PS-20141001	101
160-8693-5	WAA-05-AF-PS-20141001	97.1
160-8693-6	WAA-00-AF-FB-20141001	98.5
LCS 160-149536/2-A	Lab Control Sample	92.0
LCSD 160-149536/3-A	Lab Control Sample Dup	92.9
MB 160-149536/1-A	Method Blank	91.7

Tracer/Carrier Legend

Ba = Ba Carrier

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

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

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Th-229 (30-110)
160-8693-1	WAA-01-AF-PS-20141001	92.6
160-8693-2	WAA-02-AF-PS-20141001	84.9
160-8693-3	WAA-03-AF-PS-20141001	82.5
160-8693-4	WAA-04-AF-PS-20141001	85.1
160-8693-5	WAA-05-AF-PS-20141001	80.9
160-8693-6	WAA-00-AF-FB-20141001	82.4
LCS 160-149545/2-A	Lab Control Sample	84.5
LCSD 160-149545/3-A	Lab Control Sample Dup	84.3
MB 160-149545/1-A	Method Blank	91.0

Tracer/Carrier Legend

Th-229 = Thorium-229

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

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

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	U-232 (30-110)
160-8693-1	WAA-01-AF-PS-20141001	87.8
160-8693-2	WAA-02-AF-PS-20141001	86.6
160-8693-3	WAA-03-AF-PS-20141001	85.4
160-8693-4	WAA-04-AF-PS-20141001	87.8
160-8693-5	WAA-05-AF-PS-20141001	85.5
160-8693-6	WAA-00-AF-FB-20141001	84.3
LCS 160-149546/2-A	Lab Control Sample	82.8
LCSD 160-149546/3-A	Lab Control Sample Dup	84.2
MB 160-149546/1-A	Method Blank	92.1

Tracer/Carrier Legend

U-232 = Uranium-232

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	November 14, 2014
Sample Delivery Group (SDG):	J8840
Sample Numbers:	WAA-01-AF-PS-20141009, WAA-02-AF-PS-20141009, WAA-03-AF-PS-20141009, WAA-04-AF-PS-20141009, WAA-05-AF-PS-20141009, and WAA-00-AF-FB-20141009
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) and the EPA and others document "Multi-Agency Radiological Laboratory Analytical Protocols Manual" (July 2004) were used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.

I, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

14 November 2014

Certified by Harry Ellis, Chemist

Date

WLLFOIA4312 - 015 - 0155436

DATA VALIDATION QUALIFIERS

U — The analyte was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

WLLFOIA4312 - 015 - 0155437

DATA ASSESSMENT

Sample delivery group (SDG) J8840 included five (5) environmental air (filter) samples and one (1) QC sample (a field blank). Samples were analyzed for total alpha-emitting radium by EPA SW-846 Method 9315 and for isotopic (alpha-emitting) thorium and uranium by Department of Energy (DOE) Method A-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Insufficient sample was available for MS/MSD analyses. Duplicate LCS analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded a low activity for one (of three) thorium isotope and two (of three) uranium isotopes. The field blank yielded low activities for two thorium isotopes all two uranium isotopes. The blank activity was similar to those seen in the other field samples. No qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries and relative percent differences from the duplicate LCS analyses were within established control limits.

V. Surrogates

These radioanalytical methods use a "carrier" or "tracer", whose recovery serves the same functions as surrogate recoveries. All carrier and tracer recoveries were within the laboratory's QC limits. No qualifications were applied.

VI. Comments

All detected results were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with few qualifications applied. All data are usable as qualified for their intended purposes.

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-8840-1
Client Project/Site: West Lake Landfill - Filters

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
11/13/2014 10:02:56 AM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 160-8840-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-8840-1

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 10/14/2014 11:30 AM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

TOTAL ALPHA RADIUM (GFPC)

Samples WAA-01-AF-PS-20141009 (160-8840-1), WAA-02-AF-PS-20141009 (160-8840-2), WAA-03-AF-PS-20141009 (160-8840-3), WAA-04-AF-PS-20141009 (160-8840-4), WAA-05-AF-PS-20141009 (160-8840-5) and WAA-00-AF-FB-20141009 (160-8840-6) were analyzed for Total Alpha Radium (GFPC) in accordance with SW- 846 Method 9315. The samples were prepared on 10/27/2014 and analyzed on 10/28/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead.

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

Job ID: 160-8840-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20141009 (160-8840-1), WAA-02-AF-PS-20141009 (160-8840-2), WAA-03-AF-PS-20141009 (160-8840-3), WAA-04-AF-PS-20141009 (160-8840-4), WAA-05-AF-PS-20141009 (160-8840-5) and WAA-00-AF-FB-20141009 (160-8840-6) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared on 10/23/2014 and analyzed on 10/29/2014 and 10/30/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead.

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

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20141009 (160-8840-1), WAA-02-AF-PS-20141009 (160-8840-2), WAA-03-AF-PS-20141009 (160-8840-3), WAA-04-AF-PS-20141009 (160-8840-4), WAA-05-AF-PS-20141009 (160-8840-5) and WAA-00-AF-FB-20141009 (160-8840-6) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared on 10/23/2014 and analyzed on 10/29/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead.

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

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Dave Kinroth	Site Contact: Dave Kinroth	Date: 10-1-14	COC No:
Tetra Tech, Inc.	Tel/Fax: 314-517-6798	Lab Contact: Mike Franks	Carrier: NA	1 of 1 COCs
415 Oak Street	Analysis Turnaround Time			Sampler:
Kansas City, MO 64106	☐ CALENDAR DAYS ☑ WORKING DAYS			For Lab Use Only:
(816) 412-1786 Phone	TAT if different from Below 20			Walk-in Client:
(816) 816-410-1748 FAX	☐ 2 weeks			Lab Sampling:
Project Name: West Lake Landfill Site	☐ 1 week			
Site: Bridgeton, MO	☐ 2 days			Job / SDG No.:
P O # 1105610	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	9310 Gross Alpha/Beta	GA-01-R Gamm Spec	9315 Total Alpha Radium	A-01-R Isotopic Thorium	A-01-R Isotopic Uranium	* 9315 Radium-226 (GFPC)	Sample Specific Notes:
WAA-01-AF-PS-20141009	10/9/14	11:33	Filter	Air	1			X	X	X	X	X	X	* 9315 Radium-226 (GFPC)
WAA-02-AF-PS-20141009	10/9/14	11:12	Filter	Air	1			X	X	X	X	X	X	contingent upon TAR results
WAA-03-AF-PS-20141009	10/9/14	12:03	Filter	Air	1			X	X	X	X	X	X	for all samples
WAA-04-AF-PS-20141009	10/9/14	11:47	Filter	Air	1			X	X	X	X	X	X	
WAA-05-AF-PS-20141009	10/9/14	12:32	Filter	Air	1			X	X	X	X	X	X	
WAA-00-AF-FB-20141009	10/9/14	NA	Filter	Air	1			X	X	X	X	X	X	

160-8840 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Dave Kinroth	Tetra Tech START	10-14-14	Jill Clark	TA STL	10-14-14 1130
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-8840-1

Login Number: 8840

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8840-1

Qualifiers

Rad

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

Glossary

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

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8840-1

Method	Method Description	Protocol	Laboratory
9315	Total Apha Radium (GFPC)	SW846	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	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: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8840-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-8840-1	WAA-01-AF-PS-20141009	Filter	10/09/14 11:33	10/14/14 11:30
160-8840-2	WAA-02-AF-PS-20141009	Filter	10/09/14 11:12	10/14/14 11:30
160-8840-3	WAA-03-AF-PS-20141009	Filter	10/09/14 12:03	10/14/14 11:30
160-8840-4	WAA-04-AF-PS-20141009	Filter	10/09/14 11:47	10/14/14 11:30
160-8840-5	WAA-05-AF-PS-20141009	Filter	10/09/14 12:32	10/14/14 11:30
160-8840-6	WAA-00-AF-FB-20141009	Filter	10/09/14 00:00	10/14/14 11:30

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8840-1

Client Sample ID: WAA-01-AF-PS-20141009

Lab Sample ID: 160-8840-1
Matrix: Filter

Date Collected: 10/09/14 11:33
Date Received: 10/14/14 11:30

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.345	U	0.505	0.506	1.00	0.858	pCi/Sample	10/27/14 14:32	10/28/14 16:39	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	99.4		40 - 110	10/27/14 14:32	10/28/14 16:39	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.200	J	0.110	0.111	1.00	0.148	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1
Thorium-230	0.376	J	0.110	0.114	1.00	0.0241	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1
Thorium-232	0.0479	J	0.0391	0.0393	1.00	0.0240	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	88.1		30 - 110	10/23/14 15:02	10/29/14 21:42	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-233/234	-0.0169	U	0.0676	0.0677	1.00	0.143	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-235/236	-0.0105	U	0.0210	0.0211	1.00	0.0805	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-238	0.118	J	0.0755	0.0761	1.00	0.0933	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	86.7		30 - 110	10/23/14 15:05	10/29/14 21:41	1

Client Sample ID: WAA-02-AF-PS-20141009

Lab Sample ID: 160-8840-2
Matrix: Filter

Date Collected: 10/09/14 11:12
Date Received: 10/14/14 11:30

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.586	U	0.543	0.546	1.00	0.843	pCi/Sample	10/27/14 14:32	10/28/14 16:39	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	98.8		40 - 110	10/27/14 14:32	10/28/14 16:39	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.199	J	0.0941	0.0955	1.00	0.103	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1
Thorium-230	0.358	J	0.112	0.116	1.00	0.0641	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1
Thorium-232	0.0613	J	0.0450	0.0453	1.00	0.0248	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1

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TestAmerica St. Louis

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8840-1

Client Sample ID: WAA-02-AF-PS-20141009

Lab Sample ID: 160-8840-2
Matrix: Filter

Date Collected: 10/09/14 11:12
Date Received: 10/14/14 11:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	85.9		30 - 110	10/23/14 15:02	10/29/14 21:42	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-233/234	0.0904	J	0.0592	0.0597	1.00	0.0629	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-235/236	-0.0102	U	0.0204	0.0205	1.00	0.0782	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-238	0.0902	J	0.0591	0.0596	1.00	0.0627	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	89.2		30 - 110	10/23/14 15:05	10/29/14 21:41	1

Client Sample ID: WAA-03-AF-PS-20141009

Lab Sample ID: 160-8840-3
Matrix: Filter

Date Collected: 10/09/14 12:03
Date Received: 10/14/14 11:30

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.132	U	0.479	0.479	1.00	0.893	pCi/Sample	10/27/14 14:32	10/28/14 16:39	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	98.8		40 - 110	10/27/14 14:32	10/28/14 16:39	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.166	J	0.105	0.106	1.00	0.147	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1
Thorium-230	0.335	J	0.110	0.114	1.00	0.0794	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1
Thorium-232	0.00921	U	0.0291	0.0291	1.00	0.0631	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	86.5		30 - 110	10/23/14 15:02	10/29/14 21:42	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-233/234	0.0891	J	0.0584	0.0589	1.00	0.0620	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-235/236	0.000	U	0.0202	0.0202	1.00	0.0302	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-238	0.0889	J	0.0626	0.0631	1.00	0.0775	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	89.3		30 - 110	10/23/14 15:05	10/29/14 21:41	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8840-1

Client Sample ID: WAA-04-AF-PS-20141009

Date Collected: 10/09/14 11:47
Date Received: 10/14/14 11:30

Lab Sample ID: 160-8840-4
Matrix: Filter

Method: 9315 - Total Alpha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.608	U	0.523	0.526	1.00	0.792	pCi/Sample	10/27/14 14:32	10/28/14 16:39	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	97.6		40 - 110	10/27/14 14:32	10/28/14 16:39	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.154	U	0.120	0.121	1.00	0.184	pCi/Sample	10/23/14 15:02	10/30/14 21:52	1
Thorium-230	0.316	J	0.104	0.107	1.00	0.0620	pCi/Sample	10/23/14 15:02	10/30/14 21:52	1
Thorium-232	0.0564	J	0.0426	0.0429	1.00	0.0242	pCi/Sample	10/23/14 15:02	10/30/14 21:52	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	87.3		30 - 110	10/23/14 15:02	10/30/14 21:52	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0714	U	0.0618	0.0621	1.00	0.0854	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-235/236	0.000	U	0.0544	0.0544	1.00	0.123	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-238	0.0534	U	0.0563	0.0565	1.00	0.0853	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	82.9		30 - 110	10/23/14 15:05	10/29/14 21:41	1

Client Sample ID: WAA-05-AF-PS-20141009

Date Collected: 10/09/14 12:32
Date Received: 10/14/14 11:30

Lab Sample ID: 160-8840-5
Matrix: Filter

Method: 9315 - Total Alpha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.743	U	0.601	0.604	1.00	0.911	pCi/Sample	10/27/14 14:32	10/28/14 16:40	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	100		40 - 110	10/27/14 14:32	10/28/14 16:40	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.156	U	0.115	0.115	1.00	0.172	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1
Thorium-230	0.378	J	0.114	0.118	1.00	0.0627	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1
Thorium-232	0.0326	U	0.0400	0.0400	1.00	0.0624	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	88.5		30 - 110	10/23/14 15:02	10/29/14 21:42	1

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TestAmerica St. Louis

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8840-1

Client Sample ID: WAA-05-AF-PS-20141009

Lab Sample ID: 160-8840-5
Matrix: Filter

Date Collected: 10/09/14 12:32
Date Received: 10/14/14 11:30

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.109	J	0.0729	0.0735	1.00	0.0925	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-235/236	0.0104	U J	0.0208	0.0208	1.00	0.0312	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-238	0.100	J	0.0624	0.0630	1.00	0.0638	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*85.0*		*30 - 110*	*10/23/14 15:05*	*10/29/14 21:41*	*1*

Client Sample ID: WAA-00-AF-FB-20141009

Lab Sample ID: 160-8840-6
Matrix: Filter

Date Collected: 10/09/14 00:00
Date Received: 10/14/14 11:30

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.798	U	0.628	0.632	1.00	0.945	pCi/Sample	10/27/14 14:32	10/28/14 16:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*97.6*		*40 - 110*	*10/27/14 14:32*	*10/28/14 16:40*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.117	U	0.0977	0.0982	1.00	0.148	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1
Thorium-230	0.353	J	0.109	0.113	1.00	0.0252	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1
Thorium-232	0.0334	J	0.0334	0.0335	1.00	0.0250	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.3*		*30 - 110*	*10/23/14 15:02*	*10/29/14 21:42*	*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-233/234	0.0814	J	0.0564	0.0568	1.00	0.0623	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-235/236	0.0304	J	0.0351	0.0352	1.00	0.0304	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-238	0.0325	J	0.0325	0.0326	1.00	0.0244	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*87.7*		*30 - 110*	*10/23/14 15:05*	*10/29/14 21:41*	*1*

LTUG 14 Nov 14

TestAmerica St. Louis

11/13/2014

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8840-1

Method: 9315 - Total Apha Radium (GFPC)

Lab Sample ID: MB 160-152365/1-A — **Client Sample ID: Method Blank**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 153037 — **Prep Batch: 152365**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.4049	U	0.351	0.353	1.00	0.536	pCi/Sample	10/27/14 14:32	10/30/14 04:12	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*94.4*		*40 - 110*	*10/27/14 14:32*	*10/30/14 04:12*	*1*

