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	June 3, 2014
Sample Delivery Group (SDG):	J6828
Sample Numbers:	WAA-01-AF-PS-20140522, WAA-02-AF-PS-20140522, WAA-03-AF-PS-20140522, WAA-04-AF-PS-20140522, WAA-05-AF-PS-20140522, and WAA-00-AF-FB-20140522
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

3 June 2014

Certified by Harry Ellis, Chemist

Date

0714 40471829 1.0

Superfund

OU00

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.

DATA ASSESSMENT

Sample delivery group (SDG) J6828 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

There was no detectable activity in the laboratory (method) blanks. The field blank yielded a low gross beta activity. The other field samples yielded more than 5 times that activity, so no 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 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 no significant qualifications applied. All data are usable as qualified for their intended purposes.

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: 160-6828-2
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:
5/30/2014 4:01:35 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.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Chain of Custody 5
Receipt Checklists 7
Definitions/Glossary 8
Method Summary 9
Sample Summary 10
Client Sample Results 11
QC Sample Results 14
QC Association Summary 16

Job ID: 160-6828-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: West Lake Landfill - Filters

Report Number: 160-6828-2

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 5/27/2014 11:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 20.6° C.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples WAA-01-AF-PS-20140522 (160-6828-1), WAA-02-AF-PS-20140522 (160-6828-2), WAA-03-AF-PS-20140522 (160-6828-3), WAA-04-AF-PS-20140522 (160-6828-4), WAA-05-AF-PS-20140522 (160-6828-5) and WAA-00-AF-FB-20140522 (160-6828-6) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with SW846 9310. The samples were prepared and analyzed on 05/28/2014.

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-20140522 (160-6828-1), WAA-02-AF-PS-20140522 (160-6828-2), WAA-03-AF-PS-20140522 (160-6828-3), WAA-04-AF-PS-20140522 (160-6828-4), WAA-05-AF-PS-20140522 (160-6828-5) and WAA-00-AF-FB-20140522 (160-6828-6) were

Job ID: 160-6828-2 (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 05/28/2014 and analyzed on 05/28/2014 and 05/29/2014.

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

>>> Select a Laboratory <<<

#N/A
#N/A
#N/A
#N/A

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: 5-27-14	COC No:
Your Company Name here Tetra Tech Inc	Tel/Fax: 314-517-6798	Lab Contact: Mike Franks	Carrier:	1 of 1 COCs
Address 415 Oak Street	Analysis Turnaround Time			Sampler:
City/State/Zip Kansas City MO 64106	☐ CALENDAR DAYS ☒ WORKING DAYS			For Lab Use Only:
(xxx) xxx-xxxx 816 412 1786 Phone	TAT if different from Below 20			Walk-in Client:
(xxx) xxx-xxxx 816 410 1748 FAX	☐ 2 weeks			Lab Sampling:
Project Name: Westlake Landfill	☐ 1 week			
Site: Bridgeton MO	☐ 2 days			Job / SDG No.:
PO# 110 5610	☐ 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 Gamma 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-20140522	5-22-14	10:20	Filter	Air	1			X	X	X	X	X	X	9315-Radium 226 (GFPC)
" -02-AF-PS- " "	↓	12:21	↓	↓	↓			↓	↓	↓	↓	↓	↓	contingent upon TAR
" -03-AF-PS- " "	↓	11:43	↓	↓	↓			↓	↓	↓	↓	↓	↓	results for all samples
" -04-AF-PS- " "	↓	12:05	↓	↓	↓			↓	↓	↓	↓	↓	↓	↓
" -05-AF-PS- " "	↓	12:28	↓	↓	↓			↓	↓	↓	↓	↓	↓	↓
" -00-AF-FB- " "	↓	13:00	↓	↓	↓			↓	↓	↓	↓	↓	↓	↓

END OF SHIPMENT
Dave Kinroth 5-27-14

160-6828 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 Inc	5-27-14 11:07	[signature]	TAB	5-27-14 / 1115
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

5/30/2014

Westlake Landfill Weekly Air Filter Samples Collection Summary
dates 5-15-14 to 5-22-14

Station	Location	Filter Holder #	Begin Time	Begin Flow Rate	End Time	End Flow Rate	Total Time (mins)	AVG Flow	Sample Vol
1	MCP	1	14:26	2.57 cfm	10:20	2.48 cfm	9834	2.53	24880
2	PVA	2	16:25	2.7 cfm	12:21	2.59 cfm	9836	2.64	26016
3	PVFD	3	16:25	2.5 cfm	11:43	2.47 cfm	9780	2.48	24303
4	SV	4	17:15	2.63 cfm	12:05	2.5 cfm	9771	2.56 cfm	25063
5	SC	5	15:21	2.7 cfm	12:28	2.59 cfm	9918	2.64 cfm	26233
FB	NA	6	NA	NA	NA	NA	NA	NA	NA

Sample Number	Sample Volume (cubic feet)
WAA-01-AF-PS-20140522	24880
WAA-02-AF-PS-20140522	26016
WAA-03-AF-PS-20140522	24303
WAA-04-AF-PS-20140522	25063
WAA-05-AF-PS-20140522	26233
WAA-00-AF-FB-20140522	na

