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P.W. Grosser Consulting
630 Johnson Ave, Suite 7
Bohemia, NY 11716
ATTN: Ms. Heather Moran-Botta
hmoran-botta@pwgrosser.com

October 18, 2019

SUBJECT: Revised Suffolk County Biota Sampling Evaluation, SHD1705, Data Usability Summary Report

Dear Ms. Moran-Botta,

Enclosed are the revised validation reports for the fractions listed below. This SDG was received on June 6, 2018. Attachment 1 is a summary of the samples that were reviewed for each analysis.

- The laboratory re-issued the reports to correct for a prep factor correction. The detection limits were lowered.

LDC Project #42369_RV1:

SDG #	Fraction
320-34182-1, 320-34271-1 320-32834-1	Fluorinated Alkyl Substances

The data validation was performed under Category B guidelines using quality control summaries provided by the laboratory. The analyses were validated using the following documents, as applicable to each method:

- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, EPA 540-R-2017-002; January 2017

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink

Christina Rink
crink@lab-data.com
Project Manager/Senior Chemist

7,878 pages-ADV (Validate 20% per SDG) Attachment 1

NY DUSR Category B **LDC #42369 (P.W. Grosser Consulting - Bohemia, NY / Suffolk County Biota Sampling Evaluation, SHD1705)**

LDC	SDG#	DATE REC'D	(3) DATE DUE	PFCs -Mod (537)																															
Matrix: Water/Tissue				W	T	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	320-34182-1	06/06/18	06/27/18	4	0																														
B	320-34271-1	06/06/18	06/27/18	0	13																														
C	320-32834-1	06/06/18	06/27/18	0	28																														
Total	J/CR			4	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45

These sample counts do not include MS, MSD, or DUP's.

L:\PW Grosser\Suffolk SHD1705\42369ST.wpd

Site: Suffolk County Biota Sampling Evaluation
Laboratory: TestAmerica, Inc., Edison, NY
Report No.: 320-34182-1
Reviewer: Pei Geng and Christina Rink/Laboratory Data Consultants for P.W. Grosser Consulting
Date: June 18, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
MW-CR001-A	320-34182-1	Fluorinated Alkyl Substances
FW-YC001-A	320-34182-4	Fluorinated Alkyl Substances
FW-CR007-A	320-34182-6	Fluorinated Alkyl Substances
FW-CR006-A	320-34182-7	Fluorinated Alkyl Substances

Associated QC Samples(s):
Field/Trip Blanks: EB001, EB003, FB01, FB003
Field Duplicate pair: None Associated

The above-listed water samples were collected on December 5 through December 8, 2017 and were analyzed for fluorinated alkyl substances by method 537 modified. The data validation was performed in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,* EPA 540-R-2017-002 (January 2017), modified as necessary to accommodate the non-CLP methodologies used.

The organic data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tunes
- Initial and Continuing Calibrations
- Blanks
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Internal Standards
- Field Duplicate Results
- Quantitation Limits and Data Assessment
- Sample Quantitation and Compound Identification

Overall Evaluation of Data and Potential Usability Issues

All results are usable as reported or usable with minor qualification due to laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was complete as defined under the requirements for the NYSDEC ASP category B laboratory deliverables.

Holding Times and Sample Preservation

All criteria were met.

LC/MS Tunes

All criteria were met.

Initial and Continuing Calibrations

All criteria were met.

Blanks

Contamination was detected in the associated fluorinated alkyl substances method blank samples. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Blank ID	Compound	Level Detected	Action Level	Associated Samples
MB 320-200328/1-A	Perfluorohexanesulfonic acid	0.292 ng/L	RL	MW-CR001-A
	Perfluorooctane sulfonamide	0.368 ng/L	RL	FW-YC001-A
				FW-CR007-A
				FW-CR006-A

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the RL and > the Action Level, qualification of the data was not required.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
MW-CR001-A	Perfluorooctane sulfonamide	1.11 ng/L	2.03U ng/L
FW-YC001-A	Perfluorooctane sulfonamide	0.45 ng/L	2.05U ng/L
FW-CR007-A	Perfluorohexanesulfonic acid Perfluorooctane sulfonamide	1.86 ng/L 0.82 ng/L	2.05U ng/L 2.05U ng/L
FW-CR006-A	Perfluorooctane sulfonamide	0.41 ng/L	2.06U ng/L

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

Contamination was detected in the equipment blank samples EB001 and EB003 and field blank samples FB001 and FB003 for fluorinated alkyl substances analysis. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Field Blank ID	Compound	Level Detected	Action Level	Associated Samples
EB001	Perfluorohexanesulfonic acid Perfluorooctane sulfonamide	0.29 ng/L 0.51 ng/L	RL RL	FW-YC001-A FW-CR007-A FW-CR006-A
EB003	Perfluorohexanesulfonic acid	0.30 ng/L	RL	MW-CR001-A
FB001	Perfluorohexanesulfonic acid	0.29 ng/L	RL	FW-YC001-A FW-CR007-A FW-CR006-A
FB003	Perfluorobutanoic acid Perfluorohexanesulfonic acid	0.42 ng/L 0.28 ng/L	RL RL	MW-CR001-A

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and $\leq$ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and $\leq$ the Action Level, qualify the result as not detected (U) at the reported concentration.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
FW-YC001-A	Perfluorooctane sulfonamide	0.45 ng/L	2.05U ng/L
FW-CR007-A	Perfluorohexanesulfonic acid Perfluorooctane sulfonamide	1.86 ng/L 0.82 ng/L	2.05U ng/L 2.05U ng/L
FW-CR006-A	Perfluorooctane sulfonamide	0.41 ng/L	2.06U ng/L
MW-CR001-A	Perfluorobutanoic acid	1.11 ng/L	2.03U ng/L

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

MS/MSD Results

MS/MSD analyses were not associated with this sample set. Validation action was not required on this basis.

LCS Results

Al criteria were met.

Internal Standards

The following table lists the internal standards recovered outside of control limits and the resulting actions.

Sample	Internal Standard	Area Exceedances (Limits)	Affected Compounds	Validation actions
MW-CR001-A	M2-8:2FTS	183 (25-150)	8:2FTS	UJ nondetects
FW-YC001-A	M2-8:2FTS	169 (25-150)	8:2FTS	UJ nondetects
FW-CR007-A	M2-8:2FTS	158 (25-150)	8:2FTS	UJ nondetects
FW-CR006-A	M2-8:2FTS	172 (25-150)	8:2FTS	UJ nondetects

The 8:2FTS results were estimated due to internal standard area exceedances. The bias cannot be determined. The results can be used for project objectives as nondetects with estimated quantitation limits (UJ) which may have a minor impact on the data usability.

Field Duplicate Results

A field duplicate pair was not associated with this sample set. Validation action was not required on this basis.

Quantitation Limits and Data Assessment

Results were reported which were below the reporting limit (RL) and above the method detection limit (MDL) in the fluorinated alkyl substances analysis. These results were qualified as estimated (J) by the laboratory.

Dilutions were not required for fluorinated alkyl substances analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-34182-1

SDG No.:

Client Sample ID: MW-CR001-A | Lab Sample ID: 320-34182-1

Matrix: Water | Lab File ID: 2017.12.19LLC_026.d

Analysis Method: 537 (modified) | Date Collected: 12/08/2017 10:40

Extraction Method: 3535 | Date Extracted: 12/18/2017 13:25

Sample wt/vol: 246.7(mL) | Date Analyzed: 12/20/2017 07:49

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 200666 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	2.44		2.03	0.35
2706-90-3	Perfluoropentanoic acid (PFPeA)	4.30		2.03	0.50
307-24-4	Perfluorohexanoic acid (PFHxA)	4.73		2.03	0.59
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.81	J J	2.03	0.25
335-67-1	Perfluorooctanoic acid (PFOA)	3.17		2.03	0.86
375-95-1	Perfluorononanoic acid (PFNA)	1.92	J J	2.03	0.27
335-76-2	Perfluorodecanoic acid (PFDA)	0.31	U U	2.03	0.31
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.11	U	2.03	1.11
307-55-1	Perfluorododecanoic acid (PFDoA)	0.56	U	2.03	0.56
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.32	U	2.03	1.32
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.29	U	2.03	0.29
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.80	J J	2.03	0.20
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	8.63	B	2.03	0.17
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.30	J J	2.03	0.19
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	13.4		2.03	0.55
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.32	U U	2.03	0.32
754-91-6	Perfluorooctane Sulfonamide (FOSA)	1.11	J B 2030	2.03	0.35
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	3.14	U U	20.3	3.14
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	1.93	U U	20.3	1.93
27619-97-2	6:2FTS	2.03	U U	20.3	2.03
39108-34-4	8:2FTS	2.03	U UJ	20.3	2.03