Lab Sample ID: LCS 160-152365/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 152495 — **Prep Batch: 152365**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Total Alpha Radium			45.0	42.33		4.85	1.00	0.860	pCi/Samp	94	65 - 150		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*95.3*		*40 - 110*

Lab Sample ID: LCSD 160-152365/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 152495 — **Prep Batch: 152365**

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Total Alpha Radium			45.0	46.54		5.22	1.00	0.998	pCi/Samp	104	65 - 150	0.42	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*97.1*		*40 - 110*

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

Lab Sample ID: MB 160-151629/1-A — **Client Sample ID: Method Blank**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 152663 — **Prep Batch: 151629**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.1397	U	0.116	0.116	1.00	0.178	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1
Thorium-230	0.3347		0.114	0.117	1.00	0.0837	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1
Thorium-232	0.02608	U	0.0301	0.0302	1.00	0.0261	pCi/Sample	10/23/14 15:02	10/29/14 21:42	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.4*		*30 - 110*	*10/23/14 15:02*	*10/29/14 21:42*	*1*

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8840-1

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

Lab Sample ID: LCS 160-151629/2-A
Matrix: Filter
Analysis Batch: 152664

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 151629

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			17.3	19.24		1.80	1.00	0.0642	pCi/Samp	111	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*85.7*		*30 - 110*

Lab Sample ID: LCSD 160-151629/3-A
Matrix: Filter
Analysis Batch: 152665

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 151629

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Thorium-230			17.3	19.23		1.80	1.00	0.0252	pCi/Samp	111	81 - 118	0	1

Tracer	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Thorium-229	*85.6*		*30 - 110*

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

Lab Sample ID: MB 160-151631/1-A
Matrix: Filter
Analysis Batch: 152654

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 151631

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.07926		0.0549	0.0553	1.00	0.0607	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-235/236	0.02959	U	0.0441	0.0442	1.00	0.0755	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1
Uranium-238	0.03164		0.0316	0.0318	1.00	0.0237	pCi/Sample	10/23/14 15:05	10/29/14 21:41	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*86.8*		*30 - 110*	*10/23/14 15:05*	*10/29/14 21:41*	*1*

Lab Sample ID: LCS 160-151631/2-A
Matrix: Filter
Analysis Batch: 152655

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 151631

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-233/234			25.5	25.56		2.34	1.00	0.0824	pCi/Samp	100	84 - 120		
Uranium-238			26.0	26.57		2.43	1.00	0.0657	pCi/Samp	102	82 - 122		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*83.1*		*30 - 110*

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8840-1

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

Lab Sample ID: LCSD 160-151631/3-A
Matrix: Filter
Analysis Batch: 152656

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 151631

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Uranium-233/234			25.5	25.25		2.32	1.00	0.0663	pCi/Samp	99	84 - 120	0.07	1
Uranium-238			26.0	26.64		2.44	1.00	0.0260	pCi/Samp	102	82 - 122	0.01	1

Tracer	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Uranium-232	*82.7*		*30 - 110*

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8840-1

Rad

Prep Batch: 151629

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8840-1	WAA-01-AF-PS-20141009	Total/NA	Filter	ExtChrom	
160-8840-2	WAA-02-AF-PS-20141009	Total/NA	Filter	ExtChrom	
160-8840-3	WAA-03-AF-PS-20141009	Total/NA	Filter	ExtChrom	
160-8840-4	WAA-04-AF-PS-20141009	Total/NA	Filter	ExtChrom	
160-8840-5	WAA-05-AF-PS-20141009	Total/NA	Filter	ExtChrom	
160-8840-6	WAA-00-AF-FB-20141009	Total/NA	Filter	ExtChrom	
LCS 160-151629/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
LCSD 160-151629/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-151629/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Prep Batch: 151631

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8840-1	WAA-01-AF-PS-20141009	Total/NA	Filter	ExtChrom	
160-8840-2	WAA-02-AF-PS-20141009	Total/NA	Filter	ExtChrom	
160-8840-3	WAA-03-AF-PS-20141009	Total/NA	Filter	ExtChrom	
160-8840-4	WAA-04-AF-PS-20141009	Total/NA	Filter	ExtChrom	
160-8840-5	WAA-05-AF-PS-20141009	Total/NA	Filter	ExtChrom	
160-8840-6	WAA-00-AF-FB-20141009	Total/NA	Filter	ExtChrom	
LCS 160-151631/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
LCSD 160-151631/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-151631/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Prep Batch: 152365

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8840-1	WAA-01-AF-PS-20141009	Total/NA	Filter	DPS-0	
160-8840-2	WAA-02-AF-PS-20141009	Total/NA	Filter	DPS-0	
160-8840-3	WAA-03-AF-PS-20141009	Total/NA	Filter	DPS-0	
160-8840-4	WAA-04-AF-PS-20141009	Total/NA	Filter	DPS-0	
160-8840-5	WAA-05-AF-PS-20141009	Total/NA	Filter	DPS-0	
160-8840-6	WAA-00-AF-FB-20141009	Total/NA	Filter	DPS-0	
LCS 160-152365/2-A	Lab Control Sample	Total/NA	Filter	DPS-0	
LCSD 160-152365/3-A	Lab Control Sample Dup	Total/NA	Filter	DPS-0	
MB 160-152365/1-A	Method Blank	Total/NA	Filter	DPS-0	

Tracer/Carrier Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8840-1

Method: 9315 - Total Apha Radium (GFPC)

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

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(40-110)
160-8840-1	WAA-01-AF-PS-20141009	99.4
160-8840-2	WAA-02-AF-PS-20141009	98.8
160-8840-3	WAA-03-AF-PS-20141009	98.8
160-8840-4	WAA-04-AF-PS-20141009	97.6
160-8840-5	WAA-05-AF-PS-20141009	100
160-8840-6	WAA-00-AF-FB-20141009	97.6
LCS 160-152365/2-A	Lab Control Sample	95.3
LCSD 160-152365/3-A	Lab Control Sample Dup	97.1
MB 160-152365/1-A	Method Blank	94.4

Tracer/Carrier Legend

Ba = Ba Carrier

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

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

		Percent Yield (Acceptance Limits)
		Th-229
Lab Sample ID	Client Sample ID	(30-110)
160-8840-1	WAA-01-AF-PS-20141009	88.1
160-8840-2	WAA-02-AF-PS-20141009	85.9
160-8840-3	WAA-03-AF-PS-20141009	86.5
160-8840-4	WAA-04-AF-PS-20141009	87.3
160-8840-5	WAA-05-AF-PS-20141009	88.5
160-8840-6	WAA-00-AF-FB-20141009	85.3
LCS 160-151629/2-A	Lab Control Sample	85.7
LCSD 160-151629/3-A	Lab Control Sample Dup	85.6
MB 160-151629/1-A	Method Blank	85.4

Tracer/Carrier Legend

Th-229 = Thorium-229

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

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

		Percent Yield (Acceptance Limits)
		U-232
Lab Sample ID	Client Sample ID	(30-110)
160-8840-1	WAA-01-AF-PS-20141009	86.7
160-8840-2	WAA-02-AF-PS-20141009	89.2
160-8840-3	WAA-03-AF-PS-20141009	89.3
160-8840-4	WAA-04-AF-PS-20141009	82.9
160-8840-5	WAA-05-AF-PS-20141009	85.0
160-8840-6	WAA-00-AF-FB-20141009	87.7
LCS 160-151631/2-A	Lab Control Sample	83.1
LCSD 160-151631/3-A	Lab Control Sample Dup	82.7
MB 160-151631/1-A	Method Blank	86.8

Tracer/Carrier Legend

U-232 = Uranium-232

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	November 17, 2014
Sample Delivery Group (SDG):	J8934
Sample Numbers:	WAA-01-AF-PS-20141016, WAA-02-AF-PS-20141016, WAA-03-AF-PS-20141016, WAA-04-AF-PS-20141016, WAA-05-AF-PS-20141016, and WAA-00-AF-FB-20141016
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) and the EPA and others document "Multi-Agency Radiological Laboratory Analytical Protocols Manual" (July 2004) were used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.

I, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

17 October 2014

Certified by Harry Ellis, Chemist

Date

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DATA VALIDATION QUALIFIERS

U — The analyte was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

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DATA ASSESSMENT

Sample delivery group (SDG) J8934 included five (5) environmental air (filter) samples and one (1) QC samples (a field blank). Samples were analyzed for gross alpha and beta radiation by EPA SW-846 Method 9310 and for cesium-137 and other gamma-emitters by Department of Energy (DOE) Method Ga-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. LCS and duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blanks yielded no detectable activities. The field blank yielded a low beta activity. The other field samples yielded more than 5 times the field blank beta activity, so no further qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analyses were within established control limits. No qualifications were applied.

V. Surrogates

Surrogates are not used in these radioanalytical methods.

VI. Comments

Most detected activities were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with no significant qualifications applied. All data are usable as qualified for their intended purposes.

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-8934-2
Client Project/Site: West Lake Landfill - Filters

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
10/31/2014 1:51:39 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 160-8934-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-8934-2

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 10/20/2014 2:30 PM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples WAA-01-AF-PS-20141016 (160-8934-1), WAA-02-AF-PS-20141016 (160-8934-2), WAA-03-AF-PS-20141016 (160-8934-3), WAA-04-AF-PS-20141016 (160-8934-4), WAA-05-AF-PS-20141016 (160-8934-5) and WAA-00-AF-FB-20141016 (160-8934-6) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with SW846 9310. The samples were prepared and analyzed on 10/23/2014.

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

RADIUM-226 & OTHER GAMMA EMITTERS (GS)

Samples WAA-01-AF-PS-20141016 (160-8934-1), WAA-02-AF-PS-20141016 (160-8934-2), WAA-03-AF-PS-20141016 (160-8934-3), WAA-04-AF-PS-20141016 (160-8934-4), WAA-05-AF-PS-20141016 (160-8934-5) and WAA-00-AF-FB-20141016 (160-8934-6) were

Job ID: 160-8934-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with GA-01-R. The samples were prepared and analyzed on 10/23/2014.

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

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Dave Kinroth	Site Contact: Dave Kinroth	Date: 10-20-14	COC No:
Tetra Tech, Inc.	Tel/Fax: 314-517-6798	Lab Contact: Mike Franks	Carrier: NA	1 of 1 COCs
415 Oak Street	Analysis Turnaround Time			Sampler:
Kansas City, MO 64106	☐ CALENDAR DAYS ☑ WORKING DAYS			For Lab Use Only:
(816) 412-1786 Phone	TAT if different from Below 20			Walk-in Client:
(816) 816-410-1748 FAX	☐ 2 weeks			Lab Sampling:
Project Name: West Lake Landfill Site	☐ 1 week			
Site: Bridgeton, MO	☐ 2 days			Job / SDG No.:
P O # 1105610	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	9310 Gross Alpha/Beta	GA-01-R Gamm Spec	9315 Total Alpha Radium	A-01-R Isotopic Thorium	A-01-R Isotopic Uranium	* 9315 Radium-226 (GFPC)	Sample Specific Notes:
WAA-01-AF-PS-20141016	10/16/14	11:38	Filter	Air	1			X	X	X	X	X	X	* 9315 Radium-226 (GFPC)
WAA-02-AF-PS-20141016	10/16/14	10:39	Filter	Air	1			X	X	X	X	X	X	contingent upon TAR results
WAA-03-AF-PS-20141016	10/16/14	11:10	Filter	Air	1			X	X	X	X	X	X	for all samples
WAA-04-AF-PS-20141016	10/16/14	11:25	Filter	Air	1			X	X	X	X	X	X	
WAA-05-AF-PS-20141016	10/16/14	10:53	Filter	Air	1			X	X	X	X	X	X	
WAA-00-AF-FB-20141016	10/16/14	NA	Filter	Air	1			X	X	X	X	X	X	

160-8934 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Dave Kinroth	Tetra Tech STA	10-20-14	Jill Clark	TA STL	10-20-14 1430
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

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Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-8934-2

Login Number: 8934

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-2

Qualifiers

Rad

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

Glossary

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

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-2

Method	Method Description	Protocol	Laboratory
9310	Gross Alpha / Beta (GFPC)	SW846	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	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: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-8934-1	WAA-01-AF-PS-20141016	Filter	10/16/14 11:38	10/20/14 14:30
160-8934-2	WAA-02-AF-PS-20141016	Filter	10/16/14 10:39	10/20/14 14:30
160-8934-3	WAA-03-AF-PS-20141016	Filter	10/16/14 11:10	10/20/14 14:30
160-8934-4	WAA-04-AF-PS-20141016	Filter	10/16/14 11:25	10/20/14 14:30
160-8934-5	WAA-05-AF-PS-20141016	Filter	10/16/14 10:53	10/20/14 14:30
160-8934-6	WAA-00-AF-FB-20141016	Filter	10/16/14 00:00	10/20/14 14:30

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-2

Client Sample ID: WAA-01-AF-PS-20141016

Date Collected: 10/16/14 11:38
Date Received: 10/20/14 14:30

Lab Sample ID: 160-8934-1
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.425	J	0.260	0.264	10.0	0.315	pCi/Sample	10/23/14 10:28	10/23/14 13:05	1
Gross Beta	12.5		0.994	1.60	10.0	0.386	pCi/Sample	10/23/14 10:28	10/23/14 13:05	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-3.04	U	11.8	11.8	20.0	13.6	pCi/Sample	10/23/14 10:35	10/23/14 19:42	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*10/23/14 10:35*	*10/23/14 19:42*	*1*

Client Sample ID: WAA-02-AF-PS-20141016

Date Collected: 10/16/14 10:39
Date Received: 10/20/14 14:30

Lab Sample ID: 160-8934-2
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.323	J	0.224	0.227	10.0	0.280	pCi/Sample	10/23/14 10:28	10/23/14 13:05	1
Gross Beta	7.69	J	0.778	1.09	10.0	0.362	pCi/Sample	10/23/14 10:28	10/23/14 13:05	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0.341	U	4.11	4.11	20.0	7.72	pCi/Sample	10/23/14 10:35	10/23/14 19:40	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Be-7	*113*		*39.8*	*41.5*		*29.4*	*pCi/Sample*	*10/23/14 10:35*	*10/23/14 19:40*	*1*

Client Sample ID: WAA-03-AF-PS-20141016

Date Collected: 10/16/14 11:10
Date Received: 10/20/14 14:30

Lab Sample ID: 160-8934-3
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.281	J	0.213	0.215	10.0	0.276	pCi/Sample	10/23/14 10:28	10/23/14 13:05	1
Gross Beta	9.31	J	0.868	1.27	10.0	0.384	pCi/Sample	10/23/14 10:28	10/23/14 13:05	1

HJG 17 November 2014

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-2

Client Sample ID: WAA-03-AF-PS-20141016

Lab Sample ID: 160-8934-3
Matrix: Filter

Date Collected: 10/16/14 11:10
Date Received: 10/20/14 14:30

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-3.49	U	10.6	10.6	20.0	19.1	pCi/Sample	10/23/14 10:35	10/23/14 20:54	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*10/23/14 10:35*	*10/23/14 20:54*	*1*

Client Sample ID: WAA-04-AF-PS-20141016

Lab Sample ID: 160-8934-4
Matrix: Filter

Date Collected: 10/16/14 11:25
Date Received: 10/20/14 14:30

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.412	J	0.254	0.258	10.0	0.310	pCi/Sample	10/23/14 10:28	10/23/14 13:06	1
Gross Beta	7.75	J	0.775	1.10	10.0	0.340	pCi/Sample	10/23/14 10:28	10/23/14 13:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-0.0769	U	3.53	3.53	20.0	6.84	pCi/Sample	10/23/14 10:35	10/23/14 20:51	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*10/23/14 10:35*	*10/23/14 20:51*	*1*