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-6828-2

Login Number: 6828
List Number: 1
Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	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	

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: 160-6828-2

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: 160-6828-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-6828-1	WAA-01-AF-PS-20140522	Filter	05/22/14 10:20	05/27/14 11:15
160-6828-2	WAA-02-AF-PS-20140522	Filter	05/22/14 12:21	05/27/14 11:15
160-6828-3	WAA-03-AF-PS-20140522	Filter	05/22/14 11:43	05/27/14 11:15
160-6828-4	WAA-04-AF-PS-20140522	Filter	05/22/14 12:05	05/27/14 11:15
160-6828-5	WAA-05-AF-PS-20140522	Filter	05/22/14 12:28	05/27/14 11:15
160-6828-6	WAA-00-AF-FB-20140522	Filter	05/22/14 13:00	05/27/14 11:15

Client Sample Results

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

TestAmerica Job ID: 160-6828-2

Client Sample ID: WAA-01-AF-PS-20140522

Date Collected: 05/22/14 10:20
Date Received: 05/27/14 11:15

Lab Sample ID: 160-6828-1
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	0.418	J	0.250	0.254	10.0	0.286	pCi/Sample	05/28/14 14:31	05/28/14 18:35	1
Gross Beta	13.2		1.02	1.67	10.0	0.352	pCi/Sample	05/28/14 14:31	05/28/14 18:35	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	0.468	U U	4.83	4.83	20.0	9.03	pCi/Sample	05/28/14 14:27	05/28/14 21:39	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Be-7	*133*	J	*46.7*	*48.6*		*38.6*	*pCi/Sample*	*05/28/14 14:27*	*05/28/14 21:39*	*1*

Client Sample ID: WAA-02-AF-PS-20140522

Date Collected: 05/22/14 12:21
Date Received: 05/27/14 11:15

Lab Sample ID: 160-6828-2
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	0.625	J	0.320	0.328	10.0	0.373	pCi/Sample	05/28/14 14:31	05/28/14 18:35	1
Gross Beta	13.8		1.05	1.74	10.0	0.385	pCi/Sample	05/28/14 14:31	05/28/14 18:35	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	1.26	U U	5.65	5.65	20.0	12.1	pCi/Sample	05/28/14 14:27	05/28/14 22:42	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Be-7	*176*	J	*72.3*	*74.5*		*66.7*	*pCi/Sample*	*05/28/14 14:27*	*05/28/14 22:42*	*1*

Client Sample ID: WAA-03-AF-PS-20140522

Date Collected: 05/22/14 11:43
Date Received: 05/27/14 11:15

Lab Sample ID: 160-6828-3
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	0.392	J	0.260	0.264	10.0	0.332	pCi/Sample	05/28/14 14:31	05/28/14 18:35	1
Gross Beta	13.0		1.02	1.65	10.0	0.406	pCi/Sample	05/28/14 14:31	05/28/14 18:35	1

HVG 3 June 2014

Client Sample Results

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

TestAmerica Job ID: 160-6828-2

Client Sample ID: WAA-03-AF-PS-20140522

Date Collected: 05/22/14 11:43
Date Received: 05/27/14 11:15

Lab Sample ID: 160-6828-3
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	0.168	U U	4.72	4.72	20.0	8.94	pCi/Sample	05/28/14 14:27	05/28/14 22:43	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Be-7	*132*	J	*45.1*	*47.1*		*36.9*	*pCi/Sample*	*05/28/14 14:27*	*05/28/14 22:43*	*1*

Client Sample ID: WAA-04-AF-PS-20140522

Date Collected: 05/22/14 12:05
Date Received: 05/27/14 11:15

Lab Sample ID: 160-6828-4
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	0.573	J	0.271	0.279	10.0	0.242	pCi/Sample	05/28/14 14:31	05/28/14 18:35	1
Gross Beta	12.8		0.993	1.62	10.0	0.355	pCi/Sample	05/28/14 14:31	05/28/14 18:35	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	-0.239	U U	6.19	6.19	20.0	12.8	pCi/Sample	05/28/14 14:27	05/29/14 01:39	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Be-7	*247*	J	*98.5*	*102*		*76.8*	*pCi/Sample*	*05/28/14 14:27*	*05/29/14 01:39*	*1*

Client Sample ID: WAA-05-AF-PS-20140522

Date Collected: 05/22/14 12:28
Date Received: 05/27/14 11:15

Lab Sample ID: 160-6828-5
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	0.295	U U	0.237	0.240	10.0	0.336	pCi/Sample	05/28/14 14:31	05/28/14 18:35	1
Gross Beta	12.8		1.00	1.62	10.0	0.375	pCi/Sample	05/28/14 14:31	05/28/14 18:35	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	3.11	U U	6.34	6.35	20.0	12.5	pCi/Sample	05/28/14 14:27	05/29/14 01:39	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Be-7	*157*	J	*49.0*	*51.6*		*28.2*	*pCi/Sample*	*05/28/14 14:27*	*05/29/14 01:39*	*1*