JUN 18 2018

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-34182-1

SDG No.:

Client Sample ID: FW-YC001-A | Lab Sample ID: 320-34182-4

Matrix: Water | Lab File ID: 2017.12.19LLC_031.d

Analysis Method: 537 (modified) | Date Collected: 12/05/2017 10:30

Extraction Method: 3535 | Date Extracted: 12/18/2017 13:25

Sample wt/vol: 243.6(mL) | Date Analyzed: 12/20/2017 08:28

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 200666 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	2.01	J J	2.05	0.36
2706-90-3	Perfluoropentanoic acid (PFPeA)	1.06	J	2.05	0.50
307-24-4	Perfluorohexanoic acid (PFHxA)	1.08	J	2.05	0.60
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.83	J	2.05	0.26
335-67-1	Perfluorooctanoic acid (PFOA)	2.31		2.05	0.87
375-95-1	Perfluorononanoic acid (PFNA)	0.50	J J	2.05	0.28
335-76-2	Perfluorodecanoic acid (PFDA)	0.32	U U	2.05	0.32
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.13	U	2.05	1.13
307-55-1	Perfluorododecanoic acid (PFDoA)	0.56	U	2.05	0.56
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.33	U	2.05	1.33
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.30	U	2.05	0.30
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.0	J J	2.05	0.21
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.71	B	2.05	0.17
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.19	U U	2.05	0.19
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.80		2.05	0.55
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.33	U U	2.05	0.33
754-91-6	Perfluorooctane Sulfonamide (FOSA)	0.45	J B 2.05U	2.05	0.36
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	3.18	U U	20.5	3.18
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	1.95	U	20.5	1.95
27619-97-2	6:2FTS	2.05	U	20.5	2.05
39108-34-4	8:2FTS	2.05	U JJ	20.5	2.05

JUN 18 2018

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-34182-1

SDG No.:

Client Sample ID: FW-CR007-A | Lab Sample ID: 320-34182-6

Matrix: Water | Lab File ID: 2017.12.19LLC_033.d

Analysis Method: 537 (modified) | Date Collected: 12/05/2017 11:50

Extraction Method: 3535 | Date Extracted: 12/18/2017 13:25

Sample wt/vol: 244.2(mL) | Date Analyzed: 12/20/2017 08:44

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 200666 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	1.15	J J	2.05	0.36
2706-90-3	Perfluoropentanoic acid (PFPeA)	1.34	J	2.05	0.50
307-24-4	Perfluorohexanoic acid (PFHxA)	1.58	J	2.05	0.59
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.85	J	2.05	0.26
335-67-1	Perfluorooctanoic acid (PFOA)	1.95	J	2.05	0.87
375-95-1	Perfluorononanoic acid (PFNA)	0.96	J	2.05	0.28
335-76-2	Perfluorodecanoic acid (PFDA)	0.32	U U	2.05	0.32
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.13	U	2.05	1.13
307-55-1	Perfluorododecanoic acid (PFDoA)	0.56	U	2.05	0.56
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.33	U	2.05	1.33
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.30	U	2.05	0.30
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.55	J J	2.05	0.20
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.86	J B 2.05U	2.05	0.17
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.19	U U	2.05	0.19
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	5.69		2.05	0.55
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.33	U U	2.05	0.33
754-91-6	Perfluorooctane Sulfonamide (FOSA)	0.82	J B 2.05U	2.05	0.36
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	3.17	U U	20.5	3.17
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	1.95	U U	20.5	1.95
27619-97-2	6:2FTS	2.05	U U	20.5	2.05
39108-34-4	8:2FTS	2.05	U UJ	20.5	2.05

JUN 18 2018

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-34182-1

SDG No.:

Client Sample ID: FW-CR006-A | Lab Sample ID: 320-34182-7

Matrix: Water | Lab File ID: 2017.12.19LLC_035.d

Analysis Method: 537 (modified) | Date Collected: 12/05/2017 12:00

Extraction Method: 3535 | Date Extracted: 12/18/2017 13:25

Sample wt/vol: 242.6(mL) | Date Analyzed: 12/20/2017 09:00

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 200666 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	1.78	J J	2.06	0.36
2706-90-3	Perfluoropentanoic acid (PFPeA)	1.90	J J	2.06	0.50
307-24-4	Perfluorohexanoic acid (PFHxA)	2.11		2.06	0.60
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.93	J J	2.06	0.26
335-67-1	Perfluorooctanoic acid (PFOA)	2.56		2.06	0.88
375-95-1	Perfluorononanoic acid (PFNA)	0.92	J J	2.06	0.28
335-76-2	Perfluorodecanoic acid (PFDA)	0.32	U U	2.06	0.32
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.13	U U	2.06	1.13
307-55-1	Perfluorododecanoic acid (PFDoA)	0.58	J J	2.06	0.57
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.34	U U	2.06	1.34
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.66	J J	2.06	0.30
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.81	J J	2.06	0.21
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.23	B	2.06	0.18
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.20	U U	2.06	0.20
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	4.06		2.06	0.56
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.33	U U	2.06	0.33
754-91-6	Perfluorooctane Sulfonamide (FOSA)	0.41	J B 2.06U	2.06	0.36
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	3.19	U U	20.6	3.19
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	1.96	U U	20.6	1.96
27619-97-2	6:2FTS	2.06	U U	20.6	2.06
39108-34-4	8:2FTS	2.06	U UJ	20.6	2.06

JUN 18 2018

Initials: CR

LDC #: 42369A96
SDG #: 320-34182-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 6/13/18
Page: 1 of 1
Reviewer: CF
2nd Reviewer: CF

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537-Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤35%, Time %D≤30%. ICV≤30%
IV.	Continuing calibration	A/A	CCV≤30%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	FB001, FB003. EB001, EB003
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	N	
XI.	Internal standards	SW	
XII.	Compound quantitation RL/LOQ/LODs	A	Results < RL - Note/A
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-CR001-A	320-34182-1	Water	12/08/17
2	FW-YC001-A	320-34182-4	Water	12/05/17
3	FW-CR007-A	320-34182-6	Water	12/05/17
4	FW-CR006-A	320-34182-7	Water	12/05/17
5				
6				
7				
8				

Notes:

LDC #: 42369A96

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: A
2nd Reviewer: A

Method: LCMS (EPA Method 537)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration ≤ 30%?	✓	✓		
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?	✓			
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 42359A96

VALIDATION FINDINGS CHECKLIST

Reviewer: A
2nd Reviewer: A

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?.			✓	
XI. Internal standards				
Were internal standard area counts within ± 50% of the associated calibration standard?		✓		
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)				
B. Perfluoroheptanoic acid (PFHpA)				
C. Perfluorooctanoic acid (PFOA)				
D. Perfluorononanoic acid (PFNA)				
E. Perfluorodecanoic acid (PFDA)				
F. Perfluoroundecanoic acid (PFUnA)				
G. Perfluorododecanoic acid (PFDoA)				
H. Perfluorotridecanoic acid (PFTriA)				
I. Perfluorotetradecanoic acid (PFTeA)				
J. Perfluorobutanesulfonic acid (PFBS)				
K. Perfluorohexanesulfonic acid (PFHxS)				
L. Perfluoroheptanesulfonic acid (PFHpS)				
M. Perfluorooctanesulfonic acid (PFOS)				
N.Perfluorodecanesulfonic acid (PFDS)				
O. Perfluorooctane Sulfonamide (FOSA)				
P. Perfluorobutanoic acid (PFBA)				
Q. Perfluoropentanoic acis (PFPeA)				
R. 6:2FTS				
S. 8:2FTS				

LDC #: ~~123697~~ 96

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 12/18/17 **Blank analysis date:** 12/20/17
Conc. units: ng/L **Associated samples:** All