Client Sample ID: WAA-05-AF-PS-20141016

Lab Sample ID: 160-8934-5
Matrix: Filter

Date Collected: 10/16/14 10:53
Date Received: 10/20/14 14:30

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.525	J	0.280	0.287	10.0	0.317	pCi/Sample	10/23/14 10:28	10/23/14 13:06	1
Gross Beta	9.58	J	0.868	1.29	10.0	0.358	pCi/Sample	10/23/14 10:28	10/23/14 13:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-5.59	U	27.7	27.7	20.0	14.3	pCi/Sample	10/23/14 10:35	10/23/14 20:54	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-2

Client Sample ID: WAA-05-AF-PS-20141016

Lab Sample ID: 160-8934-5
Matrix: Filter

Date Collected: 10/16/14 10:53
Date Received: 10/20/14 14:30

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*10/23/14 10:35*	*10/23/14 20.54*	*1*

Client Sample ID: WAA-00-AF-FB-20141016

Lab Sample ID: 160-8934-6
Matrix: Filter

Date Collected: 10/16/14 00:00
Date Received: 10/20/14 14:30

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.153	U	0.193	0.194	10.0	0.318	pCi/Sample	10/23/14 10:28	10/23/14 13:06	1
Gross Beta	**1.22**	J	0.344	0.365	10.0	0.331	pCi/Sample	10/23/14 10:28	10/23/14 13:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.31	U	5.16	5.16	20.0	9.22	pCi/Sample	10/23/14 10:35	10/23/14 21:53	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*10/23/14 10:35*	*10/23/14 21:53*	*1*

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12 Nov 14

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-2

Method: 9310 - Gross Alpha / Beta (GFPC)

Lab Sample ID: MB 160-151557/1-A
Matrix: Filter
Analysis Batch: 151627

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 151557

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.01760	U	0.149	0.149	10.0	0.317	pCi/Sample	10/23/14 10:28	10/23/14 13:03	1
Gross Beta	-0.02119	U	0.188	0.188	10.0	0.371	pCi/Sample	10/23/14 10:28	10/23/14 13:03	1

Lab Sample ID: LCS 160-151557/2-A
Matrix: Filter
Analysis Batch: 151627

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 151557

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Alpha	5.37	4.923		0.928	10.0	0.285	pCi/Samp	92	75 - 125

Lab Sample ID: LCSB 160-151557/3-A
Matrix: Filter
Analysis Batch: 151627

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 151557

Analyte	Spike Added	LCSB Result	LCSB Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Beta	18.0	18.70		2.22	10.0	0.387	pCi/Samp	104	75 - 125

Lab Sample ID: 160-8934-1 DU
Matrix: Filter
Analysis Batch: 151627

Client Sample ID: WAA-01-AF-PS-20141016
Prep Type: Total/NA
Prep Batch: 151557

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Gross Alpha	0.425		0.3218		0.227	10.0	0.285	pCi/Samp	0.21	1
Gross Beta	12.5		10.71		1.41	10.0	0.371	pCi/Samp	0.60	1

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

Lab Sample ID: MB 160-151565/1-A
Matrix: Filter
Analysis Batch: 151551

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 151565

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-6.235	U	3830	3830	20.0	16.2	pCi/Sample	10/23/14 10:35	10/23/14 19:42	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*10/23/14 10:35*	*10/23/14 19:42*	*1*

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-2

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

Lab Sample ID: LCS 160-151565/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 151587 — **Prep Batch: 151565**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	32000	32670		3400		167	pCi/Samp	102	87 - 116
Cesium-137	11200	11030		1170	20.0	87.5	pCi/Samp	99	87 - 120
Cobalt-60	12100	12170		1240		47.7	pCi/Samp	100	87 - 115

Lab Sample ID: 160-8934-1 DU — **Client Sample ID: WAA-01-AF-PS-20141016**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 151551 — **Prep Batch: 151565**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Cesium-137	-3.04	U	-3.395	U	24.6	20.0	16.1	pCi/Samp	0.01	1

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-2

Rad

Prep Batch: 151557

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8934-1	WAA-01-AF-PS-20141016	Total/NA	Filter	None	
160-8934-1 DU	WAA-01-AF-PS-20141016	Total/NA	Filter	None	
160-8934-2	WAA-02-AF-PS-20141016	Total/NA	Filter	None	
160-8934-3	WAA-03-AF-PS-20141016	Total/NA	Filter	None	
160-8934-4	WAA-04-AF-PS-20141016	Total/NA	Filter	None	
160-8934-5	WAA-05-AF-PS-20141016	Total/NA	Filter	None	
160-8934-6	WAA-00-AF-FB-20141016	Total/NA	Filter	None	
LCS 160-151557/2-A	Lab Control Sample	Total/NA	Filter	None	
LCSB 160-151557/3-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-151557/1-A	Method Blank	Total/NA	Filter	None	

Prep Batch: 151565

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8934-1	WAA-01-AF-PS-20141016	Total/NA	Filter	None	
160-8934-1 DU	WAA-01-AF-PS-20141016	Total/NA	Filter	None	
160-8934-2	WAA-02-AF-PS-20141016	Total/NA	Filter	None	
160-8934-3	WAA-03-AF-PS-20141016	Total/NA	Filter	None	
160-8934-4	WAA-04-AF-PS-20141016	Total/NA	Filter	None	
160-8934-5	WAA-05-AF-PS-20141016	Total/NA	Filter	None	
160-8934-6	WAA-00-AF-FB-20141016	Total/NA	Filter	None	
LCS 160-151565/2-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-151565/1-A	Method Blank	Total/NA	Filter	None	

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	December 1, 2014
Sample Delivery Group (SDG):	J8934
Sample Numbers:	WAA-01-AF-PS-20141016, WAA-02-AF-PS-20141016, WAA-03-AF-PS-20141016, WAA-04-AF-PS-20141016, WAA-05-AF-PS-20141016, and WAA-00-AF-FB-20141016
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) and the EPA and others document "Multi-Agency Radiological Laboratory Analytical Protocols Manual" (July 2004) were used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.

I, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

1 December 2014

Certified by Harry Ellis, Chemist

Date

WLLFOIA4312 - 015 - 0155477

DATA VALIDATION QUALIFIERS

U — The analyte was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

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DATA ASSESSMENT

Sample delivery group (SDG) J8934 included five (5) environmental air (filter) samples and one (1) QC sample (a field blank). Samples were analyzed for total alpha-emitting radium by EPA SW-846 Method 9315 and for isotopic (alpha-emitting) thorium and uranium by Department of Energy (DOE) Method A-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Insufficient sample was available for MS/MSD analyses. Duplicate LCS analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded a low activity for one (of three) thorium isotope and no uranium isotopes. The field blank yielded low activities for the same thorium isotope and two (of three) uranium isotopes. The blank activity was similar to those seen in the other field samples. No qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries and relative percent differences from the duplicate LCS analyses were within established control limits.

V. Surrogates

These radioanalytical methods use a "carrier" or "tracer", whose recovery serves the same functions as surrogate recoveries. All carrier and tracer recoveries were within the laboratory's QC limits. No qualifications were applied.

VI. Comments

All detected results were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with few qualifications applied. All data are usable as qualified for their intended purposes.

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-8934-1
Client Project/Site: West Lake Landfill - Filters

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
11/19/2014 9:25:25 AM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

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

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 160-8934-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-8934-1

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 10/20/2014 2:30 PM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

TOTAL ALPHA RADIUM (GFPC)

Samples WAA-01-AF-PS-20141016 (160-8934-1), WAA-02-AF-PS-20141016 (160-8934-2), WAA-03-AF-PS-20141016 (160-8934-3), WAA-04-AF-PS-20141016 (160-8934-4), WAA-05-AF-PS-20141016 (160-8934-5) and WAA-00-AF-FB-20141016 (160-8934-6) were analyzed for Total Alpha Radium (GFPC) in accordance with SW- 846 Method 9315. The samples were prepared on 10/29/2014 and analyzed on 11/02/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead of a sample duplicate.

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

Job ID: 160-8934-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20141016 (160-8934-1), WAA-02-AF-PS-20141016 (160-8934-2), WAA-03-AF-PS-20141016 (160-8934-3), WAA-04-AF-PS-20141016 (160-8934-4), WAA-05-AF-PS-20141016 (160-8934-5) and WAA-00-AF-FB-20141016 (160-8934-6) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared and analyzed on 11/10/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead of a sample duplicate.

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

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20141016 (160-8934-1), WAA-02-AF-PS-20141016 (160-8934-2), WAA-03-AF-PS-20141016 (160-8934-3), WAA-04-AF-PS-20141016 (160-8934-4), WAA-05-AF-PS-20141016 (160-8934-5) and WAA-00-AF-FB-20141016 (160-8934-6) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared on 10/30/2014 and analyzed on 11/07/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead of a sample duplicate.

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

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Dave Kinroth	Site Contact: Dave Kinroth	Date: 10-20-14	COC No:
Tetra Tech, Inc.	Tel/Fax: 314-517-6798	Lab Contact: Mike Franks	Carrier: NA	1 of 1 COCs
415 Oak Street	Analysis Turnaround Time			Sampler:
Kansas City, MO 64106	☐ CALENDAR DAYS ☑ WORKING DAYS			For Lab Use Only:
(816) 412-1786 Phone	TAT if different from Below 20			Walk-in Client:
(816) 816-410-1748 FAX	☐ 2 weeks			Lab Sampling:
Project Name: West Lake Landfill Site	☐ 1 week			
Site: Bridgeton, MO	☐ 2 days			Job / SDG No.:
P O # 1105610	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	9310 Gross Alpha/Beta	GA-01-R Gamm Spec	9315 Total Alpha Radium	A-01-R Isotopic Thorium	A-01-R Isotopic Uranium	* 9315 Radium-226 (GFPC)	Sample Specific Notes:
WAA-01-AF-PS-20141016	10/16/14	11:38	Filter	Air	1			X	X	X	X	X	X	* 9315 Radium-226 (GFPC)
WAA-02-AF-PS-20141016	10/16/14	10:39	Filter	Air	1			X	X	X	X	X	X	contingent upon TAR results
WAA-03-AF-PS-20141016	10/16/14	11:10	Filter	Air	1			X	X	X	X	X	X	for all samples
WAA-04-AF-PS-20141016	10/16/14	11:25	Filter	Air	1			X	X	X	X	X	X	
WAA-05-AF-PS-20141016	10/16/14	10:53	Filter	Air	1			X	X	X	X	X	X	
WAA-00-AF-FB-20141016	10/16/14	NA	Filter	Air	1			X	X	X	X	X	X	

160-8934 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Dave Kinroth	Tetra Tech STA	10-20-14	Jill Clark	TA STL	10-20-14 1430
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

WLLFOIA4312 - 015 - 0155485

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-8934-1

Login Number: 8934

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-1

Qualifiers

Rad

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

Glossary

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

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-1

Method	Method Description	Protocol	Laboratory
9315	Total Apha Radium (GFPC)	SW846	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	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: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-8934-1	WAA-01-AF-PS-20141016	Filter	10/16/14 11:38	10/20/14 14:30
160-8934-2	WAA-02-AF-PS-20141016	Filter	10/16/14 10:39	10/20/14 14:30
160-8934-3	WAA-03-AF-PS-20141016	Filter	10/16/14 11:10	10/20/14 14:30
160-8934-4	WAA-04-AF-PS-20141016	Filter	10/16/14 11:25	10/20/14 14:30
160-8934-5	WAA-05-AF-PS-20141016	Filter	10/16/14 10:53	10/20/14 14:30
160-8934-6	WAA-00-AF-FB-20141016	Filter	10/16/14 00:00	10/20/14 14:30

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-1

Client Sample ID: WAA-01-AF-PS-20141016

Lab Sample ID: 160-8934-1
Matrix: Filter

Date Collected: 10/16/14 11:38
Date Received: 10/20/14 14:30

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.468	U	0.404	0.407	1.00	0.634	pCi/Sample	10/29/14 13:31	11/02/14 16:00	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	97.6		40 - 110	10/29/14 13:31	11/02/14 16:00	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.102	U	0.124	0.125	1.00	0.200	pCi/Sample	11/10/14 08:54	11/10/14 20:25	1
Thorium-230	0.352	J	0.176	0.178	1.00	0.135	pCi/Sample	11/10/14 08:54	11/10/14 20:25	1
Thorium-232	0.00341	U	0.0475	0.0475	1.00	0.135	pCi/Sample	11/10/14 08:54	11/10/14 20:25	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	85.3		30 - 110	11/10/14 08:54	11/10/14 20:25	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0642	U	0.0974	0.0976	1.00	0.169	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-235/236	-0.00571	U	0.0563	0.0563	1.00	0.169	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-238	0.0946	U	0.0923	0.0926	1.00	0.120	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	90.0		30 - 110	10/30/14 14:02	11/07/14 10:00	1

Client Sample ID: WAA-02-AF-PS-20141016

Lab Sample ID: 160-8934-2
Matrix: Filter

Date Collected: 10/16/14 10:39
Date Received: 10/20/14 14:30

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.275	U	0.324	0.325	1.00	0.533	pCi/Sample	10/29/14 13:31	11/02/14 16:00	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	98.8		40 - 110	10/29/14 13:31	11/02/14 16:00	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0484	U	0.140	0.140	1.00	0.269	pCi/Sample	11/10/14 08:54	11/10/14 20:25	1
Thorium-230	0.405	J	0.188	0.191	1.00	0.0652	pCi/Sample	11/10/14 08:54	11/10/14 20:25	1
Thorium-232	0.0774	U	0.0883	0.0885	1.00	0.119	pCi/Sample	11/10/14 08:54	11/10/14 20:25	1

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TestAmerica St. Louis

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-1

Client Sample ID: WAA-02-AF-PS-20141016

Lab Sample ID: 160-8934-2
Matrix: Filter

Date Collected: 10/16/14 10:39
Date Received: 10/20/14 14:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	79.0		30 - 110	11/10/14 08:54	11/10/14 20:25	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0183	U	0.104	0.104	1.00	0.215	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-235/236	-0.00947	U	0.0189	0.0190	1.00	0.126	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-238	0.102	J	0.0906	0.0910	1.00	0.101	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	93.3		30 - 110	10/30/14 14:02	11/07/14 10:00	1

Client Sample ID: WAA-03-AF-PS-20141016

Lab Sample ID: 160-8934-3
Matrix: Filter

Date Collected: 10/16/14 11:10
Date Received: 10/20/14 14:30

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.292	U	0.330	0.331	1.00	0.539	pCi/Sample	10/29/14 13:31	11/02/14 16:00	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	101		40 - 110	10/29/14 13:31	11/02/14 16:00	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0843	U	0.140	0.140	1.00	0.248	pCi/Sample	11/10/14 08:54	11/10/14 20:26	1
Thorium-230	0.327	J	0.177	0.179	1.00	0.166	pCi/Sample	11/10/14 08:54	11/10/14 20:26	1
Thorium-232	0.0489	U	0.0909	0.0910	1.00	0.169	pCi/Sample	11/10/14 08:54	11/10/14 20:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	82.2		30 - 110	11/10/14 08:54	11/10/14 20:26	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0695	U	0.0871	0.0873	1.00	0.137	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-235/236	-0.0192	U	0.0272	0.0272	1.00	0.152	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-238	0.0401	U	0.0677	0.0678	1.00	0.122	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	95.2		30 - 110	10/30/14 14:02	11/07/14 10:00	1