HVE 3 Jun 14

Client Sample Results

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

TestAmerica Job ID: 160-6828-2

Client Sample ID: WAA-00-AF-FB-20140522
Date Collected: 05/22/14 13:00
Date Received: 05/27/14 11:15

Lab Sample ID: 160-6828-6
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	0.112	U U	0.181	0.181	10.0	0.319	pCi/Sample	05/28/14 14:31	05/28/14 18:36	1
Gross Beta	1.73	J	0.407	0.442	10.0	0.366	pCi/Sample	05/28/14 14:31	05/28/14 18:36	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	2.59	U U	4.65	4.66	20.0	8.00	pCi/Sample	05/28/14 14:27	05/29/14 01:40	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*	*05/28/14 14:27*	*05/29/14 01:40*	*1*

HVE

3 Jun 14

QC Sample Results

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

TestAmerica Job ID: 160-6828-2

Method: 9310 - Gross Alpha / Beta (GFPC)

Lab Sample ID: MB 160-124191/1-A — **Client Sample ID: Method Blank**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 124192 — **Prep Batch: 124191**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.2253	U	0.203	0.205	10.0	0.293	pCi/Sample	05/28/14 14:31	05/28/14 18:35	1
Gross Beta	0.01693	U	0.172	0.172	10.0	0.335	pCi/Sample	05/28/14 14:31	05/28/14 18:35	1

Lab Sample ID: LCS 160-124191/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 124192 — **Prep Batch: 124191**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Alpha	5.37	5.236		0.993	10.0	0.434	pCi/Samp	97	75 - 125

Lab Sample ID: LCSB 160-124191/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 124192 — **Prep Batch: 124191**

Analyte	Spike Added	LCSB Result	LCSB Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Beta	19.3	18.09		2.16	10.0	0.402	pCi/Samp	94	75 - 125

Lab Sample ID: 160-6828-1 DU — **Client Sample ID: WAA-01-AF-PS-20140522**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 124192 — **Prep Batch: 124191**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Gross Alpha	0.418		0.4375		0.250	10.0	0.258	pCi/Samp	0.04	1
Gross Beta	13.2		13.49		1.69	10.0	0.359	pCi/Samp	0.08	1

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

Lab Sample ID: MB 160-124187/1-A — **Client Sample ID: Method Blank**
Matrix: Filter — **Prep Type: Total/NA**
Analysis Batch: 124222 — **Prep Batch: 124187**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Cesium-137	0.0000	U	4.97	4.97	20.0	14.9	pCi/Sample	05/28/14 14:27	05/28/14 21:39	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*	*05/28/14 14:27*	*05/28/14 21:39*	*1*

QC Sample Results

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

TestAmerica Job ID: 160-6828-2

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

Lab Sample ID: LCS 160-124187/2-A
Matrix: Filter
Analysis Batch: 124223

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 124187

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	32000	32210		3350		125	pCi/Samp	101	87 - 116
Cesium-137	11300	11510		1210	20.0	83.2	pCi/Samp	102	87 - 120
Cobalt-60	12800	13160		1330		35.0	pCi/Samp	103	87 - 115

Lab Sample ID: 160-6828-1 DU
Matrix: Filter
Analysis Batch: 124577

Client Sample ID: WAA-01-AF-PS-20140522
Prep Type: Total/NA
Prep Batch: 124187

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Cesium-137	0.468	U	1.406	U	5.24	20.0	9.39	pCi/Samp	0.09	1

QC Association Summary

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

TestAmerica Job ID: 160-6828-2

Rad

Prep Batch: 124187

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6828-1	WAA-01-AF-PS-20140522	Total/NA	Filter	None	
160-6828-1 DU	WAA-01-AF-PS-20140522	Total/NA	Filter	None	
160-6828-2	WAA-02-AF-PS-20140522	Total/NA	Filter	None	
160-6828-3	WAA-03-AF-PS-20140522	Total/NA	Filter	None	
160-6828-4	WAA-04-AF-PS-20140522	Total/NA	Filter	None	
160-6828-5	WAA-05-AF-PS-20140522	Total/NA	Filter	None	
160-6828-6	WAA-00-AF-FB-20140522	Total/NA	Filter	None	
LCS 160-124187/2-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-124187/1-A	Method Blank	Total/NA	Filter	None	

Prep Batch: 124191

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6828-1	WAA-01-AF-PS-20140522	Total/NA	Filter	None	
160-6828-1 DU	WAA-01-AF-PS-20140522	Total/NA	Filter	None	
160-6828-2	WAA-02-AF-PS-20140522	Total/NA	Filter	None	
160-6828-3	WAA-03-AF-PS-20140522	Total/NA	Filter	None	
160-6828-4	WAA-04-AF-PS-20140522	Total/NA	Filter	None	
160-6828-5	WAA-05-AF-PS-20140522	Total/NA	Filter	None	
160-6828-6	WAA-00-AF-FB-20140522	Total/NA	Filter	None	
LCS 160-124191/2-A	Lab Control Sample	Total/NA	Filter	None	
LCSB 160-124191/3-A	Lab Control Sample	Total/NA	Filter	None	
MB 160-124191/1-A	Method Blank	Total/NA	Filter	None	