Compound	Blank ID	Sample Identification								
	MB 320-200328/1-A		1	2	3	4				
K	0.292				1.86 J 0.51					
D	0.368		1.11 J 2.03 U	0.45 J 2.05 U	0.87 J 2.05 U	0.41 J 2.06 U				

Blank extraction date: _____ **Blank analysis date:** _____ **Associated samples:** _____
Conc. units: _____

Compound	Blank ID	Sample Identification								

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 42368A96

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: A
2nd Reviewer: A

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: ng/L **Associated sample units:** ng/L
Sampling date: 12/5/18
Field blank type: (circle one) Trip Blank/Field Blank / Rinsate / Other: FB/EB Associated Samples: 2-4

Compound	Blank ID	BK ID	Sample Identification							
	FB001	EB001		2	3	4				
K	0.29	0.29			1.86/2.05U					
O		0.51		0.45/2.05U	0.82/2.05U	0.41/2.06U				

Blank units: ng/L **Associated sample units:** ng/L
Sampling date: 12/8/18
Field blank type: (circle one) Field Blank / Rinsate / Other: FB/EB Associated Samples: 1

Compound	Blank ID	BK ID	Sample Identification							
	FB003	EB003		1						
P	0.42			1.11/2.03U						
K	0.28	0.30								

LDC #: 42369A96

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within ~~50~~ 25-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (ND)	M2-8:2FTS	183 (25-150)		J/UJ/R (AQ) S
		2 (ND)		169		
		3 (ND)		158		
		4 (ND)		172		
		MB 320-20038/1A		203		
			13C2-PFTeDA	151		(I)
			d3-NMeFOSAA	159		(D)

LDC #: 42369A96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: C

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (1.0 std)	Recalculated RRF (1.0 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	12/19/17	PFOA (1st internal standard)	1.0272	1.0272	1.0553	1.0553	8.1	8.1
	(A8_N)		PFOS (2nd internal standard)	1.1082	1.1082	1.0633	1.0633	3.5	3.5
			(3rd internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42369A96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2017.12.19_023	12/20/17	PFOA (1st internal standard)	1.0553	1.068	1.068	1.2	1.2
			PFOS (2nd internal standard)	1.0633	1.040	1.040	2.1	2.1
2	2017.12.19_034	12/20/17	PFOA (1st internal standard)	1.0553	1.045	1.045	0.9	0.9
			PFOS (2nd internal standard)	1.0633	1.016	1.016	4.5	4.5
3			PFOA (1st internal standard)					
			PFOS (2nd internal standard)					
4			PFOA (1st internal standard)					
			PFOS (2nd internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42368A96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 2

METHOD: __ GC ✓ HPLC/MS

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA

RPD = I SSCLCS - SSCLCSD I * 2/(SSCLCS + SSCLCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 320-260 328

Compound	Spike Added (ng/L)		Spiked Sample Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										
PFOA	40.0	NA	30.93	NA	77	77				
PFOS	37.1	✓	31.08	✓	84	84				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42368A96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 2

METHOD: __ GC V HPLC /MS

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 1 Compound Name PFOA

Concentration = $\frac{(188151)(2.5)(10)(1)}{(5695553)(1.0553)(0.2467)}$

$= 3.17$ ng/L

#	Sample ID	Compound	Reported Concentrations (ng/L)	Recalculated Results Concentrations ( )	Qualifications
	1	PFOA	3.17		

Comments: _____

SAMPCALew.wpd

Site: Suffolk County Biota Sampling Evaluation
Laboratory: Eurofins, Edison, NY
Report No.: 320-34271-1
Reviewer: Stella Cuenco, Pei Geng, and Christina Rink/Laboratory Data Consultants for P.W. Grosser Consulting
Date: October 18, 2019

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
BB-CR008-E	320-34271-5	Fluorinated Alkyl Substances
BB-CR008-H	320-34271-8	Fluorinated Alkyl Substances
LB-CR008-B	320-34271-11	Fluorinated Alkyl Substances
LB-CR008-H	320-34271-17	Fluorinated Alkyl Substances
BG-CR008-E	320-34271-24	Fluorinated Alkyl Substances
AE-CR008-A	320-34271-30	Fluorinated Alkyl Substances
AE-CR008-B	320-34271-31	Fluorinated Alkyl Substances
AE-CR008-D	320-34271-33	Fluorinated Alkyl Substances
AE-CR008-H	320-34271-37	Fluorinated Alkyl Substances
WP-CR001-A	320-34271-40	Fluorinated Alkyl Substances
WP-CR001-B	320-34271-41	Fluorinated Alkyl Substances
WP-CR001-C	320-34271-42	Fluorinated Alkyl Substances
WP-CR001-F	320-34271-45	Fluorinated Alkyl Substances
BB-CR008-EDUP	320-34271-5DUP	Fluorinated Alkyl Substances
AE-CR008-DMS	320-34271-33MS	Fluorinated Alkyl Substances
AE-CR008-DMSD	320-34271-33MSD	Fluorinated Alkyl Substances
WP-CR001-FDUP	320-34271-45DUP	Fluorinated Alkyl Substances

Associated QC Samples(s):
Field/Trip Blanks: EB-CR001, FB-CR001
Field Duplicate pair: None Associated

The above-listed tissue samples were collected on August 3 through December 1, 2017 and were analyzed for fluorinated alkyl substances by method 537 modified. The data validation was performed in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,* EPA 540-R-2017-002 (January 2017), modified as necessary to accommodate the non-CLP methodologies used.

The organic data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tunes
- Initial and Continuing Calibrations
- Blanks
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Duplicate Results
- Laboratory Control Sample (LCS)/Standard Reference Material (SRM) Results
- Internal Standards
- Field Duplicate Results
- Moisture Content
- Quantitation Limits and Data Assessment
- Sample Quantitation and Compound Identification

Overall Evaluation of Data and Potential Usability Issues

All results are usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was complete as defined under the requirements for the NYSDEC ASP category B laboratory deliverables.

Holding Times and Sample Preservation

All criteria were met.

LC/MS Tunes

All criteria were met.

Initial and Continuing Calibrations

Initial calibration:

All criteria were met.

Continuing calibration:

Compounds that did not meet criteria are summarized in the following table.

Date	Instrument ID	Compound	CC %D	Associated Samples	Affected Compound		Validation Action
01/06/18	2018.01.06_019	d3-NMeFOSAA	53.7	AE-CR008-A AE-CR008-B AE-CR008-D	NMeFOSAA	XX	UJ nondetects
01/06/18	2018.01.06_019	M2-6:2FTS M2-8:2FTS	51.4 149.6	AE-CR008-D	6:2FTS 8:2FTS	XX XX	UJ nondetects UJ nondetects
01/06/18	2018.01.06_030	d3-NMeFOSAA d3-NEtFOSAA	54.0 68.5	AE-CR008-H WP-CR001-A	NMeFOSAA NEtFOSAA	XX XX	UJ nondetects UJ nondetects

X = Initial calibration (IC) relative standard deviation (%RSD) > 35; estimate (J/UJ) positive and nondetect results.

XX = Continuing calibration (CC) percent difference (%D) > 30 for unlabeled compounds/50 for labeled compounds; estimate (J/UJ) positive and nondetect results.

SS = Second source verification percent difference (%D) > 30; estimate (J/UJ) positive and nondetect results.

+ = Response factor (RRF) < validation criteria; estimate (J/UJ) positive and nondetect results.

The 6:2FTS, 8:2FTS, NMeFOSAA, and NEtFOSAA results for the samples listed above were estimated due to continuing calibration exceedances. The bias cannot be determined. The results can be used for project objectives as nondetects with estimated quantitation limits (UJ) which may have a minor impact on the data usability.