HVE 1 Dec 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-1

Client Sample ID: WAA-04-AF-PS-20141016

Lab Sample ID: 160-8934-4
Matrix: Filter

Date Collected: 10/16/14 11:25
Date Received: 10/20/14 14:30

Method: 9315 - Total Alpha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.393	U	0.297	0.299	1.00	0.436	pCi/Sample	10/29/14 13:31	11/02/14 16:01	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	99.4		40 - 110	10/29/14 13:31	11/02/14 16:01	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0605	U	0.130	0.130	1.00	0.240	pCi/Sample	11/10/14 08:54	11/10/14 20:26	1
Thorium-230	0.232	J	0.145	0.146	1.00	0.135	pCi/Sample	11/10/14 08:54	11/10/14 20:26	1
Thorium-232	0.0816	J	0.0816	0.0819	1.00	0.0612	pCi/Sample	11/10/14 08:54	11/10/14 20:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	82.2		30 - 110	11/10/14 08:54	11/10/14 20:26	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0668	U	0.101	0.101	1.00	0.175	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-235/236	-0.0396	U	0.0396	0.0397	1.00	0.191	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-238	0.0524	U	0.0810	0.0811	1.00	0.141	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	89.1		30 - 110	10/30/14 14:02	11/07/14 10:00	1

Client Sample ID: WAA-05-AF-PS-20141016

Lab Sample ID: 160-8934-5
Matrix: Filter

Date Collected: 10/16/14 10:53
Date Received: 10/20/14 14:30

Method: 9315 - Total Alpha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.194	U	0.263	0.264	1.00	0.442	pCi/Sample	10/29/14 13:31	11/02/14 16:01	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	97.3		40 - 110	10/29/14 13:31	11/02/14 16:01	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0764	U	0.117	0.117	1.00	0.203	pCi/Sample	11/10/14 08:54	11/10/14 20:26	1
Thorium-230	0.356	J	0.207	0.209	1.00	0.242	pCi/Sample	11/10/14 08:54	11/10/14 20:26	1
Thorium-232	-0.00152	U	0.0741	0.0741	1.00	0.189	pCi/Sample	11/10/14 08:54	11/10/14 20:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	79.3		30 - 110	11/10/14 08:54	11/10/14 20:26	1

HUG 1 Dec 14

TestAmerica St. Louis

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-1

Client Sample ID: WAA-05-AF-PS-20141016

Lab Sample ID: 160-8934-5
Matrix: Filter

Date Collected: 10/16/14 10:53
Date Received: 10/20/14 14:30

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0966	U	0.0942	0.0945	1.00	0.123	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-235/236	0.000	U	0.0194	0.0194	1.00	0.0698	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-238	0.0591	U	0.0778	0.0779	1.00	0.123	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*90.1*		*30 - 110*	*10/30/14 14:02*	*11/07/14 10:00*	*1*

Client Sample ID: WAA-00-AF-FB-20141016

Lab Sample ID: 160-8934-6
Matrix: Filter

Date Collected: 10/16/14 00:00
Date Received: 10/20/14 14:30

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.292	U	0.274	0.275	1.00	0.425	pCi/Sample	10/29/14 13:31	11/02/14 16:01	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*100*		*40 - 110*	*10/29/14 13:31*	*11/02/14 16:01*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	-0.0726	U J	0.0537	0.0541	1.00	0.226	pCi/Sample	11/10/14 08:54	11/10/14 20:26	1
Thorium-230	**0.617**		0.247	0.253	1.00	0.194	pCi/Sample	11/10/14 08:54	11/10/14 20:26	1
Thorium-232	0.0569	U	0.102	0.102	1.00	0.187	pCi/Sample	11/10/14 08:54	11/10/14 20:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.3*		*30 - 110*	*11/10/14 08:54*	*11/10/14 20:26*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.114**	J	0.0929	0.0933	1.00	0.0958	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-235/236	0.0216	U J	0.0431	0.0432	1.00	0.0647	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-238	**0.0692**	J	0.0692	0.0694	1.00	0.0519	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*93.5*		*30 - 110*	*10/30/14 14:02*	*11/07/14 10:00*	*1*

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QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-1

Method: 9315 - Total Apha Radium (GFPC)

Lab Sample ID: MB 160-152917/1-A — **Client Sample ID: Method Blank**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 153654 — **Prep Batch: 152917**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.3382	U	0.362	0.363	1.00	0.587	pCi/Sample	10/29/14 13:31	11/02/14 16:00	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*94.7*		*40 - 110*	*10/29/14 13:31*	*11/02/14 16:00*	*1*

Lab Sample ID: LCS 160-152917/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 153654 — **Prep Batch: 152917**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Total Alpha Radium			45.0	44.23		4.66	1.00	0.666	pCi/Samp	98	65 - 150		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*95.0*		*40 - 110*

Lab Sample ID: LCSD 160-152917/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 153654 — **Prep Batch: 152917**

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Total Alpha Radium			45.0	49.74		5.06	1.00	0.525	pCi/Samp	111	65 - 150	0.57	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*95.6*		*40 - 110*

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

Lab Sample ID: MB 160-155188/1-A — **Client Sample ID: Method Blank**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 155621 — **Prep Batch: 155188**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0000	U	0.0176	0.0176	1.00	0.0634	pCi/Sample	11/10/14 08:54	11/10/14 20:25	1
Thorium-230	0.1684		0.119	0.120	1.00	0.0634	pCi/Sample	11/10/14 08:54	11/10/14 20:25	1
Thorium-232	0.01227	U	0.0456	0.0456	1.00	0.116	pCi/Sample	11/10/14 08:54	11/10/14 20:25	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.1*		*30 - 110*	*11/10/14 08:54*	*11/10/14 20:25*	*1*

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

Lab Sample ID: LCS 160-155188/2-A
Matrix: Filter
Analysis Batch: 155622

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 155188

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			16.1	18.09		2.04	1.00	0.142	pCi/Samp	113	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*67.0*		*30 - 110*

Lab Sample ID: LCSD 160-155188/3-A
Matrix: Filter
Analysis Batch: 155912

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 155188

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Thorium-230			16.1	18.90		2.02	1.00	0.115	pCi/Samp	118	81 - 118	0.20	1

Tracer	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Thorium-229	*81.4*		*30 - 110*

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

Lab Sample ID: MB 160-153072/1-A
Matrix: Filter
Analysis Batch: 154926

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 153072

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.08740	U	0.0867	0.0871	1.00	0.105	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-235/236	-0.009887	U	0.0198	0.0198	1.00	0.131	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1
Uranium-238	0.02220	U	0.0583	0.0583	1.00	0.125	pCi/Sample	10/30/14 14:02	11/07/14 10:00	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*85.3*		*30 - 110*	*10/30/14 14:02*	*11/07/14 10:00*	*1*

Lab Sample ID: LCS 160-153072/2-A
Matrix: Filter
Analysis Batch: 154927

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 153072

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-233/234			25.5	25.46		2.56	1.00	0.155	pCi/Samp	100	84 - 120		
Uranium-238			26.0	26.01		2.60	1.00	0.106	pCi/Samp	100	82 - 122		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*86.7*		*30 - 110*

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-1

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

Lab Sample ID: LCSD 160-153072/3-A
Matrix: Filter
Analysis Batch: 154928

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 153072

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Uranium-233/234			25.5	26.37		2.61	1.00	0.166	pCi/Samp	104	84 - 120	0.18	1
Uranium-238			26.0	26.73		2.64	1.00	0.0994	pCi/Samp	103	82 - 122	0.14	1

Tracer	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Uranium-232	*96.6*		*30 - 110*

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-1

Rad

Prep Batch: 152917

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8934-1	WAA-01-AF-PS-20141016	Total/NA	Filter	DPS-0	
160-8934-2	WAA-02-AF-PS-20141016	Total/NA	Filter	DPS-0	
160-8934-3	WAA-03-AF-PS-20141016	Total/NA	Filter	DPS-0	
160-8934-4	WAA-04-AF-PS-20141016	Total/NA	Filter	DPS-0	
160-8934-5	WAA-05-AF-PS-20141016	Total/NA	Filter	DPS-0	
160-8934-6	WAA-00-AF-FB-20141016	Total/NA	Filter	DPS-0	
LCS 160-152917/2-A	Lab Control Sample	Total/NA	Filter	DPS-0	
LCSD 160-152917/3-A	Lab Control Sample Dup	Total/NA	Filter	DPS-0	
MB 160-152917/1-A	Method Blank	Total/NA	Filter	DPS-0	

Prep Batch: 153072

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8934-1	WAA-01-AF-PS-20141016	Total/NA	Filter	ExtChrom	
160-8934-2	WAA-02-AF-PS-20141016	Total/NA	Filter	ExtChrom	
160-8934-3	WAA-03-AF-PS-20141016	Total/NA	Filter	ExtChrom	
160-8934-4	WAA-04-AF-PS-20141016	Total/NA	Filter	ExtChrom	
160-8934-5	WAA-05-AF-PS-20141016	Total/NA	Filter	ExtChrom	
160-8934-6	WAA-00-AF-FB-20141016	Total/NA	Filter	ExtChrom	
LCS 160-153072/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
LCSD 160-153072/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-153072/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Prep Batch: 155188

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-8934-1	WAA-01-AF-PS-20141016	Total/NA	Filter	ExtChrom	
160-8934-2	WAA-02-AF-PS-20141016	Total/NA	Filter	ExtChrom	
160-8934-3	WAA-03-AF-PS-20141016	Total/NA	Filter	ExtChrom	
160-8934-4	WAA-04-AF-PS-20141016	Total/NA	Filter	ExtChrom	
160-8934-5	WAA-05-AF-PS-20141016	Total/NA	Filter	ExtChrom	
160-8934-6	WAA-00-AF-FB-20141016	Total/NA	Filter	ExtChrom	
LCS 160-155188/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
LCSD 160-155188/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-155188/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Tracer/Carrier Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-8934-1

Method: 9315 - Total Apha Radium (GFPC)

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

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(40-110)
160-8934-1	WAA-01-AF-PS-20141016	97.6
160-8934-2	WAA-02-AF-PS-20141016	98.8
160-8934-3	WAA-03-AF-PS-20141016	101
160-8934-4	WAA-04-AF-PS-20141016	99.4
160-8934-5	WAA-05-AF-PS-20141016	97.3
160-8934-6	WAA-00-AF-FB-20141016	100
LCS 160-152917/2-A	Lab Control Sample	95.0
LCSD 160-152917/3-A	Lab Control Sample Dup	95.6
MB 160-152917/1-A	Method Blank	94.7

Tracer/Carrier Legend

Ba = Ba Carrier

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

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

		Percent Yield (Acceptance Limits)
		Th-229
Lab Sample ID	Client Sample ID	(30-110)
160-8934-1	WAA-01-AF-PS-20141016	85.3
160-8934-2	WAA-02-AF-PS-20141016	79.0
160-8934-3	WAA-03-AF-PS-20141016	82.2
160-8934-4	WAA-04-AF-PS-20141016	82.2
160-8934-5	WAA-05-AF-PS-20141016	79.3
160-8934-6	WAA-00-AF-FB-20141016	78.3
LCS 160-155188/2-A	Lab Control Sample	67.0
LCSD 160-155188/3-A	Lab Control Sample Dup	81.4
MB 160-155188/1-A	Method Blank	82.1

Tracer/Carrier Legend

Th-229 = Thorium-229

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

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

		Percent Yield (Acceptance Limits)
		U-232
Lab Sample ID	Client Sample ID	(30-110)
160-8934-1	WAA-01-AF-PS-20141016	90.0
160-8934-2	WAA-02-AF-PS-20141016	93.3
160-8934-3	WAA-03-AF-PS-20141016	95.2
160-8934-4	WAA-04-AF-PS-20141016	89.1
160-8934-5	WAA-05-AF-PS-20141016	90.1
160-8934-6	WAA-00-AF-FB-20141016	93.5
LCS 160-153072/2-A	Lab Control Sample	86.7
LCSD 160-153072/3-A	Lab Control Sample Dup	96.6
MB 160-153072/1-A	Method Blank	85.3

Tracer/Carrier Legend

U-232 = Uranium-232

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	November 17, 2014
Sample Delivery Group (SDG):	J9055
Sample Numbers:	WAA-01-AF-PS-20141023, WAA-02-AF-PS-20141023, WAA-03-AF-PS-20141023, WAA-04-AF-PS-20141023, WAA-05-AF-PS-20141023, and WAA-00-AF-FB-20141023
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) and the EPA and others document "Multi-Agency Radiological Laboratory Analytical Protocols Manual" (July 2004) were used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.

I, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

17 October 2014

Certified by Harry Ellis, Chemist

Date

WLLFOIA4312 - 015 - 0155499

DATA VALIDATION QUALIFIERS

U — The analyte was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

WLLFOIA4312 - 015 - 0155500

DATA ASSESSMENT

Sample delivery group (SDG) J9055 included five (5) environmental air (filter) samples and one (1) QC samples (a field blank). Samples were analyzed for gross alpha and beta radiation by EPA SW-846 Method 9310 and for cesium-137 and other gamma-emitters by Department of Energy (DOE) Method Ga-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. LCS and duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blanks yielded no detectable activities. The field blank yielded a low beta activity. The other field samples yielded more than 5 times the field blank beta activity, so no further qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analyses were within established control limits. No qualifications were applied.

V. Surrogates

Surrogates are not used in these radioanalytical methods.

VI. Comments

Many detected activities were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with no significant qualifications applied. All data are usable as qualified for their intended purposes.

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-9055-2
Client Project/Site: West Lake Landfill - Filters

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
10/31/2014 4:28:21 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 160-9055-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-9055-2

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 10/27/2014 1:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 20.0° C.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples WAA-01-AF-PS-20141023 (160-9055-1), WAA-02-AF-PS-20141023 (160-9055-2), WAA-03-AF-PS-20141023 (160-9055-3), WAA-04-AF-PS-20141023 (160-9055-4), WAA-05-AF-PS-20141023 (160-9055-5) and WAA-00-AF-FB-20141023 (160-9055-6) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with SW846 9310. The samples were prepared and analyzed on 10/28/2014.

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

RADIUM-226 & OTHER GAMMA EMITTERS (GS)

Samples WAA-01-AF-PS-20141023 (160-9055-1), WAA-02-AF-PS-20141023 (160-9055-2), WAA-03-AF-PS-20141023 (160-9055-3), WAA-04-AF-PS-20141023 (160-9055-4), WAA-05-AF-PS-20141023 (160-9055-5) and WAA-00-AF-FB-20141023 (160-9055-6) were

Job ID: 160-9055-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with GA-01-R. The samples were prepared on 10/28/2014 and analyzed on 10/29/2014 and 10/30/2014.

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

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Dave Kinroth	Site Contact: Dave Kinroth	Date: 10-27-14	COC No:
Tetra Tech, Inc.	Tel/Fax: 314-517-6798	Lab Contact: Mike Franks	Carrier: NA	1 of 1 COCs
415 Oak Street	Analysis Turnaround Time			Sampler:
Kansas City, MO 64106	☐ CALENDAR DAYS ☑ WORKING DAYS			For Lab Use Only:
(816) 412-1786 Phone	TAT if different from Below ____20____			Walk-in Client:
(816) 816-410-1748 FAX	☐ 2 weeks			Lab Sampling:
Project Name: West Lake Landfill Site	☐ 1 week			
Site: Bridgeton, MO	☐ 2 days			Job / SDG No.:
P O # 1105610	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	9310 Gross Alpha/Beta	GA-01-R Gamm Spec	9315 Total Alpha Radium	A-01-R Isotopic Thorium	A-01-R Isotopic Uranium	* 9315 Radium-226 (GFPC)	Sample Specific Notes:
WAA-01-AF-PS-20141023	10/23/14	14:34	Filter	Air	1			X	X	X	X	X	X	* 9315 Radium-226 (GFPC)
WAA-02-AF-PS-20141023	10/23/14	13:29	Filter	Air	1			X	X	X	X	X	X	contingent upon TAR results
WAA-03-AF-PS-20141023	10/23/14	14:01	Filter	Air	1			X	X	X	X	X	X	for all samples
WAA-04-AF-PS-20141023	10/23/14	14:19	Filter	Air	1			X	X	X	X	X	X	
WAA-05-AF-PS-20141023	10/23/14	13:44	Filter	Air	1			X	X	X	X	X	X	
WAA-00-AF-FB-20141023	10/23/14	NA	Filter	Air	1			X	X	X	X	X	X	

160-9055 Chain of Custody

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4=HNO3, 5=NaOH, 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for_____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Dave Kinroth	Tetra Tech STARL	10-27-14 1320	[illegible]	Tr Salem	10-27-14 / 1330
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-9055-2

Login Number: 9055

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-2

Qualifiers

Rad

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

Glossary

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

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-2

Method	Method Description	Protocol	Laboratory
9310	Gross Alpha / Beta (GFPC)	SW846	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	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: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-9055-1	WAA-01-AF-PS-20141023	Filter	10/23/14 14:34	10/27/14 13:30
160-9055-2	WAA-02-AF-PS-20141023	Filter	10/23/14 13:29	10/27/14 13:30
160-9055-3	WAA-03-AF-PS-20141023	Filter	10/23/14 14:01	10/27/14 13:30
160-9055-4	WAA-04-AF-PS-20141023	Filter	10/23/14 14:19	10/27/14 13:30
160-9055-5	WAA-05-AF-PS-20141023	Filter	10/23/14 13:44	10/27/14 13:30
160-9055-6	WAA-00-AF-FB-20141023	Filter	10/23/14 00:00	10/27/14 13:30

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-2

Client Sample ID: WAA-01-AF-PS-20141023

Lab Sample ID: 160-9055-1
Matrix: Filter

Date Collected: 10/23/14 14:34
Date Received: 10/27/14 13:30

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.563	J	0.277	0.285	10.0	0.276	pCi/Sample	10/28/14 10:27	10/28/14 12:50	1
Gross Beta	14.0		1.06	1.75	10.0	0.384	pCi/Sample	10/28/14 10:27	10/28/14 12:50	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-0.959	U	6.10	6.10	20.0	11.3	pCi/Sample	10/28/14 10:13	10/29/14 20:33	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*10/28/14 10:13*	*10/29/14 20:33*	*1*

Client Sample ID: WAA-02-AF-PS-20141023

Lab Sample ID: 160-9055-2
Matrix: Filter

Date Collected: 10/23/14 13:29
Date Received: 10/27/14 13:30

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.429	J	0.262	0.266	10.0	0.326	pCi/Sample	10/28/14 10:27	10/28/14 12:50	1
Gross Beta	12.4		0.984	1.59	10.0	0.360	pCi/Sample	10/28/14 10:27	10/28/14 12:50	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-0.845	U	6.04	6.04	20.0	10.9	pCi/Sample	10/28/14 10:13	10/29/14 21:11	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*10/28/14 10:13*	*10/29/14 21:11*	*1*

Client Sample ID: WAA-03-AF-PS-20141023

Lab Sample ID: 160-9055-3
Matrix: Filter

Date Collected: 10/23/14 14:01
Date Received: 10/27/14 13:30

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.275	U	0.222	0.224	10.0	0.310	pCi/Sample	10/28/14 10:27	10/28/14 12:51	1
Gross Beta	11.9		0.952	1.52	10.0	0.340	pCi/Sample	10/28/14 10:27	10/28/14 12:51	1

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TestAmerica St. Louis

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-2

Client Sample ID: WAA-03-AF-PS-20141023

Lab Sample ID: 160-9055-3
Matrix: Filter

Date Collected: 10/23/14 14:01
Date Received: 10/27/14 13:30

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.69	U	5.76	5.76	20.0	10.4	pCi/Sample	10/28/14 10:13	10/29/14 21:08	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*10/28/14 10:13*	*10/29/14 21:08*	*1*

Client Sample ID: WAA-04-AF-PS-20141023

Lab Sample ID: 160-9055-4
Matrix: Filter

Date Collected: 10/23/14 14:19
Date Received: 10/27/14 13:30

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.331	J	0.239	0.241	10.0	0.317	pCi/Sample	10/28/14 10:27	10/28/14 12:51	1
Gross Beta	10.5		0.908	1.39	10.0	0.358	pCi/Sample	10/28/14 10:27	10/28/14 12:51	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-3.77	U	7.87	7.88	20.0	13.6	pCi/Sample	10/28/14 10:13	10/29/14 21:52	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*10/28/14 10:13*	*10/29/14 21:52*	*1*

Client Sample ID: WAA-05-AF-PS-20141023

Lab Sample ID: 160-9055-5
Matrix: Filter

Date Collected: 10/23/14 13:44
Date Received: 10/27/14 13:30

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.290	U	0.229	0.231	10.0	0.318	pCi/Sample	10/28/14 10:27	10/28/14 12:52	1
Gross Beta	11.1		0.923	1.45	10.0	0.331	pCi/Sample	10/28/14 10:27	10/28/14 12:52	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-0.00186	U	5.68	5.68	20.0	10.9	pCi/Sample	10/28/14 10:13	10/30/14 16:56	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-2

Client Sample ID: WAA-05-AF-PS-20141023

Lab Sample ID: 160-9055-5
Matrix: Filter

Date Collected: 10/23/14 13:44
Date Received: 10/27/14 13:30

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/Sample	10/28/14 10:13	10/30/14 16:56	1

Client Sample ID: WAA-00-AF-FB-20141023

Lab Sample ID: 160-9055-6
Matrix: Filter

Date Collected: 10/23/14 00:00
Date Received: 10/27/14 13:30

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.172	U	0.196	0.197	10.0	0.311	pCi/Sample	10/28/14 10:27	10/28/14 12:52	1
Gross Beta	1.68	J	0.390	0.425	10.0	0.327	pCi/Sample	10/28/14 10:27	10/28/14 12:52	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.44	U	5.78	5.78	20.0	10.5	pCi/Sample	10/28/14 10:13	10/30/14 16:58	1

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/Sample	10/28/14 10:13	10/30/14 16:58	1

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QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-2

Method: 9310 - Gross Alpha / Beta (GFPC)

Lab Sample ID: MB 160-152465/1-A
Matrix: Filter
Analysis Batch: 152492

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 152465

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.3124	U	0.234	0.237	10.0	0.315	pCi/Sample	10/28/14 10:27	10/28/14 12:49	1
Gross Beta	0.1061	U	0.220	0.220	10.0	0.386	pCi/Sample	10/28/14 10:27	10/28/14 12:49	1

Lab Sample ID: LCS 160-152465/2-A
Matrix: Filter
Analysis Batch: 152492

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 152465

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Alpha	5.37	5.098		0.958	10.0	0.280	pCi/Samp	95	75 - 125

Lab Sample ID: LCSB 160-152465/3-A
Matrix: Filter
Analysis Batch: 152492

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 152465

Analyte	Spike Added	LCSB Result	LCSB Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Beta	18.0	16.96		2.04	10.0	0.370	pCi/Samp	94	75 - 125

Lab Sample ID: 160-9055-1 DU
Matrix: Filter
Analysis Batch: 152596

Client Sample ID: WAA-01-AF-PS-20141023
Prep Type: Total/NA
Prep Batch: 152465

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Gross Alpha	0.563		0.4365	U	0.370	10.0	0.505	pCi/Samp	0.19	1
Gross Beta	14.0		12.03		1.52	10.0	0.369	pCi/Samp	0.61	1

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

Lab Sample ID: MB 160-152462/1-A
Matrix: Filter
Analysis Batch: 152929

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 152462

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0.0000	U	1.28	1.28	20.0	3.33	pCi/Sample	10/28/14 10:13	10/29/14 21:12	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*10/28/14 10:13*	*10/29/14 21:12*	*1*

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-2

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

Lab Sample ID: LCS 160-152462/2-A
Matrix: Filter
Analysis Batch: 152959

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 152462

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	32000	31900		3320		172	pCi/Samp	100	87 - 116
Cesium-137	11200	10800		1150	20.0	100	pCi/Samp	97	87 - 120
Cobalt-60	12100	12050		1230		51.9	pCi/Samp	99	87 - 115

Lab Sample ID: 160-9055-1 DU
Matrix: Filter
Analysis Batch: 152951

Client Sample ID: WAA-01-AF-PS-20141023
Prep Type: Total/NA
Prep Batch: 152462

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Cesium-137	-0.959	U	-0.8663	U	4.21	20.0	7.72	pCi/Samp	0.01	1

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-2

Rad

Prep Batch: 152462

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-9055-1	WAA-01-AF-PS-20141023	Total/NA	Filter	None	
160-9055-1 DU	WAA-01-AF-PS-20141023	Total/NA	Filter	None	
160-9055-2	WAA-02-AF-PS-20141023	Total/NA	Filter	None	
160-9055-3	WAA-03-AF-PS-20141023	Total/NA	Filter	None	
160-9055-4	WAA-04-AF-PS-20141023	Total/NA	Filter	None	
160-9055-5	WAA-05-AF-PS-20141023	Total/NA	Filter	None	
160-9055-6	WAA-00-AF-FB-20141023	Total/NA	Filter	None	
LCS 160-152462/2-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-152462/1-A	Method Blank	Total/NA	Filter	None	

Prep Batch: 152465

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-9055-1	WAA-01-AF-PS-20141023	Total/NA	Filter	None	
160-9055-1 DU	WAA-01-AF-PS-20141023	Total/NA	Filter	None	
160-9055-2	WAA-02-AF-PS-20141023	Total/NA	Filter	None	
160-9055-3	WAA-03-AF-PS-20141023	Total/NA	Filter	None	
160-9055-4	WAA-04-AF-PS-20141023	Total/NA	Filter	None	
160-9055-5	WAA-05-AF-PS-20141023	Total/NA	Filter	None	
160-9055-6	WAA-00-AF-FB-20141023	Total/NA	Filter	None	
LCS 160-152465/2-A	Lab Control Sample	Total/NA	Filter	None	
LCSB 160-152465/3-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-152465/1-A	Method Blank	Total/NA	Filter	None	

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	December 1, 2014
Sample Delivery Group (SDG):	J9055
Sample Numbers:	WAA-01-AF-PS-20141023, WAA-02-AF-PS-20141023, WAA-03-AF-PS-20141023, WAA-04-AF-PS-20141023, WAA-05-AF-PS-20141023, and WAA-00-AF-FB-20141023
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) and the EPA and others document "Multi-Agency Radiological Laboratory Analytical Protocols Manual" (July 2004) were used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.

I, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

1 December 2014

Certified by Harry Ellis, Chemist

Date

WLLFOIA4312 - 015 - 0155518

DATA VALIDATION QUALIFIERS

U — The analyte was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

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DATA ASSESSMENT

Sample delivery group (SDG) J9055 included five (5) environmental air (filter) samples and one (1) QC sample (a field blank). Samples were analyzed for total alpha-emitting radium by EPA SW-846 Method 9315 and for isotopic (alpha-emitting) thorium and uranium by Department of Energy (DOE) Method A-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Insufficient sample was available for MS/MSD analyses. Duplicate LCS analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blank yielded a low activity for one (of three) thorium isotope and one (of three) uranium isotopes. The field blank yielded low activities for two thorium isotopes and no uranium isotopes. The blank activity was similar to those seen in the other field samples. No qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries and relative percent differences from the duplicate LCS analyses were within established control limits.

V. Surrogates

These radioanalytical methods use a "carrier" or "tracer", whose recovery serves the same functions as surrogate recoveries. All carrier and tracer recoveries were within the laboratory's QC limits. No qualifications were applied.

VI. Comments

All detected results were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with few qualifications applied. All data are usable as qualified for their intended purposes.

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-9055-1
Client Project/Site: West Lake Landfill - Filters

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
11/24/2014 5:05:10 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

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

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 160-9055-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-9055-1

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 10/27/2014 1:30 PM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

TOTAL ALPHA RADIUM (GFPC)

Samples WAA-01-AF-PS-20141023 (160-9055-1), WAA-02-AF-PS-20141023 (160-9055-2), WAA-03-AF-PS-20141023 (160-9055-3), WAA-04-AF-PS-20141023 (160-9055-4), WAA-05-AF-PS-20141023 (160-9055-5) and WAA-00-AF-FB-20141023 (160-9055-6) were analyzed for Total Alpha Radium (GFPC) in accordance with SW- 846 Method 9315. The samples were prepared on 11/06/2014 and analyzed on 11/07/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead of a sample duplicate.

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

Job ID: 160-9055-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20141023 (160-9055-1), WAA-02-AF-PS-20141023 (160-9055-2), WAA-03-AF-PS-20141023 (160-9055-3), WAA-04-AF-PS-20141023 (160-9055-4), WAA-05-AF-PS-20141023 (160-9055-5) and WAA-00-AF-FB-20141023 (160-9055-6) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared on 11/12/2014 and analyzed on 11/16/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead of a sample duplicate.

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

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples WAA-01-AF-PS-20141023 (160-9055-1), WAA-02-AF-PS-20141023 (160-9055-2), WAA-03-AF-PS-20141023 (160-9055-3), WAA-04-AF-PS-20141023 (160-9055-4), WAA-05-AF-PS-20141023 (160-9055-5) and WAA-00-AF-FB-20141023 (160-9055-6) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with A-01-R. The samples were prepared on 11/05/2014 and analyzed on 11/07/2014.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP). The samples are filters that must be split between multiple analysis. A LCS/LCSD was used instead of a sample duplicate.