Blanks

Contamination was detected in the associated fluorinated alkyl substances method blank samples. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Blank ID	Compound	Level Detected	Action Level	Associated Samples
MB 320-202823/1-A	6:2FTS	0.0131 mg/Kg	RL	WP-CR001-B WP-CR001-C WP-CR001-F
MB 320-201207/1-A	Perfluorobutanoic acid Perfluoroundecanoic acid Perfluorohexanesulfonic acid 6:2FTS	0.000166 mg/Kg 0.0000889 mg/Kg 0.0000702 mg/Kg 0.000829 mg/Kg	RL RL RL RL	BB-CR008-E BB-CR008-H LB-CR008-B LB-CR008-H
MB 320-201223/1-A	Perfluorohexanesulfonic acid	0.0000792 mg/Kg	RL	BG-CR008-E AE-CR008-A AE-CR008-B AE-CR008-D AE-CR008-H WP-CR001-A

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the RL and > the Action Level, qualification of the data was not required.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
BB-CR008-E	Perfluorobutanoic acid	0.00013 mg/Kg	0.00092U mg/Kg
	Perfluoroundecanoic acid	0.00060 mg/Kg	0.00092U mg/Kg
	Perfluorohexanesulfonic acid	0.00076 mg/Kg	0.00092U mg/Kg
BB-CR008-H	Perfluorobutanoic acid	0.00018 mg/Kg	0.0010U mg/Kg
	Perfluoroundecanoic acid	0.00019 mg/Kg	0.0010U mg/Kg
	Perfluorohexanesulfonic acid	0.00075 mg/Kg	0.0010U mg/Kg
LB-CR008-H	Perfluorobutanoic acid	0.00012 mg/Kg	0.00092U mg/Kg

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

Contamination was detected in the equipment blank sample EB-CR001 and field blank sample FB-CR001 for fluorinated alkyl substances analysis. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Field Blank ID	Compound	Level Detected	Action Level	Associated Samples
EB-CR001	Perfluorohexanesulfonic acid	0.29 ng/L	RL	WP-CR001-A WP-CR001-B WP-CR001-C WP-CR001-F
FB-CR001	Perfluorohexanesulfonic acid	0.27 ng/L	RL	WP-CR001-A
	Perfluorooctane Sulfonamide	0.37 ng/L	RL	WP-CR001-B
	6:2FTS	3.43 ng/L	RL	WP-CR001-C WP-CR001-F

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and $\leq$ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and $\leq$ the Action Level, qualify the result as not detected (U) at the reported concentration.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
WP-CR001-A	Perfluorohexanesulfonic acid	0.0038 mg/Kg	0.0038U mg/Kg
	Perfluorooctane Sulfonamide	0.00012 mg/Kg	0.0010U mg/Kg
WP-CR001-B	Perfluorohexanesulfonic acid	0.0016 mg/Kg	0.0016U mg/Kg
	Perfluorooctane Sulfonamide	0.00045 mg/Kg	0.00097U mg/Kg
WP-CR001-C	Perfluorohexanesulfonic acid	0.00070 mg/Kg	0.00098U mg/Kg
	Perfluorooctane Sulfonamide	0.00012 mg/Kg	0.00098U mg/Kg
WP-CR001-F	Perfluorohexanesulfonic acid	0.0029 mg/Kg	0.0029U mg/Kg
	Perfluorooctane Sulfonamide	0.00017 mg/Kg	0.00093U mg/Kg

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

MS/MSD Results

MS/MSD analyses were performed on sample AE-CR008-D for fluorinated alkyl substances analysis. The following table lists the compounds recovered outside of control limits in the MS/MSD analyses and the resulting actions.

Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Affected Sample	Validation Action
Perfluorohexanesulfonic acid	141 (75-121)	131 (75-121)	-	AE-CR008-D	J detects

The perfluorohexanesulfonic acid result may be biased high due to high MS/MSD percent recovery. The result can be used for project objectives as an estimated value (J) which may have a minor impact on the data usability.

Laboratory Duplicate Results

Laboratory duplicates were performed on samples BB-CR008-E and WP-CR001-F for fluorinated alkyl substances analysis. All criteria were met.

LCS/SRM Results

Al criteria were met.

Internal Standards

The following table lists the internal standards recovered outside of control limits and the resulting actions.

Sample	Internal Standard	Area Exceedances (Limits)	Affected Compounds	Validation actions
BB-CR008-E	d5-NEtFOSAA	180 (25-150)	NEtFOSAA	UJ nondetects
AE-CR008-D	M2-6:2FTS	431 (25-150)	6:2FTS	UJ nondetects
	M2-8:2FTS	741 (25-150)	8:2FTS	UJ nondetects

The NEtFOSAA, 6:2FTS, and 8:2FTS results were estimated due to internal standard area exceedances. The bias cannot be determined. The results can be used for project objectives as nondetects with estimated quantitation limits (UJ) which may have a minor impact on the data usability.

Field Duplicate Results

A field duplicate pair was not associated with this sample set. Validation action was not required on this basis.

Moisture Content

All criteria were met.

Quantitation Limits and Data Assessment

Results were reported which were below the reporting limit (RL) and above the method detection limit (MDL) in the fluorinated alkyl substances analysis. These results were qualified as estimated (J) by the laboratory.

Due to high target compound levels or difficult sample matrix, select samples were analyzed at dilutions. The following table lists the sample dilutions which were performed and the results reported. RLs were elevated accordingly.

Sample	Fluorinated Alkyl Substances Analysis Reported
BB-CR008-E BB-CR008-H LB-CR008-B LB-CR008-H BG-CR008-E AE-CR008-A AE-CR008-B AE-CR008-H WP-CR001-A WP-CR001-B WP-CR001-C WP-CR001-F	10-fold dilution for select analytes due to nature of sample matrix

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: BB-CR008-E Lab Sample ID: 320-34271-5

Matrix: Tissue Lab File ID: 2018.01.04LLAX_044.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 15:08

Extraction Method: SHAKE Date Extracted: 12/23/2017 09:44

Sample wt/vol: 1.09(g) Date Analyzed: 01/05/2018 04:35

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202746 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00013	J B 0.00092U	0.00092	0.000092
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000063	U U	0.00092	0.000063
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000048	U	0.00092	0.000048
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000055	U	0.00092	0.000055
335-67-1	Perfluorooctanoic acid (PFOA)	0.00010	U	0.00092	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.000039	U	0.00092	0.000039
335-76-2	Perfluorodecanoic acid (PFDA)	0.000067	U	0.00092	0.000067
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00060	J B 0.00092U	0.00092	0.000068
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00011	J J	0.00092	0.000054
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00019	J J	0.00092	0.000047
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000061	U U	0.00092	0.000061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000092	U U	0.00092	0.000092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00076	J B 0.00092U	0.00092	0.000061
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000066	U U	0.00092	0.000066
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0029		0.00092	0.000071
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000054	U U	0.00092	0.000054
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000065	U	0.00092	0.000065
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0060	U	0.0092	0.0060
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0018	U UJ	0.0092	0.0018

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Initials: ER

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: BB-CR008-E DL Lab Sample ID: 320-34271-5 DL

Matrix: Tissue Lab File ID: 2018.01.12LLC_011.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 15:08

Extraction Method: SHAKE Date Extracted: 12/23/2017 09:44

Sample wt/vol: 1.09(g) Date Analyzed: 01/12/2018 21:04

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203807 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0036	U	0.092	0.0036
39108-34-4	8:2 FTS	0.0062	U	0.092	0.0062

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	159	*	25-150
STL02280	M2-8:2 FTS	204	*	25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: BB-CR008-H Lab Sample ID: 320-34271-8

Matrix: Tissue Lab File ID: 2018.01.04LLAX_049.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 15:14

Extraction Method: SHAKE Date Extracted: 12/23/2017 09:44

Sample wt/vol: 0.98(g) Date Analyzed: 01/05/2018 05:14

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202746 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00018	J B 0.0010U	0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000070	U	0.0010	0.000070
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000053	U	0.0010	0.000053
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000061	U	0.0010	0.000061
335-67-1	Perfluorooctanoic acid (PFOA)	0.00011	U	0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.000055	J J	0.0010	0.000044
335-76-2	Perfluorodecanoic acid (PFDA)	0.000074	U	0.0010	0.000074
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00019	J B 0.0010U	0.0010	0.000076
307-55-1	Perfluorododecanoic acid (PFDoA)	0.000060	U	0.0010	0.000060
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.000052	U	0.0010	0.000052
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000067	U	0.0010	0.000067
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00075	J B 0.0010U	0.0010	0.000067
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000073	U	0.0010	0.000073
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0051		0.0010	0.000079
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000060	U	0.0010	0.000060
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000072	U	0.0010	0.000072
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0066	U	0.010	0.0066
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0020	U	0.010	0.0020

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: BB-CR008-H DL Lab Sample ID: 320-34271-8 DL

Matrix: Tissue Lab File ID: 2018.01.12LLC_016.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 15:14