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

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Dave Kinroth	Site Contact: Dave Kinroth	Date: 10-27-14	COC No:
Tetra Tech, Inc.	Tel/Fax: 314-517-6798	Lab Contact: Mike Franks	Carrier: NA	1 of 1 COCs
415 Oak Street	Analysis Turnaround Time			Sampler:
Kansas City, MO 64106	☐ CALENDAR DAYS ☑ WORKING DAYS			For Lab Use Only:
(816) 412-1786 Phone	TAT if different from Below 20			Walk-in Client:
(816) 816-410-1748 FAX	☐ 2 weeks			Lab Sampling:
Project Name: West Lake Landfill Site	☐ 1 week			
Site: Bridgeton, MO	☐ 2 days			Job / SDG No.:
P O # 1105610	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	9310 Gross Alpha/Beta	GA-01-R Gamm Spec	9315 Total Alpha Radium	A-01-R Isotopic Thorium	A-01-R Isotopic Uranium	* 9315 Radium-226 (GFPC)	Sample Specific Notes:
WAA-01-AF-PS-20141023	10/23/14	14:34	Filter	Air	1			X	X	X	X	X	X	* 9315 Radium-226 (GFPC)
WAA-02-AF-PS-20141023	10/23/14	13:29	Filter	Air	1			X	X	X	X	X	X	contingent upon TAR results
WAA-03-AF-PS-20141023	10/23/14	14:01	Filter	Air	1			X	X	X	X	X	X	for all samples
WAA-04-AF-PS-20141023	10/23/14	14:19	Filter	Air	1			X	X	X	X	X	X	
WAA-05-AF-PS-20141023	10/23/14	13:44	Filter	Air	1			X	X	X	X	X	X	
WAA-00-AF-FB-20141023	10/23/14	NA	Filter	Air	1			X	X	X	X	X	X	

160-9055 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Dave Kinroth	Tetra Tech START	10-27-14 1320	[signature]	[signature]	10-27-14 / 1330
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

WLLFOIA4312 - 015 - 0155526
11/24/2014

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-9055-1

Login Number: 9055

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-1

Qualifiers

Rad

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

Glossary

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

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-1

Method	Method Description	Protocol	Laboratory
9315	Total Apha Radium (GFPC)	SW846	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	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: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-9055-1	WAA-01-AF-PS-20141023	Filter	10/23/14 14:34	10/27/14 13:30
160-9055-2	WAA-02-AF-PS-20141023	Filter	10/23/14 13:29	10/27/14 13:30
160-9055-3	WAA-03-AF-PS-20141023	Filter	10/23/14 14:01	10/27/14 13:30
160-9055-4	WAA-04-AF-PS-20141023	Filter	10/23/14 14:19	10/27/14 13:30
160-9055-5	WAA-05-AF-PS-20141023	Filter	10/23/14 13:44	10/27/14 13:30
160-9055-6	WAA-00-AF-FB-20141023	Filter	10/23/14 00:00	10/27/14 13:30

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-1

Client Sample ID: WAA-01-AF-PS-20141023

Lab Sample ID: 160-9055-1
Matrix: Filter

Date Collected: 10/23/14 14:34
Date Received: 10/27/14 13:30

Method: 9315 - Total Alpha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.692	U	0.555	0.558	1.00	0.834	pCi/Sample	11/06/14 14:25	11/07/14 18:06	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	102		40 - 110	11/06/14 14:25	11/07/14 18:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	-0.00526	U	0.108	0.108	1.00	0.235	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-230	0.429	J	0.178	0.181	1.00	0.0551	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-232	0.139	J	0.105	0.105	1.00	0.101	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	90.9		30 - 110	11/12/14 08:29	11/16/14 22:24	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.133	J	0.0900	0.0907	1.00	0.127	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-235/236	0.00975	U	0.0338	0.0338	1.00	0.0746	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-238	0.0939	J	0.0585	0.0591	1.00	0.0599	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	90.4		30 - 110	11/05/14 08:13	11/07/14 17:43	1

Client Sample ID: WAA-02-AF-PS-20141023

Lab Sample ID: 160-9055-2
Matrix: Filter

Date Collected: 10/23/14 13:29
Date Received: 10/27/14 13:30

Method: 9315 - Total Alpha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.739	J	0.513	0.517	1.00	0.725	pCi/Sample	11/06/14 14:25	11/07/14 18:06	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110	11/06/14 14:25	11/07/14 18:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0290	U	0.135	0.135	1.00	0.265	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-230	0.494	J	0.198	0.202	1.00	0.107	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-232	0.0722	U	0.0905	0.0907	1.00	0.142	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1

HVE 1 Dec 2014

TestAmerica St. Louis

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-1

Client Sample ID: WAA-02-AF-PS-20141023

Lab Sample ID: 160-9055-2
Matrix: Filter

Date Collected: 10/23/14 13:29
Date Received: 10/27/14 13:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	89.5		30 - 110	11/12/14 08:29	11/16/14 22:24	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.109	J	0.0658	0.0664	1.00	0.0743	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-235/236	0.0193	U	0.0386	0.0386	1.00	0.0739	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-238	0.116	J	0.0638	0.0646	1.00	0.0592	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	88.4		30 - 110	11/05/14 08:13	11/07/14 17:43	1

Client Sample ID: WAA-03-AF-PS-20141023

Lab Sample ID: 160-9055-3
Matrix: Filter

Date Collected: 10/23/14 14:01
Date Received: 10/27/14 13:30

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.783	J	0.532	0.537	1.00	0.750	pCi/Sample	11/06/14 14:25	11/07/14 18:06	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	102		40 - 110	11/06/14 14:25	11/07/14 18:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.113	U J	0.114	0.114	1.00	0.165	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-230	0.579		0.211	0.216	1.00	0.0574	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-232	0.0872	U	0.0866	0.0869	1.00	0.105	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	92.2		30 - 110	11/12/14 08:29	11/16/14 22:24	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0628	U J	0.0769	0.0771	1.00	0.127	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-235/236	0.0586		0.0478	0.0481	1.00	0.0293	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-238	0.0392	U	0.0607	0.0607	1.00	0.105	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	91.9		30 - 110	11/05/14 08:13	11/07/14 17:43	1

HVE 1 Dec 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-1

Client Sample ID: WAA-04-AF-PS-20141023

Date Collected: 10/23/14 14:19
Date Received: 10/27/14 13:30

Lab Sample ID: 160-9055-4
Matrix: Filter

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.313	U	0.508	0.509	1.00	0.876	pCi/Sample	11/06/14 14:25	11/07/14 18:06	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	102		40 - 110	11/06/14 14:25	11/07/14 18:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0318	U	0.0965	0.0966	1.00	0.194	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-230	0.484	J	0.195	0.199	1.00	0.106	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-232	0.0570	J	0.0659	0.0660	1.00	0.0570	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	91.8		30 - 110	11/12/14 08:29	11/16/14 22:24	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.114	J	0.0729	0.0735	1.00	0.0935	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-235/236	0.0473	U J	0.0500	0.0502	1.00	0.0724	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-238	0.0986		0.0661	0.0666	1.00	0.0839	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	92.4		30 - 110	11/05/14 08:13	11/07/14 17:43	1

Client Sample ID: WAA-05-AF-PS-20141023

Date Collected: 10/23/14 13:44
Date Received: 10/27/14 13:30

Lab Sample ID: 160-9055-5
Matrix: Filter

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.768	U	0.553	0.557	1.00	0.800	pCi/Sample	11/06/14 14:25	11/07/14 18:06	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	102		40 - 110	11/06/14 14:25	11/07/14 18:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	-0.0207	U	0.0985	0.0985	1.00	0.235	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-230	0.503	J	0.205	0.209	1.00	0.131	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-232	0.0745	U	0.0933	0.0935	1.00	0.146	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	85.7		30 - 110	11/12/14 08:29	11/16/14 22:24	1

HUG 1 Dec 14

TestAmerica St. Louis

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-1

Client Sample ID: WAA-05-AF-PS-20141023

Lab Sample ID: 160-9055-5
Matrix: Filter

Date Collected: 10/23/14 13:44
Date Received: 10/27/14 13:30

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0617	U	0.0577	0.0580	1.00	0.0853	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-235/236	0.00960	U	0.0333	0.0333	1.00	0.0735	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-238	0.0924	J	0.0653	0.0658	1.00	0.0852	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	94.8		30 - 110	11/05/14 08:13	11/07/14 17:43	1

Client Sample ID: WAA-00-AF-FB-20141023

Lab Sample ID: 160-9055-6
Matrix: Filter

Date Collected: 10/23/14 00:00
Date Received: 10/27/14 13:30

Method: 9315 - Total Apha Radium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.928	U	0.655	0.661	1.00	0.972	pCi/Sample	11/06/14 14:25	11/07/14 18:11	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110	11/06/14 14:25	11/07/14 18:11	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0639	U	0.137	0.137	1.00	0.251	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-230	0.457	J	0.183	0.187	1.00	0.0548	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-232	0.102	J	0.0903	0.0907	1.00	0.100	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	93.7		30 - 110	11/12/14 08:29	11/16/14 22:24	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.0838	U	0.0664	0.0668	1.00	0.0938	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-235/236	0.0190	U	0.0379	0.0380	1.00	0.0726	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-238	0.0304	U	0.0373	0.0373	1.00	0.0582	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	95.4		30 - 110	11/05/14 08:13	11/07/14 17:43	1

HVE
1 Daily

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-1

Method: 9315 - Total Apha Radium (GFPC)

Lab Sample ID: MB 160-154755/1-A — **Client Sample ID: Method Blank**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 155099 — **Prep Batch: 154755**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Alpha Radium	0.5408	U	0.518	0.521	1.00	0.810	pCi/Sample	11/06/14 14:25	11/07/14 18:05	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*97.3*		*40 - 110*	*11/06/14 14:25*	*11/07/14 18:05*	*1*

Lab Sample ID: LCS 160-154755/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 155099 — **Prep Batch: 154755**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Total Alpha Radium			45.0	42.84		4.83	1.00	0.944	pCi/Samp	95	65 - 150		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*98.5*		*40 - 110*

Lab Sample ID: LCSD 160-154755/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 155099 — **Prep Batch: 154755**

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Total Alpha Radium			45.0	42.74		4.81	1.00	0.834	pCi/Samp	95	65 - 150	0.01	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*97.1*		*40 - 110*

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

Lab Sample ID: MB 160-156210/1-A — **Client Sample ID: Method Blank**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 157278 — **Prep Batch: 156210**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.01857	U	0.134	0.134	1.00	0.272	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-230	0.4953		0.209	0.213	1.00	0.159	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1
Thorium-232	0.04035	U	0.0571	0.0572	1.00	0.0605	pCi/Sample	11/12/14 08:29	11/16/14 22:24	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.2*		*30 - 110*	*11/12/14 08:29*	*11/16/14 22:24*	*1*

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

Lab Sample ID: LCS 160-156210/2-A
Matrix: Filter
Analysis Batch: 157279

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 156210

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			16.1	18.52		1.99	1.00	0.228	pCi/Samp	115	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*83.4*		*30 - 110*

Lab Sample ID: LCSD 160-156210/3-A
Matrix: Filter
Analysis Batch: 157280

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 156210

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Thorium-230			16.1	16.44		1.74	1.00	0.0955	pCi/Samp	102	81 - 118	0.56	1

Tracer	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Thorium-229	*102*		*30 - 110*

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

Lab Sample ID: MB 160-154258/1-A
Matrix: Filter
Analysis Batch: 154879

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 154258

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.08542		0.0560	0.0565	1.00	0.0594	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-235/236	0.009664	U	0.0335	0.0335	1.00	0.0740	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1
Uranium-238	0.03100	U	0.0490	0.0491	1.00	0.0857	pCi/Sample	11/05/14 08:13	11/07/14 17:43	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*91.7*		*30 - 110*	*11/05/14 08:13*	*11/07/14 17:43*	*1*

Lab Sample ID: LCS 160-154258/2-A
Matrix: Filter
Analysis Batch: 154881

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 154258

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-233/234			25.5	26.18		2.39	1.00	0.0653	pCi/Samp	103	84 - 120		
Uranium-238			26.0	27.25		2.48	1.00	0.0652	pCi/Samp	105	82 - 122		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*83.7*		*30 - 110*

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-1

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

Lab Sample ID: LCSD 160-154258/3-A
Matrix: Filter
Analysis Batch: 154882

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 154258

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Uranium-233/234			25.5	25.74		2.35	1.00	0.0637	pCi/Samp	101	84 - 120	0.09	1
Uranium-238			26.0	26.57		2.42	1.00	0.0636	pCi/Samp	102	82 - 122	0.14	1

Tracer	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Uranium-232	*84.1*		*30 - 110*

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-1

Rad

Prep Batch: 154258

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-9055-1	WAA-01-AF-PS-20141023	Total/NA	Filter	ExtChrom	
160-9055-2	WAA-02-AF-PS-20141023	Total/NA	Filter	ExtChrom	
160-9055-3	WAA-03-AF-PS-20141023	Total/NA	Filter	ExtChrom	
160-9055-4	WAA-04-AF-PS-20141023	Total/NA	Filter	ExtChrom	
160-9055-5	WAA-05-AF-PS-20141023	Total/NA	Filter	ExtChrom	
160-9055-6	WAA-00-AF-FB-20141023	Total/NA	Filter	ExtChrom	
LCS 160-154258/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
LCSD 160-154258/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-154258/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Prep Batch: 154755

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-9055-1	WAA-01-AF-PS-20141023	Total/NA	Filter	DPS-0	
160-9055-2	WAA-02-AF-PS-20141023	Total/NA	Filter	DPS-0	
160-9055-3	WAA-03-AF-PS-20141023	Total/NA	Filter	DPS-0	
160-9055-4	WAA-04-AF-PS-20141023	Total/NA	Filter	DPS-0	
160-9055-5	WAA-05-AF-PS-20141023	Total/NA	Filter	DPS-0	
160-9055-6	WAA-00-AF-FB-20141023	Total/NA	Filter	DPS-0	
LCS 160-154755/2-A	Lab Control Sample	Total/NA	Filter	DPS-0	
LCSD 160-154755/3-A	Lab Control Sample Dup	Total/NA	Filter	DPS-0	
MB 160-154755/1-A	Method Blank	Total/NA	Filter	DPS-0	

Prep Batch: 156210

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-9055-1	WAA-01-AF-PS-20141023	Total/NA	Filter	ExtChrom	
160-9055-2	WAA-02-AF-PS-20141023	Total/NA	Filter	ExtChrom	
160-9055-3	WAA-03-AF-PS-20141023	Total/NA	Filter	ExtChrom	
160-9055-4	WAA-04-AF-PS-20141023	Total/NA	Filter	ExtChrom	
160-9055-5	WAA-05-AF-PS-20141023	Total/NA	Filter	ExtChrom	
160-9055-6	WAA-00-AF-FB-20141023	Total/NA	Filter	ExtChrom	
LCS 160-156210/2-A	Lab Control Sample	Total/NA	Filter	ExtChrom	
LCSD 160-156210/3-A	Lab Control Sample Dup	Total/NA	Filter	ExtChrom	
MB 160-156210/1-A	Method Blank	Total/NA	Filter	ExtChrom	

Tracer/Carrier Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9055-1

Method: 9315 - Total Apha Radium (GFPC)

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

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(40-110)
160-9055-1	WAA-01-AF-PS-20141023	102
160-9055-2	WAA-02-AF-PS-20141023	104
160-9055-3	WAA-03-AF-PS-20141023	102
160-9055-4	WAA-04-AF-PS-20141023	102
160-9055-5	WAA-05-AF-PS-20141023	102
160-9055-6	WAA-00-AF-FB-20141023	104
LCS 160-154755/2-A	Lab Control Sample	98.5
LCSD 160-154755/3-A	Lab Control Sample Dup	97.1
MB 160-154755/1-A	Method Blank	97.3

Tracer/Carrier Legend

Ba = Ba Carrier

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

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

		Percent Yield (Acceptance Limits)
		Th-229
Lab Sample ID	Client Sample ID	(30-110)
160-9055-1	WAA-01-AF-PS-20141023	90.9
160-9055-2	WAA-02-AF-PS-20141023	89.5
160-9055-3	WAA-03-AF-PS-20141023	92.2
160-9055-4	WAA-04-AF-PS-20141023	91.8
160-9055-5	WAA-05-AF-PS-20141023	85.7
160-9055-6	WAA-00-AF-FB-20141023	93.7
LCS 160-156210/2-A	Lab Control Sample	83.4
LCSD 160-156210/3-A	Lab Control Sample Dup	102
MB 160-156210/1-A	Method Blank	86.2

Tracer/Carrier Legend

Th-229 = Thorium-229

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

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

		Percent Yield (Acceptance Limits)
		U-232
Lab Sample ID	Client Sample ID	(30-110)
160-9055-1	WAA-01-AF-PS-20141023	90.4
160-9055-2	WAA-02-AF-PS-20141023	88.4
160-9055-3	WAA-03-AF-PS-20141023	91.9
160-9055-4	WAA-04-AF-PS-20141023	92.4
160-9055-5	WAA-05-AF-PS-20141023	94.8
160-9055-6	WAA-00-AF-FB-20141023	95.4
LCS 160-154258/2-A	Lab Control Sample	83.7
LCSD 160-154258/3-A	Lab Control Sample Dup	84.1
MB 160-154258/1-A	Method Blank	91.7

Tracer/Carrier Legend

U-232 = Uranium-232

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	November 17, 2014
Sample Delivery Group (SDG):	J9175
Sample Numbers:	WAA-01-AF-PS-20141030, WAA-02-AF-PS-20141030, WAA-03-AF-PS-20141030, WAA-04-AF-PS-20141030, WAA-05-AF-PS-20141030, and WAA-00-AF-FB-20141030
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) and the EPA and others document "Multi-Agency Radiological Laboratory Analytical Protocols Manual" (July 2004) were used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.

I, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

17 October 2014

Certified by Harry Ellis, Chemist

Date

WLLFOIA4312 - 015 - 0155540

DATA VALIDATION QUALIFIERS

U — The analyte was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

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DATA ASSESSMENT

Sample delivery group (SDG) J9175 included five (5) environmental air (filter) samples and one (1) QC samples (a field blank). Samples were analyzed for gross alpha and beta radiation by EPA SW-846 Method 9310 and for cesium-137 and other gamma-emitters by Department of Energy (DOE) Method Ga-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. LCS and duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blanks yielded no detectable activities. The field blank yielded a low beta activity. Most other field samples yielded more than 10 times the field blank beta activity, so no further qualifications were applied. However, sample WAA-02-AF-PS-20141030 yielded a gross beta activity about twice that of the field blank. A significant part of this activity may be blank contamination, so this result was qualified as estimated and flagged "J".

IV. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analyses were within established control limits. No qualifications were applied.

V. Surrogates

Surrogates are not used in these radioanalytical methods.

VI. Comments

Some detected activities were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with no significant qualifications applied. All data are usable as qualified for their intended purposes.

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-9175-2
Client Project/Site: West Lake Landfill - Filters

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
11/13/2014 9:54:37 AM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 160-9175-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-9175-2

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 11/3/2014 1:00 PM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples WAA-01-AF-PS-20141030 (160-9175-1), WAA-02-AF-PS-20141030 (160-9175-2), WAA-03-AF-PS-20141030 (160-9175-3), WAA-04-AF-PS-20141030 (160-9175-4), WAA-05-AF-PS-20141030 (160-9175-5) and WAA-00-AF-FB-20141030 (160-9175-6) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with SW846 9310. The samples were prepared and analyzed on 11/05/2014.

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

RADIUM-226 & OTHER GAMMA EMITTERS (GS)

Samples WAA-01-AF-PS-20141030 (160-9175-1), WAA-02-AF-PS-20141030 (160-9175-2), WAA-03-AF-PS-20141030 (160-9175-3), WAA-04-AF-PS-20141030 (160-9175-4), WAA-05-AF-PS-20141030 (160-9175-5) and WAA-00-AF-FB-20141030 (160-9175-6) were

Job ID: 160-9175-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with GA-01-R. The samples were prepared on 11/05/2014 and analyzed on 11/05/2014 and 11/06/2014.

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

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Dave Kinroth	Site Contact: Dave Kinroth	Date: 10-27-14	COC No:
Tetra Tech, Inc.	Tel/Fax: 314-517-6798	Lab Contact: Mike Franks	Carrier: NA	1 of 1 COCs
415 Oak Street	Analysis Turnaround Time			Sampler:
Kansas City, MO 64106	☐ CALENDAR DAYS ☑ WORKING DAYS			For Lab Use Only:
(816) 412-1786 Phone	TAT if different from Below 20			Walk-in Client:
(816) 816-410-1748 FAX	☐ 2 weeks			Lab Sampling:
Project Name: West Lake Landfill Site	☐ 1 week			
Site: Bridgeton, MO	☐ 2 days			Job / SDG No.:
P O # 1105610	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	9310 Gross Alpha/Beta	GA-01-R Gamm Spec	9315 Total Alpha Radium	A-01-R Isotopic Thorium	A-01-R Isotopic Uranium	* 9315 Radium-226 (GFPC)	Sample Specific Notes:
WAA-01-AF-PS-20141030	10/30/14	12:25	Filter	Air	1			X	X	X	X	X	X	* 9315 Radium-226 (GFPC)
WAA-02-AF-PS-20141030	10/30/14	11:20	Filter	Air	1			X	X	X	X	X	X	contingent upon TAR results
WAA-03-AF-PS-20141030	10/30/14	11:51	Filter	Air	1			X	X	X	X	X	X	for all samples
WAA-04-AF-PS-20141030	10/30/14	12:08	Filter	Air	1			X	X	X	X	X	X	
WAA-05-AF-PS-20141030	10/30/14	11:34	Filter	Air	1			X	X	X	X	X	X	
WAA-00-AF-FB-20141030	10/30/14	NA	Filter	Air	1			X	X	X	X	X	X	

160-9175 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Dave Kinroth Tetra Tech START	11/3/14	17:12	[signature]	[signature]	11-3-14 / 1300
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

WLLFOIA4312 - 015 - 0155548
11/13/2014

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-9175-2

Login Number: 9175

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9175-2

Qualifiers

Rad

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

Glossary

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

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9175-2

Method	Method Description	Protocol	Laboratory
9310	Gross Alpha / Beta (GFPC)	SW846	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	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: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9175-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-9175-1	WAA-01-AF-PS-20141030	Filter	10/30/14 12:25	11/03/14 13:00
160-9175-2	WAA-02-AF-PS-20141030	Filter	10/30/14 11:20	11/03/14 13:00
160-9175-3	WAA-03-AF-PS-20141030	Filter	10/30/14 11:51	11/03/14 13:00
160-9175-4	WAA-04-AF-PS-20141030	Filter	10/30/14 12:08	11/03/14 13:00
160-9175-5	WAA-05-AF-PS-20141030	Filter	10/30/14 11:34	11/03/14 13:00
160-9175-6	WAA-00-AF-FB-20141030	Filter	10/30/14 00:00	11/03/14 13:00

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9175-2

Client Sample ID: WAA-01-AF-PS-20141030

Date Collected: 10/30/14 12:25
Date Received: 11/03/14 13:00

Lab Sample ID: 160-9175-1
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.245	U	0.215	0.217	10.0	0.311	pCi/Sample	11/05/14 11:20	11/05/14 18:24	1
Gross Beta	17.4		1.16	2.09	10.0	0.387	pCi/Sample	11/05/14 11:20	11/05/14 18:24	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.94	U	5.55	5.56	20.0	9.84	pCi/Sample	11/05/14 10:51	11/05/14 22:14	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*11/05/14 10:51*	*11/05/14 22:14*	*1*

Client Sample ID: WAA-02-AF-PS-20141030

Date Collected: 10/30/14 11:20
Date Received: 11/03/14 13:00

Lab Sample ID: 160-9175-2
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.295	J	0.217	0.220	10.0	0.280	pCi/Sample	11/05/14 11:20	11/05/14 18:24	1
Gross Beta	2.97	J	0.505	0.586	10.0	0.362	pCi/Sample	11/05/14 11:20	11/05/14 18:24	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-5.75	U	29.5	29.5	20.0	14.5	pCi/Sample	11/05/14 10:51	11/05/14 22:15	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*11/05/14 10:51*	*11/05/14 22:15*	*1*

Client Sample ID: WAA-03-AF-PS-20141030

Date Collected: 10/30/14 11:51
Date Received: 11/03/14 13:00

Lab Sample ID: 160-9175-3
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.662	J	0.304	0.313	10.0	0.305	pCi/Sample	11/05/14 11:20	11/05/14 18:24	1
Gross Beta	19.5		1.22	2.30	10.0	0.370	pCi/Sample	11/05/14 11:20	11/05/14 18:24	1

HUG 17 Nov 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9175-2

Client Sample ID: WAA-03-AF-PS-20141030

Date Collected: 10/30/14 11:51
Date Received: 11/03/14 13:00

Lab Sample ID: 160-9175-3
Matrix: Filter

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-0.382	U	4.95	4.95	20.0	9.12	pCi/Sample	11/05/14 10:51	11/05/14 22:17	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Be-7	*92.4*		*35.9*	*37.1*		*28.0*	*pCi/Sample*	*11/05/14 10:51*	*11/05/14 22:17*	*1*

Client Sample ID: WAA-04-AF-PS-20141030

Date Collected: 10/30/14 12:08
Date Received: 11/03/14 13:00

Lab Sample ID: 160-9175-4
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.366	J	0.234	0.238	10.0	0.276	pCi/Sample	11/05/14 11:20	11/05/14 18:24	1
Gross Beta	18.0		1.19	2.16	10.0	0.384	pCi/Sample	11/05/14 11:20	11/05/14 18:24	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-0.979	U	5.51	5.51	20.0	10.1	pCi/Sample	11/05/14 10:51	11/06/14 01:42	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*11/05/14 10:51*	*11/06/14 01:42*	*1*

Client Sample ID: WAA-05-AF-PS-20141030

Date Collected: 10/30/14 11:34
Date Received: 11/03/14 13:00

Lab Sample ID: 160-9175-5
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.427	J	0.260	0.264	10.0	0.318	pCi/Sample	11/05/14 11:20	11/05/14 18:24	1
Gross Beta	18.2		1.17	2.17	10.0	0.331	pCi/Sample	11/05/14 11:20	11/05/14 18:24	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0.0251	U	6.40	6.40	20.0	11.9	pCi/Sample	11/05/14 10:51	11/05/14 22:17	1

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Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9175-2

Client Sample ID: WAA-05-AF-PS-20141030

Date Collected: 10/30/14 11:34
Date Received: 11/03/14 13:00

Lab Sample ID: 160-9175-5
Matrix: Filter

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/Sample	11/05/14 10:51	11/05/14 22:17	1

Client Sample ID: WAA-00-AF-FB-20141030

Date Collected: 10/30/14 00:00
Date Received: 11/03/14 13:00

Lab Sample ID: 160-9175-6
Matrix: Filter

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.183	U	0.196	0.198	10.0	0.305	pCi/Sample	11/05/14 11:20	11/05/14 18:25	1
Gross Beta	1.38	J	0.375	0.400	10.0	0.366	pCi/Sample	11/05/14 11:20	11/05/14 18:25	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0.587	U	5.49	5.49	20.0	10.4	pCi/Sample	11/05/14 10:51	11/05/14 22:18	1

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/Sample	11/05/14 10:51	11/05/14 22:18	1

HVG

17 Nov 14

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9175-2

Method: 9310 - Gross Alpha / Beta (GFPC)

Lab Sample ID: MB 160-154299/1-A
Matrix: Filter
Analysis Batch: 154479

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 154299

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.1276	U	0.186	0.186	10.0	0.317	pCi/Sample	11/05/14 11:20	11/05/14 18:23	1
Gross Beta	0.2762	U	0.240	0.241	10.0	0.371	pCi/Sample	11/05/14 11:20	11/05/14 18:23	1

Lab Sample ID: LCS 160-154299/2-A
Matrix: Filter
Analysis Batch: 154479

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 154299

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Alpha	5.37	5.522		1.01	10.0	0.311	pCi/Samp	103	75 - 125

Lab Sample ID: LCSB 160-154299/3-A
Matrix: Filter
Analysis Batch: 154479

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 154299

Analyte	Spike Added	LCSB Result	LCSB Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Beta	18.0	18.51		2.20	10.0	0.371	pCi/Samp	103	75 - 125

Lab Sample ID: 160-9175-1 DU
Matrix: Filter
Analysis Batch: 154479

Client Sample ID: WAA-01-AF-PS-20141030
Prep Type: Total/NA
Prep Batch: 154299

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Gross Alpha	0.245	U	0.4337		0.255	10.0	0.280	pCi/Samp	0.40	1
Gross Beta	17.4		18.15		2.16	10.0	0.362	pCi/Samp	0.17	1

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

Lab Sample ID: MB 160-154295/1-A
Matrix: Filter
Analysis Batch: 154310

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 154295

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.560	U	12.5	12.5	20.0	15.8	pCi/Sample	11/05/14 10:51	11/05/14 22:13	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*11/05/14 10:51*	*11/05/14 22:13*	*1*

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9175-2

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

Lab Sample ID: LCS 160-154295/2-A
Matrix: Filter
Analysis Batch: 154313

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 154295

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	32000	32580		3390		166	pCi/Samp	102	87 - 116
Cesium-137	11200	11080		1180	20.0	105	pCi/Samp	99	87 - 120
Cobalt-60	12100	12160		1240		54.3	pCi/Samp	101	87 - 115

Lab Sample ID: 160-9175-1 DU
Matrix: Filter
Analysis Batch: 154722

Client Sample ID: WAA-01-AF-PS-20141030
Prep Type: Total/NA
Prep Batch: 154295

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Cesium-137	-1.94	U	-1.926	U	5.23	20.0	9.17	pCi/Samp	0	1

Other Detected Radionuclides	*Sample Result*	*Sample Qual*	*DU Result*	*DU Qual*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*RER*	*RER Limit*
Other Detected Radionuclide	*None*		*None*					*pCi/Samp*		

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9175-2

Rad

Prep Batch: 154295

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-9175-1	WAA-01-AF-PS-20141030	Total/NA	Filter	None	
160-9175-1 DU	WAA-01-AF-PS-20141030	Total/NA	Filter	None	
160-9175-2	WAA-02-AF-PS-20141030	Total/NA	Filter	None	
160-9175-3	WAA-03-AF-PS-20141030	Total/NA	Filter	None	
160-9175-4	WAA-04-AF-PS-20141030	Total/NA	Filter	None	
160-9175-5	WAA-05-AF-PS-20141030	Total/NA	Filter	None	
160-9175-6	WAA-00-AF-FB-20141030	Total/NA	Filter	None	
LCS 160-154295/2-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-154295/1-A	Method Blank	Total/NA	Filter	None	

Prep Batch: 154299

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-9175-1	WAA-01-AF-PS-20141030	Total/NA	Filter	None	
160-9175-1 DU	WAA-01-AF-PS-20141030	Total/NA	Filter	None	
160-9175-2	WAA-02-AF-PS-20141030	Total/NA	Filter	None	
160-9175-3	WAA-03-AF-PS-20141030	Total/NA	Filter	None	
160-9175-4	WAA-04-AF-PS-20141030	Total/NA	Filter	None	
160-9175-5	WAA-05-AF-PS-20141030	Total/NA	Filter	None	
160-9175-6	WAA-00-AF-FB-20141030	Total/NA	Filter	None	
LCS 160-154299/2-A	Lab Control Sample	Total/NA	Filter	None	
LCSB 160-154299/3-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-154299/1-A	Method Blank	Total/NA	Filter	None	

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	West Lake Landfill Site, Bridgeton, Missouri
Laboratory:	TestAmerica Laboratories, Inc. (Earth City, Missouri)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	December 1, 2014
Sample Delivery Group (SDG):	J9298
Sample Numbers:	WAA-01-AF-PS-20141106, WAA-02-AF-PS-20141106, WAA-03-AF-PS-20141106, WAA-04-AF-PS-20141106, WAA-05-AF-PS-20141106, and WAA-00-AF-FB-20141106
Matrix / Number of Samples:	5 Air Samples and 1 Field Blank

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review" (9240.1-48), June 2008. In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) and the EPA and others document "Multi-Agency Radiological Laboratory Analytical Protocols Manual" (July 2004) were used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project-specific data package.

I, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

1 December 2014

Certified by Harry Ellis, Chemist

Date

WLLFOIA4312 - 015 - 0155559

DATA VALIDATION QUALIFIERS

U — The analyte was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

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DATA ASSESSMENT

Sample delivery group (SDG) J9298 included five (5) environmental air (filter) samples and one (1) QC samples (a field blank). Samples were analyzed for gross alpha and beta radiation by EPA SW-846 Method 9310 and for cesium-137 and other gamma-emitters by Department of Energy (DOE) Method Ga-01-R. The following summarizes the data validation that was performed.

RADIOANALYTICAL ANALYSES

I. Holding Time and Chain of Custody (COC) Requirements

The samples were received by the laboratory and analyzed within the established holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not practical for air analyses. LCS and duplicate sample analysis provided adequate data on precision and accuracy. No qualifications were applied.

III. Blanks

The laboratory (method) blanks yielded no detectable activities. The field blank yielded a low beta activity. The other field samples yielded 5 to 10 times the field blank beta activity, so no further qualifications were applied.

IV. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analyses were within established control limits. No qualifications were applied.

V. Surrogates

Surrogates are not used in these radioanalytical methods.

VI. Comments

Many detected activities were less than their reporting limits ("RL"). These extrapolations should be qualified as estimated (flagged "J").

VII. Overall Assessment of Data

Overall data quality is acceptable, with no significant qualifications applied. All data are usable as qualified for their intended purposes.

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-9298-2
Client Project/Site: West Lake Landfill - Filters

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
11/19/2014 5:26:52 PM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

LINKS

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Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 160-9298-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-9298-2

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 11/10/2014 1:29 PM; the samples arrived in good condition, properly preserved. The temperature of the cooler at receipt was 20.0° C.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples WAA-01-AF-PS-20141106 (160-9298-1), WAA-02-AF-PS-20141106 (160-9298-2), WAA-03-AF-PS-20141106 (160-9298-3), WAA-04-AF-PS-20141106 (160-9298-4), WAA-05-AF-PS-20141106 (160-9298-5) and WAA-00-AF-FB-20141106 (160-9298-6) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with SW846 9310. The samples were prepared on 11/12/2014 and analyzed on 11/13/2014.

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

RADIUM-226 & OTHER GAMMA EMITTERS (GS)

Samples WAA-01-AF-PS-20141106 (160-9298-1), WAA-02-AF-PS-20141106 (160-9298-2), WAA-03-AF-PS-20141106 (160-9298-3), WAA-04-AF-PS-20141106 (160-9298-4), WAA-05-AF-PS-20141106 (160-9298-5) and WAA-00-AF-FB-20141106 (160-9298-6) were

Job ID: 160-9298-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

analyzed for Radium-226 & Other Gamma Emitters (GS) in accordance with GA-01-R. The samples were prepared on 11/12/2014 and analyzed on 11/13/2014 and 11/14/2014.

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

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Dave Kinroth	Site Contact: Dave Kinroth	Date: 11-10-14	COC No:
Tetra Tech, Inc.	Tel/Fax: 314-517-6798	Lab Contact: Mike Franks	Carrier: NA	1 of 1 COCs
415 Oak Street	Analysis Turnaround Time			Sampler:
Kansas City, MO 64106	☐ CALENDAR DAYS ☑ WORKING DAYS			For Lab Use Only:
(816) 412-1786 Phone	TAT if different from Below 20			Walk-in Client:
(816) 816-410-1748 FAX	☐ 2 weeks			Lab Sampling:
Project Name: West Lake Landfill Site	☐ 1 week			
Site: Bridgeton, MO	☐ 2 days			Job / SDG No.:
P O # 1105610	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	9310 Gross Alpha/Beta	GA-01-R Gamm Spec	9315 Total Alpha Radium	A-01-R Isotopic Thorium	A-01-R Isotopic Uranium	* 9315 Radium-226 (GFPC)	Sample Specific Notes:
WAA-01-AF-PS-20141106	11/6/14	14:22	Filter	Air	1			X	X	X	X	X	X	* 9315 Radium-226 (GFPC)
WAA-02-AF-PS-20141106	11/6/14	13:09	Filter	Air	1			X	X	X	X	X	X	contingent upon TAR results
WAA-03-AF-PS-20141106	11/6/14	13:43	Filter	Air	1			X	X	X	X	X	X	for all samples
WAA-04-AF-PS-20141106	11/6/14	14:00	Filter	Air	1			X	X	X	X	X	X	
WAA-05-AF-PS-20141106	11/6/14	13:27	Filter	Air	1			X	X	X	X	X	X	
WAA-00-AF-FB-20141106	11/6/14	NA	Filter	Air	1			X	X	X	X	X	X	

160-9298 Chain of Custody

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4=HNO3, 5=NaOH, 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Dave Kinroth	Tetra Tech START	11-10-14 1:3	1329 11-10-14	TA Stlouis	11-10-14/1329
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

WLLFOIA4312 - 015 - 0155567
1/19/2014

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-9298-2

Login Number: 9298

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9298-2

Qualifiers

Rad

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

Glossary

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

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9298-2

Method	Method Description	Protocol	Laboratory
9310	Gross Alpha / Beta (GFPC)	SW846	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	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: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9298-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-9298-1	WAA-01-AF-PS-20141106	Filter	11/06/14 14:22	11/10/14 13:29
160-9298-2	WAA-02-AF-PS-20141106	Filter	11/06/14 13:09	11/10/14 13:29
160-9298-3	WAA-03-AF-PS-20141106	Filter	11/06/14 13:43	11/10/14 13:29
160-9298-4	WAA-04-AF-PS-20141106	Filter	11/06/14 14:00	11/10/14 13:29
160-9298-5	WAA-05-AF-PS-20141106	Filter	11/06/14 13:27	11/10/14 13:29
160-9298-6	WAA-00-AF-FB-20141106	Filter	11/06/14 00:00	11/10/14 13:29

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9298-2

Client Sample ID: WAA-01-AF-PS-20141106

Lab Sample ID: 160-9298-1
Matrix: Filter

Date Collected: 11/06/14 14:22
Date Received: 11/10/14 13:29

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.551	J	0.276	0.283	10.0	0.281	pCi/Sample	11/12/14 14:59	11/13/14 11:59	1
Gross Beta	11.0		0.933	1.44	10.0	0.342	pCi/Sample	11/12/14 14:59	11/13/14 11:59	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.41	U	10.4	10.4	20.0	14.5	pCi/Sample	11/12/14 14:41	11/13/14 19:00	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*11/12/14 14:41*	*11/13/14 19:00*	*1*

Client Sample ID: WAA-02-AF-PS-20141106

Lab Sample ID: 160-9298-2
Matrix: Filter

Date Collected: 11/06/14 13:09
Date Received: 11/10/14 13:29

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.354	U	0.279	0.282	10.0	0.407	pCi/Sample	11/12/14 14:59	11/13/14 12:00	1
Gross Beta	11.4		0.946	1.48	10.0	0.386	pCi/Sample	11/12/14 14:59	11/13/14 12:00	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-6.41	U	39.5	39.5	20.0	14.5	pCi/Sample	11/12/14 14:41	11/13/14 19:01	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*11/12/14 14:41*	*11/13/14 19:01*	*1*

Client Sample ID: WAA-03-AF-PS-20141106

Lab Sample ID: 160-9298-3
Matrix: Filter

Date Collected: 11/06/14 13:43
Date Received: 11/10/14 13:29

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.799	J	0.349	0.360	10.0	0.378	pCi/Sample	11/12/14 14:59	11/13/14 12:00	1
Gross Beta	13.8		1.05	1.73	10.0	0.417	pCi/Sample	11/12/14 14:59	11/13/14 12:00	1

HVE 1 Dec 20 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9298-2

Client Sample ID: WAA-03-AF-PS-20141106

Lab Sample ID: 160-9298-3
Matrix: Filter

Date Collected: 11/06/14 13:43
Date Received: 11/10/14 13:29

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0.155	U	6.04	6.04	20.0	11.0	pCi/Sample	11/12/14 14:41	11/14/14 02:01	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*11/12/14 14:41*	*11/14/14 02:01*	*1*

Client Sample ID: WAA-04-AF-PS-20141106

Lab Sample ID: 160-9298-4
Matrix: Filter

Date Collected: 11/06/14 14:00
Date Received: 11/10/14 13:29

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.0712	U	0.196	0.196	10.0	0.370	pCi/Sample	11/12/14 14:59	11/13/14 12:00	1
Gross Beta	9.62	J	0.885	1.31	10.0	0.428	pCi/Sample	11/12/14 14:59	11/13/14 12:00	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-1.16	U	6.73	6.73	20.0	12.2	pCi/Sample	11/12/14 14:41	11/14/14 02:02	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*11/12/14 14:41*	*11/14/14 02:02*	*1*

Client Sample ID: WAA-05-AF-PS-20141106

Lab Sample ID: 160-9298-5
Matrix: Filter

Date Collected: 11/06/14 13:27
Date Received: 11/10/14 13:29

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.642	J	0.313	0.321	10.0	0.350	pCi/Sample	11/12/14 14:59	11/13/14 12:00	1
Gross Beta	11.4		0.940	1.48	10.0	0.337	pCi/Sample	11/12/14 14:59	11/13/14 12:00	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	1.78	U	5.73	5.73	20.0	10.4	pCi/Sample	11/12/14 14:41	11/14/14 02:03	1

HVG 1 Dec 14

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9298-2

Client Sample ID: WAA-05-AF-PS-20141106

Lab Sample ID: 160-9298-5
Matrix: Filter

Date Collected: 11/06/14 13:27
Date Received: 11/10/14 13:29

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/Sample	11/12/14 14:41	11/14/14 02:03	1

Client Sample ID: WAA-00-AF-FB-20141106

Lab Sample ID: 160-9298-6
Matrix: Filter

Date Collected: 11/06/14 00:00
Date Received: 11/10/14 13:29

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.120	U	0.176	0.177	10.0	0.303	pCi/Sample	11/12/14 14:59	11/13/14 14:18	1
Gross Beta	1.21	J	0.340	0.361	10.0	0.322	pCi/Sample	11/12/14 14:59	11/13/14 14:18	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	-5.19	U	25.2	25.2	20.0	14.8	pCi/Sample	11/12/14 14:41	11/14/14 02:05	1

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/Sample	11/12/14 14:41	11/14/14 02:05	1

AVG
1 Dec 2014

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9298-2

Method: 9310 - Gross Alpha / Beta (GFPC)

Lab Sample ID: MB 160-156389/1-A
Matrix: Filter
Analysis Batch: 156589

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 156389

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.1665	U	0.195	0.196	10.0	0.313	pCi/Sample	11/12/14 14:59	11/13/14 11:59	1
Gross Beta	0.1616	U	0.224	0.225	10.0	0.377	pCi/Sample	11/12/14 14:59	11/13/14 11:59	1

Lab Sample ID: LCS 160-156389/2-A
Matrix: Filter
Analysis Batch: 156589

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 156389

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Alpha	5.37	5.167		0.965	10.0	0.303	pCi/Samp	96	75 - 125

Lab Sample ID: LCSB 160-156389/3-A
Matrix: Filter
Analysis Batch: 156589

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 156389

Analyte	Spike Added	LCSB Result	LCSB Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Beta	18.0	17.35		2.08	10.0	0.351	pCi/Samp	97	75 - 125

Lab Sample ID: 160-9298-1 DU
Matrix: Filter
Analysis Batch: 156589

Client Sample ID: WAA-01-AF-PS-20141106
Prep Type: Total/NA
Prep Batch: 156389

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Gross Alpha	0.551		0.4716		0.274	10.0	0.313	pCi/Samp	0.14	1
Gross Beta	11.0		9.041		1.24	10.0	0.377	pCi/Samp	0.74	1

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

Lab Sample ID: MB 160-156385/1-A
Matrix: Filter
Analysis Batch: 156706

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 156385

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0.01263	U	5.03	5.03	20.0	9.33	pCi/Sample	11/12/14 14:41	11/13/14 18:33	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/Sample*	*11/12/14 14:41*	*11/13/14 18:33*	*1*

QC Sample Results

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9298-2

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

Lab Sample ID: LCS 160-156385/2-A
Matrix: Filter
Analysis Batch: 157455

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 156385

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	32000	32000		3330		95.0	pCi/Samp	100	87 - 116
Cesium-137	11200	11350		1190	20.0	56.0	pCi/Samp	102	87 - 120
Cobalt-60	12000	12070		1220		38.5	pCi/Samp	100	87 - 115

Lab Sample ID: 160-9298-1 DU
Matrix: Filter
Analysis Batch: 157050

Client Sample ID: WAA-01-AF-PS-20141106
Prep Type: Total/NA
Prep Batch: 156385

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Cesium-137	-1.41	U	-0.4747	U	5.54	20.0	10.1	pCi/Samp	0.06	1

Other Detected Radionuclides	*Sample Result*	*Sample Qual*	*DU Result*	*DU Qual*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*RER*	*RER Limit*
Other Detected Radionuclide	*None*		*None*					*pCi/Samp*		

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: West Lake Landfill - Filters

TestAmerica Job ID: 160-9298-2

Rad

Prep Batch: 156385

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-9298-1	WAA-01-AF-PS-20141106	Total/NA	Filter	None	
160-9298-1 DU	WAA-01-AF-PS-20141106	Total/NA	Filter	None	
160-9298-2	WAA-02-AF-PS-20141106	Total/NA	Filter	None	
160-9298-3	WAA-03-AF-PS-20141106	Total/NA	Filter	None	
160-9298-4	WAA-04-AF-PS-20141106	Total/NA	Filter	None	
160-9298-5	WAA-05-AF-PS-20141106	Total/NA	Filter	None	
160-9298-6	WAA-00-AF-FB-20141106	Total/NA	Filter	None	
LCS 160-156385/2-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-156385/1-A	Method Blank	Total/NA	Filter	None	

Prep Batch: 156389

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-9298-1	WAA-01-AF-PS-20141106	Total/NA	Filter	None	
160-9298-1 DU	WAA-01-AF-PS-20141106	Total/NA	Filter	None	
160-9298-2	WAA-02-AF-PS-20141106	Total/NA	Filter	None	
160-9298-3	WAA-03-AF-PS-20141106	Total/NA	Filter	None	
160-9298-4	WAA-04-AF-PS-20141106	Total/NA	Filter	None	
160-9298-5	WAA-05-AF-PS-20141106	Total/NA	Filter	None	
160-9298-6	WAA-00-AF-FB-20141106	Total/NA	Filter	None	
LCS 160-156389/2-A	Lab Control Sample	Total/NA	Filter	None	
LCSB 160-156389/3-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-156389/1-A	Method Blank	Total/NA	Filter	None	