Extraction Method: SHAKE Date Extracted: 12/23/2017 09:44

Sample wt/vol: 0.98(g) Date Analyzed: 01/12/2018 21:43

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203807 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0040	U	0.10	0.0040
39108-34-4	8:2 FTS	0.0069	U	0.10	0.0069

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	149		25-150
STL02280	M2-8:2 FTS	165	*	25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: LB-CR008-B Lab Sample ID: 320-34271-11

Matrix: Tissue Lab File ID: 2018.01.04LLAX_052.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 14:02

Extraction Method: SHAKE Date Extracted: 12/23/2017 09:44

Sample wt/vol: 1.10(g) Date Analyzed: 01/05/2018 05:38

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202746 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.000091	U	0.00091	0.000091
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000063	U	0.00091	0.000063
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000047	U	0.00091	0.000047
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000055	U	0.00091	0.000055
335-67-1	Perfluorooctanoic acid (PFOA)	0.00010	U	0.00091	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00050	J	0.00091	0.000039
335-76-2	Perfluorodecanoic acid (PFDA)	0.00035	J	0.00091	0.000066
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0018	B	0.00091	0.000067
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00027	J	0.00091	0.000054
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00039	J	0.00091	0.000046
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00032	J	0.00091	0.000060
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000091	U	0.00091	0.000091
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0015	B	0.00091	0.000060
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00017	J	0.00091	0.000065
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.050		0.00091	0.000070
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00016	J	0.00091	0.000054
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000065	U	0.00091	0.000065
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0059	U	0.0091	0.0059
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0018	U	0.0091	0.0018

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: LB-CR008-B DL Lab Sample ID: 320-34271-11 DL

Matrix: Tissue Lab File ID: 2018.01.12LLC_019.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 14:02

Extraction Method: SHAKE Date Extracted: 12/23/2017 09:44

Sample wt/vol: 1.10(g) Date Analyzed: 01/12/2018 22:07

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203807 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0035	U J	0.091	0.0035
39108-34-4	8:2 FTS	0.0062	U J	0.091	0.0062

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	151	*	25-150
STL02280	M2-8:2 FTS	176	*	25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: LB-CR008-H Lab Sample ID: 320-34271-17

Matrix: Tissue Lab File ID: 2018.01.04LLAX_059.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 14:14

Extraction Method: SHAKE Date Extracted: 12/23/2017 09:44

Sample wt/vol: 1.09(g) Date Analyzed: 01/05/2018 06:33

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202746 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00012	J B 0.000920	0.00092	0.000092
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000063	U J	0.00092	0.000063
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000048	U	0.00092	0.000048
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000055	U	0.00092	0.000055
335-67-1	Perfluorooctanoic acid (PFOA)	0.00010	U	0.00092	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00051	J J	0.00092	0.000039
335-76-2	Perfluorodecanoic acid (PFDA)	0.00023	J J	0.00092	0.000067
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0013	B	0.00092	0.000068
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00019	J J	0.00092	0.000054
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00026	J	0.00092	0.000047
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00021	J	0.00092	0.000061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000092	U U	0.00092	0.000092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0014	B	0.00092	0.000061
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00013	J J	0.00092	0.000066
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.067		0.00092	0.000071
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000094	J J	0.00092	0.000054
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000065	U U	0.00092	0.000065
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0060	U	0.0092	0.0060
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0018	U	0.0092	0.0018

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: LB-CR008-H DL Lab Sample ID: 320-34271-17 DL

Matrix: Tissue Lab File ID: 2018.01.12LLC_026.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 14:14

Extraction Method: SHAKE Date Extracted: 12/23/2017 09:44

Sample wt/vol: 1.09(g) Date Analyzed: 01/12/2018 23:02

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203807 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0036	U J	0.092	0.0036
39108-34-4	8:2 FTS	0.0062	U J	0.092	0.0062

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	166	*	25-150
STL02280	M2-8:2 FTS	165	*	25-150

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: BG-CR008-E Lab Sample ID: 320-34271-24

Matrix: Tissue Lab File ID: 2018.01.06LLA_015.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 13:08

Extraction Method: SHAKE Date Extracted: 12/23/2017 12:23

Sample wt/vol: 1.02(g) Date Analyzed: 01/06/2018 06:34

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202873 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.000098	U	0.00098	0.000098
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000068	U	0.00098	0.000068
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000051	U	0.00098	0.000051
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000059	U	0.00098	0.000059
335-67-1	Perfluorooctanoic acid (PFOA)	0.00011	U	0.00098	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.000042	U	0.00098	0.000042
335-76-2	Perfluorodecanoic acid (PFDA)	0.00023	J	0.00098	0.000072
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0011		0.00098	0.000073
307-55-1	Perfluorododecanoic acid (PFDoA)	0.000098	J	0.00098	0.000058
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.000093	J	0.00098	0.000050
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000065	U	0.00098	0.000065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000098	U	0.00098	0.000098
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0012	B	0.00098	0.000065
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0094		0.00098	0.000075
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000058	U	0.00098	0.000058
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000070	U	0.00098	0.000070
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0064	U	0.0098	0.0064
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U	0.0098	0.0019

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: BG-CR008-E RE Lab Sample ID: 320-34271-24 RE

Matrix: Tissue Lab File ID: 2018.01.18LLC_013.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 13:08

Extraction Method: SHAKE Date Extracted: 01/15/2018 16:12

Sample wt/vol: 1.09(g) Date Analyzed: 01/18/2018 11:45

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204505 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000066	U J	0.00092	0.000066

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	78		25-150

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FORM I 537 (modified)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: BG-CR008-E DL Lab Sample ID: 320-34271-24 DL

Matrix: Tissue Lab File ID: 2018.01.13LLC_008.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 13:08

Extraction Method: SHAKE Date Extracted: 12/23/2017 12:23

Sample wt/vol: 1.02(g) Date Analyzed: 01/13/2018 21:13

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203820 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0038	U J	0.098	0.0038
39108-34-4	8:2 FTS	0.0067	U J	0.098	0.0067

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	152	*	25-150
STL02280	M2-8:2 FTS	173	*	25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: AE-CR008-A Lab Sample ID: 320-34271-30

Matrix: Tissue Lab File ID: 2018.01.06LLA_022.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 12:00

Extraction Method: SHAKE Date Extracted: 12/23/2017 12:23

Sample wt/vol: 0.98(g) Date Analyzed: 01/06/2018 07:29

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202873 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00087	J	0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000070	U	0.0010	0.000070
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000053	U	0.0010	0.000053
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000061	U	0.0010	0.000061
335-67-1	Perfluorooctanoic acid (PFOA)	0.00012	J	0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.0013		0.0010	0.000044
335-76-2	Perfluorodecanoic acid (PFDA)	0.00030	J	0.0010	0.000074
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0017		0.0010	0.000076
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00021	J	0.0010	0.000060
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.000052	U	0.0010	0.000052
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000067	U	0.0010	0.000067
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0033	B	0.0010	0.000067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.047		0.0010	0.000079
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000098	J	0.0010	0.000060
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000072	U	0.0010	0.000072
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0066	U	0.010	0.0066
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0020	U	0.010	0.0020

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: AE-CR008-A RE Lab Sample ID: 320-34271-30 RE

Matrix: Tissue Lab File ID: 2018.01.18LLC_021.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 12:00

Extraction Method: SHAKE Date Extracted: 01/15/2018 16:12

Sample wt/vol: 1.00(g) Date Analyzed: 01/18/2018 12:48

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204505 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00011	J J	0.0010	0.000072

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	75		25-150

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Initials: CR

FORM I 537 (modified)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: AE-CR008-A DL Lab Sample ID: 320-34271-30 DL

Matrix: Tissue Lab File ID: 2018.01.13LLC_015.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 12:00

Extraction Method: SHAKE Date Extracted: 12/23/2017 12:23

Sample wt/vol: 0.98(g) Date Analyzed: 01/13/2018 22:08

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203820 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0040	U	0.10	0.0040
39108-34-4	8:2 FTS	0.0069	U	0.10	0.0069

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	157	*	25-150
STL02280	M2-8:2 FTS	243	*	25-150

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: AE-CR008-B Lab Sample ID: 320-34271-31

Matrix: Tissue Lab File ID: 2018.01.06LLA_023.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 12:02

Extraction Method: SHAKE Date Extracted: 12/23/2017 12:23

Sample wt/vol: 1.05(g) Date Analyzed: 01/06/2018 07:36

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202873 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00072	J	0.00095	0.000095
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000066	U	0.00095	0.000066
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000050	U	0.00095	0.000050
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000057	U	0.00095	0.000057
335-67-1	Perfluorooctanoic acid (PFOA)	0.00010	U	0.00095	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00042	J	0.00095	0.000041
335-76-2	Perfluorodecanoic acid (PFDA)	0.00029	J	0.00095	0.000070
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0016		0.00095	0.000070
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00019	J	0.00095	0.000056
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00034	J	0.00095	0.000049
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000063	U	0.00095	0.000063
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000095	U	0.00095	0.000095
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0056	B	0.00095	0.000063
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.035		0.00095	0.000073
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000093	J	0.00095	0.000056
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000068	U	0.00095	0.000068
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0062	U	0.0095	0.0062
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U	0.0095	0.0019

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: AE-CR008-B RE Lab Sample ID: 320-34271-31 RE

Matrix: Tissue Lab File ID: 2018.01.18LLC_022.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 12:02

Extraction Method: SHAKE Date Extracted: 01/15/2018 16:12

Sample wt/vol: 1.09(g) Date Analyzed: 01/18/2018 12:56

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204505 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000066	U	0.00092	0.000066

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	82		25-150

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: AE-CR008-B DL Lab Sample ID: 320-34271-31 DL

Matrix: Tissue Lab File ID: 2018.01.13LLC_016.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 12:02

Extraction Method: SHAKE Date Extracted: 12/23/2017 12:23

Sample wt/vol: 1.05(g) Date Analyzed: 01/13/2018 22:16

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203820 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0037	U	0.095	0.0037
39108-34-4	8:2 FTS	0.0065	U	0.095	0.0065

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	205	*	25-150
STL02280	M2-8:2 FTS	261	*	25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: AE-CR008-D Lab Sample ID: 320-34271-33

Matrix: Tissue Lab File ID: 2018.01.06LLA_025.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 12:06

Extraction Method: SHAKE Date Extracted: 12/23/2017 12:23

Sample wt/vol: 1.08(g) Date Analyzed: 01/06/2018 07:52

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202873 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00046	J	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000048	U	0.00093	0.000048
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000056	U	0.00093	0.000056
335-67-1	Perfluorooctanoic acid (PFOA)	0.00010	U	0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.0011		0.00093	0.000040
335-76-2	Perfluorodecanoic acid (PFDA)	0.00023	J	0.00093	0.000068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0018		0.00093	0.000069
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00045	J	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00071	J	0.00093	0.000047
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00070	J	0.00093	0.000061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0095	F1 B	0.00093	0.000061
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.059		0.00093	0.000071
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00012	J	0.00093	0.000055
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000066	U	0.00093	0.000066
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0060	U	0.0093	0.0060
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0018	U	0.0093	0.0018
27619-97-2	6:2 FTS	0.00036	U	0.0093	0.00036
39108-34-4	8:2 FTS	0.00063	U	0.0093	0.00063

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: AE-CR008-D RE Lab Sample ID: 320-34271-33 RE

Matrix: Tissue Lab File ID: 2018.01.18LLC_024.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 12:06

Extraction Method: SHAKE Date Extracted: 01/15/2018 16:12

Sample wt/vol: 1.02(g) Date Analyzed: 01/18/2018 13:11

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204505 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00026	J J	0.00098	0.000071

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	73		25-150

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: AE-CR008-H Lab Sample ID: 320-34271-37

Matrix: Tissue Lab File ID: 2018.01.06LLA_033.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 12:14

Extraction Method: SHAKE Date Extracted: 12/23/2017 12:23

Sample wt/vol: 1.02(g) Date Analyzed: 01/06/2018 08:55

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202873 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0010		0.00098	0.000098
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000068	U	0.00098	0.000068
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000051	U	0.00098	0.000051
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000059	U	0.00098	0.000059
335-67-1	Perfluorooctanoic acid (PFOA)	0.00011	U	0.00098	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00028	J	0.00098	0.000042
335-76-2	Perfluorodecanoic acid (PFDA)	0.00028	J	0.00098	0.000072
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0021		0.00098	0.000073
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00032	J	0.00098	0.000058
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00051	J	0.00098	0.000050
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00041	J	0.00098	0.000065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000098	U	0.00098	0.000098
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0045	B	0.00098	0.000065
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.017		0.00098	0.000075
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00021	J	0.00098	0.000058
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0064	U	0.0098	0.0064
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U	0.0098	0.0019

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: AE-CR008-H RE Lab Sample ID: 320-34271-37 RE

Matrix: Tissue Lab File ID: 2018.01.18LLC_033.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 12:14

Extraction Method: SHAKE Date Extracted: 01/15/2018 16:12

Sample wt/vol: 1.06(g) Date Analyzed: 01/18/2018 14:22

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204505 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000068	U	0.00094	0.000068

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	84		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: AE-CR008-H DL Lab Sample ID: 320-34271-37 DL

Matrix: Tissue Lab File ID: 2018.01.13LLC_026.d

Analysis Method: 537 (modified) Date Collected: 08/03/2017 12:14

Extraction Method: SHAKE Date Extracted: 12/23/2017 12:23

Sample wt/vol: 1.02(g) Date Analyzed: 01/13/2018 23:35

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203820 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00070	U	0.0098	0.00070
27619-97-2	6:2 FTS	0.0038	U	0.098	0.0038
39108-34-4	8:2 FTS	0.0067	U	0.098	0.0067

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	33		25-150
STL02279	M2-6:2 FTS	111		25-150
STL02280	M2-8:2 FTS	161	*	25-150

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Initials: CR

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: WP-CR001-A Lab Sample ID: 320-34271-40

Matrix: Tissue Lab File ID: 2018.01.06LLA_036.d

Analysis Method: 537 (modified) Date Collected: 12/01/2017 16:00

Extraction Method: SHAKE Date Extracted: 12/23/2017 12:23

Sample wt/vol: 1.00(g) Date Analyzed: 01/06/2018 09:18

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202873 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00027	J	0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000069	U	0.0010	0.000069
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000052	U	0.0010	0.000052
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000060	U	0.0010	0.000060
335-67-1	Perfluorooctanoic acid (PFOA)	0.00011	U	0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00056	J	0.0010	0.000043
335-76-2	Perfluorodecanoic acid (PFDA)	0.00019	J	0.0010	0.000073
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0016		0.0010	0.000074
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00019	J	0.0010	0.000059
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00022	J	0.0010	0.000051
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000066	U	0.0010	0.000066
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0038	B	0.0010	0.000066
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0084		0.0010	0.000077
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000077	J	0.0010	0.000059
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00012	J 0.00010 U	0.0010	0.000071
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0065	U	0.010	0.0065
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0020	U	0.010	0.0020

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: WP-CR001-A RE Lab Sample ID: 320-34271-40 RE

Matrix: Tissue Lab File ID: 2018.01.18LLC_036.d

Analysis Method: 537 (modified) Date Collected: 12/01/2017 16:00

Extraction Method: SHAKE Date Extracted: 01/15/2018 16:22

Sample wt/vol: 1.05(g) Date Analyzed: 01/18/2018 14:45

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204505 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00011	J J	0.00095	0.000069

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	76		25-150

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Initials: CR

FORM I 537 (modified)

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: WP-CR001-A DL Lab Sample ID: 320-34271-40 DL

Matrix: Tissue Lab File ID: 2018.01.13LLC_029.d

Analysis Method: 537 (modified) Date Collected: 12/01/2017 16:00

Extraction Method: SHAKE Date Extracted: 12/23/2017 12:23

Sample wt/vol: 1.00(g) Date Analyzed: 01/13/2018 23:58

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203820 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0039	U * J	0.10	0.0039
39108-34-4	8:2 FTS	0.0068	U J	0.10	0.0068

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	121		25-150
STL02280	M2-8:2 FTS	173	*	25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: WP-CR001-B Lab Sample ID: 320-34271-41

Matrix: Tissue Lab File ID: 2018.01.13LLB_004.d

Analysis Method: 537 (modified) Date Collected: 12/01/2017 16:02

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:41

Sample wt/vol: 1.03(g) Date Analyzed: 01/13/2018 15:29

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203811 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00069	J J	0.00097	0.000097
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.00019	J J	0.00097	0.000067
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000050	U U	0.00097	0.000050
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000058	U	0.00097	0.000058
335-67-1	Perfluorooctanoic acid (PFOA)	0.00011	U	0.00097	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00069	J J	0.00097	0.000042
335-76-2	Perfluorodecanoic acid (PFDA)	0.00028	J J	0.00097	0.000071
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00066	J	0.00097	0.000072
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00023	J	0.00097	0.000057
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00012	J	0.00097	0.000050
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000064	U U	0.00097	0.000064
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000097	U U	0.00097	0.000097
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0016	U	0.00097	0.000064
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000070	U U	0.00097	0.000070
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0030		0.00097	0.000075
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00020	J J	0.00097	0.000057
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00045	J 0.00097U	0.00097	0.000069
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0063	U U	0.0097	0.0063
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U U	0.0097	0.0019

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: WP-CR001-B DL Lab Sample ID: 320-34271-41 DL

Matrix: Tissue Lab File ID: 2018.01.13LLC_032.d

Analysis Method: 537 (modified) Date Collected: 12/01/2017 16:02

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:41

Sample wt/vol: 1.03(g) Date Analyzed: 01/14/2018 00:22

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203822 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0038	U	0.097	0.0038
39108-34-4	8:2 FTS	0.0066	U	0.097	0.0066

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	142		25-150
STL02280	M2-8:2 FTS	225	*	25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: WP-CR001-C Lab Sample ID: 320-34271-42

Matrix: Tissue Lab File ID: 2018.01.13LLB_005.d

Analysis Method: 537 (modified) Date Collected: 12/01/2017 16:04

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:41

Sample wt/vol: 1.02(g) Date Analyzed: 01/13/2018 15:37

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203811 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00026	J J	0.00098	0.000098
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000068	U U	0.00098	0.000068
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000051	U	0.00098	0.000051
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000059	U	0.00098	0.000059
335-67-1	Perfluorooctanoic acid (PFOA)	0.00011	U	0.00098	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00043	J J	0.00098	0.000042
335-76-2	Perfluorodecanoic acid (PFDA)	0.00026	J J	0.00098	0.000072
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0012		0.00098	0.000073
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00036	J J	0.00098	0.000058
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00021	J	0.00098	0.000050
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00034	J	0.00098	0.000065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000098	U U	0.00098	0.000098
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00070	J 0.000098U	0.00098	0.000065
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000071	U U	0.00098	0.000071
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0063		0.00098	0.000075
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000058	U U	0.00098	0.000058
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00012	J 0.000098U	0.00098	0.000070
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0064	U U	0.0098	0.0064
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U U	0.0098	0.0019

OCT 18 2019

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: WP-CR001-C DL Lab Sample ID: 320-34271-42 DL

Matrix: Tissue Lab File ID: 2018.01.13LLC_033.d

Analysis Method: 537 (modified) Date Collected: 12/01/2017 16:04

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:41

Sample wt/vol: 1.02(g) Date Analyzed: 01/14/2018 00:30

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203822 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0038	U	0.098	0.0038
39108-34-4	8:2 FTS	0.0067	U	0.098	0.0067

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	142		25-150
STL02280	M2-8:2 FTS	261	*	25-150

OCT 18 2019

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: WP-CR001-F Lab Sample ID: 320-34271-45

Matrix: Tissue Lab File ID: 2018.01.13LLB_012.d

Analysis Method: 537 (modified) Date Collected: 12/01/2017 16:10

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:41

Sample wt/vol: 1.08(g) Date Analyzed: 01/13/2018 17:34

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203811 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00033	J J	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U U	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000048	U	0.00093	0.000048
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000056	U	0.00093	0.000056
335-67-1	Perfluorooctanoic acid (PFOA)	0.00010	U	0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.0016		0.00093	0.000040
335-76-2	Perfluorodecanoic acid (PFDA)	0.00051	J J	0.00093	0.000068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0057		0.00093	0.000069
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00031	J J	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00027	J	0.00093	0.000047
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00033	J	0.00093	0.000061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U U	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0029	J	0.00093	0.000061
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00015	J J	0.00093	0.000067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.021		0.00093	0.000071
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00013	J J	0.00093	0.000055
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00017	J 0.000093U	0.00093	0.000066
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0060	U U	0.0093	0.0060
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0018	U J	0.0093	0.0018

OCT 18 2019

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-34271-1

SDG No.:

Client Sample ID: WP-CR001-F DL Lab Sample ID: 320-34271-45 DL

Matrix: Tissue Lab File ID: 2018.01.13LLC_038.d

Analysis Method: 537 (modified) Date Collected: 12/01/2017 16:10

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:41

Sample wt/vol: 1.08(g) Date Analyzed: 01/14/2018 01:09

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203822 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0036	U	0.093	0.0036
39108-34-4	8:2 FTS	0.0063	U	0.093	0.0063

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	153	*	25-150
STL02280	M2-8:2 FTS	270	*	25-150

OCT 18 2019

Initials: CR

LDC #: 42369B96
SDG #: 320-34271-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 6/13/18
Page: 1 of 2
Reviewer:
2nd Reviewer:

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537-Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSDs ≤ 35% / r² ; True / ICV = 30%
IV.	Continuing calibration	SW	CCV ≤ 30% / Labeled ≤ 50%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	EB-CR001, FB-CR001
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates/DUP	SW/A	
IX.	Laboratory control samples	A	LCS, SRM
X.	Field duplicates	N	
XI.	Internal standards	SW	
XII.	Compound quantitation RL/LOQ/LODs	A	results < RL - J flags/A
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1 1	BB-CR008-E (1/10x) (IS high)	320-34271-5	Tissue	08/03/17
2 1	BB-CR008-H	320-34271-8	Tissue	08/03/17
3 1	LB-CR008-B	320-34271-11	Tissue	08/03/17
4 1	LB-CR008-H	320-34271-17	Tissue	08/03/17
5 2	BG-CR008-E	320-34271-24	Tissue	08/03/17
6 2	AE-CR008-A	320-34271-30	Tissue	08/03/17
7 2	AE-CR008-B	320-34271-31	Tissue	08/03/17
8 2	AE-CR008-D	320-34271-33	Tissue	08/03/17
9 2	AE-CR008-H (1/10x - IS high)	320-34271-37	Tissue	08/03/17
10 2	WP-CR001-A	320-34271-40	Tissue	~~08/03/17~~ 12/1/17
11 3	WP-CR001-B	320-34271-41	Tissue	08/03/17
12 3	WP-CR001-C	320-34271-42	Tissue	08/03/17
13 3	WP-CR001-F	320-34271-45	Tissue	08/03/17
14	BB-CR008-EDUP	320-34271-5DUP	Tissue	08/03/17

1 MB 320-201207/1-A, 2 MB 320-201223/1-A, 3 MB 320-202823/1-A

LDC #: 42369B96
SDG #: 320-34271-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 4/12/18

Reviewer:
2nd Reviewer:

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537-Modified)

	Client ID	Lab ID	Matrix	Date
15	AE-CR008-DMS	320-34271-33MS	Tissue	08/03/17
16	AE-CR008-DMSD	320-34271-33MSD	Tissue	08/03/17
17	WP-CR001-FDUP	320-34271-45DUP	Tissue	08/03/17
18				
19				
20				

Notes:

LDC #: 42369B96

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: Q
2nd Reviewer: Q

Method: LCMS (EPA Method 537)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration ≤ 30%?	✓			Labeled ≤ 50%
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?	✓			
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 42369B46

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?.			✓	
XI. Internal standards				
Were internal standard area counts within ± 50% of the associated calibration standard?		✓		
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data	✓			
Overall assessment of data was found to be acceptable.				

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. ~~N-methyl perfluorooctanesulfonamidoacetic acid~~ (NMeFOSAA)			
U. ~~N-Ethyl perfluorooctanesulfonamidoacetic acid~~ (NEtFOSAA)			

LDC #: 4-269B96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: a

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed after every 10 injections for each instrument?

Y N N/A Were all continuing calibration percent differences (%D) ≤30 %?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Finding RRF (Limit:)	Associated Samples	Qualifications
	1/6/18	20180106_019	d3-T	53.7 (50%)		6-8, 15-16	J/NA (T)
			M2-R	51.4		8, 15-16	J/NA (R)
			M2-S	149.6		↓	↓ (S)
						(ND)	
	1/6/18	20180106_020	d3-T	54.0		9-10 (ND)	J/NA (T)
			d5-U	68.5		↓	(U)
	1/4/18	20180113_039	~~M8-S~~ 9				

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LDC #: 42387B96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 9
2nd Reviewer: C

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 1/5/18 **Blank analysis date:** 1/13/18

Conc. units: ng/L **Associated samples:** 11-13

Compound	Blank ID	Sample Identification								
MB 320-20283/4A										
R	0.0131									

Blank extraction date: _____ **Blank analysis date:** _____ **Associated samples:** _____

Conc. units: _____

Compound	Blank ID	Sample Identification								

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 42369B96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: n
2nd Reviewer:

METHOD: LC/MS PFCs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 12/23/17 **Blank analysis date:** 01/12/18
Conc. units: mg/Kg **Associated samples:** 1-4

Compound	Blank ID	Sample Identification						
	MB 320-201207/1-A	1	2	4				
P	0.000166	0.00013/0.00092U	0.00018/0.0010U	0.00012/0.00092U				
F	0.0000889	0.0000/0.00092U	0.00019/0.0010U					
K	0.0000702	0.00076/0.00092U	0.00075/0.0010U					
R	0.000829							
	<RL							

Blank extraction date: 12/23/17 **Blank analysis date:** 01/06/18
Conc. units: mg/Kg **Associated samples:** 5-10

Compound	Blank ID	Sample Identification						
	MB 320-201223/1-A							
K	0.0000792							
	<RL							

LDC #: 42369B96

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: Q
2nd Reviewer: Q

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: ng/L **Associated sample units:** ng/KS
Sampling date: 12/11/17
Field blank type: (circle one) Trip Blank/Field Blank / Rinsate / Other: Associated Samples: 10-13

Compound	Blank ID	BK-17		Sample Identification						
	FB-CR001	FB-CR001		10	11	12	13			
K	0.29	0.27		0.0038 / ~~0.0010U~~	0.0016 / ~~0.0009U~~	0.00070 / ~~0.0009U~~	0.0029 / ~~0.0009U~~			
O		0.37								
R		3.43								
O				0.00012	0.00045	0.00012	0.00017			
			Raiq DL	0.0010U	0.0009U	0.0009U	0.0009U			

Blank units: _____ **Associated sample units:** _____
Sampling date: _____
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

LDC #: ~~[illegible]~~ 42359B96

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates/Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) or duplicate sample analyzed for each matrix in this SDG?
(Y) N N/A Was a MS/MSD analyzed every 20 samples of each matrix?
Y (N) N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?
(Y) N N/A Were all duplicate sample relative percent differences (RPD) or differences within QC limits?

#	Date	MS/MSD/DUP ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		15/16	K	141 (75-121)	131 (75-121)		8 (dets)	J dets/A
			~~E~~ M	70R out				No qual >4xSA

LDC #: 42385/D590

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 12
Reviewer: 9
2nd Reviewer: 2

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all internal standard area counts within 50-150% limits?

Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (ND)	d5-NMeFOSAA	180 (25-150)		J (U)
		1 (ND)	M2-6:2FTS	159	No Level IV	J (R) (OX)
			M2-8:2FTS	204		J (S)
		MB 320-20126/1-A	d3-NMeFOSAA	160		J
			M2-PFOA	350		
			M2-PFOS	575		
		1A (lab dup)	d5-NMeFOSAA	162		J
		MB 320-20123/1-A	13C4-PFBA	2		
			13C5-PFPeA	6		
			13C2-PFHxA	9		
			13C4-PFHpA	12		
			13C4-PFOA	13		
			13C5-PFNA	19		
			13C3-PFBS	22		
			M2-PFOA	20		
		MB 320-20128/1-A	13C4-PFBA	2		J
			13C5-PFPeA	4		
			13C2-PFHxA	5		
			13C4-PFHpA	8		
			13C4-PFOA	14		
			13C2-PFTeDA	16		
			13C3-PFBS	19		
			M2-PFOA	10		

LDC #: 42369B96

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 9
2nd Reviewer: a

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		14 (Lab dup)	M2-S	179 (25-150)		J/UJ/P
		17 (Lab dup)	↓	~~DNR~~ ↓		↓
		2 (ND)	M2-S	165 (25-150)		~~J/UJ/P (S)~~ No Qual (10X)
		3 (ND)	M2-R	151		
			M2-S	176		
		4 (ND)	M2-R	166		
			M2-S	165		
		5 (ND)	M2-R	152		
			M2-S	173		
		6 (ND)	↓	157		
		~~7 (ND)~~		~~243~~		
		7 (ND)		205		
			↓	261		↓
		8 (ND)	M2-R	431		J/UJ/P (R)
			M2-S	741		(S)
		9 (ND)	M2-S	161		No Qual (10X)
		10 (ND)	M2-~~R~~S	173		↓

LDC #: 43698B96

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 9
2nd Reviewer: Q

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

Y (N) N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		11 (ND)	M2-S	225 (25-150)		No qual (10x)
			↓	↓		↓
		12 (ND)	↓	261		
		13 (ND)	M2-R	153		
			M2-S	270		↓

PFCs_IS.wpd

LDC #: 42369B96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (2.5 std)	Recalculated RRF (2.5 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	1/3/18	PFOA (1st internal standard)	1.1336	1.1336	1.1474	1.1474	4.8	4.8
	(A8_N)		8:2 FTS (2nd internal standard)	1.3681	1.3681	1.2467	1.2467	6.0	6.0
			(3rd internal standard)						
2	ICAL	1/17/18	PFOA (1st internal standard)	1.1344	1.1344	1.1721	1.1721	6.9	6.9
	(A8_N)		PFHpS (2nd internal standard)	1.4365	1.4365	1.3545	1.3545	4.0	4.0
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42369B96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.01.04_034	1/5/18	PFOA	(1st internal standard)	1.1474	1.154	1.154	0.6	0.6
			8:2 FTS	(2nd internal standard)	1.2467	1.240	1.240	0.5	0.5
2	2018.01.04_045	1/5/18	PFOA	(1st internal standard)	1.1474	1.122	1.122	2.2	2.2
			8:2 FTS	(2nd internal standard)	1.2467	1.162	1.162	6.8	6.8
3	2018.01.04_056	1/5/18	PFOA	(1st internal standard)	1.1474	1.130	1.130	1.5	1.5
			8:2 FTS	(2nd internal standard)	1.2467	1.297	1.297	4.0	4.0
4	2018.01.06_007	1/6/18	PFOA	(1st internal standard)	1.1474	1.054	1.054	8.1	8.1
			8:2 FTS	(2nd internal standard)	1.2467	1.237	1.237	0.8	0.8

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42369B96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.01.06_019	1/6/18	PFOA	(1st internal standard)	1.1474	1.110	1.110	3.3	3.3
			8:2 FTS	(2nd internal standard)	1.2467	1.296	1.296	3.9	3.9
2	2018.01.06_030	1/6/18	PFOA	(1st internal standard)	1.1474	1.097	1.097	4.4	4.4
			8:2 FTS	(2nd internal standard)	1.2467	1.186	1.186	4.9	4.9
3	2018.01.12_001	1/12/18	PFOA	(1st internal standard)	1.1474	1.127	1.127	1.7	1.7
			8:2 FTS	(2nd internal standard)	1.2467	1.241	1.241	0.4	0.4
4	2018.01.12_012	1/12/18	PFOA	(1st internal standard)	1.1474	1.120	1.120	2.4	2.4
			8:2 FTS	(2nd internal standard)	1.2467	1.309	1.309	5.0	5.0

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.01.12_023	1/12/18	PFOA	(1st internal standard)	1.1474	1.063	1.063	7.3	7.3
			8:2 FTS	(2nd internal standard)	1.2467	1.255	1.255	0.7	0.7
2	2018.01.13_006	1/13/18	PFOA	(1st internal standard)	1.1474	1.050	1.050	8.5	8.5
			8:2 FTS	(2nd internal standard)	1.2467	1.293	1.293	3.7	3.7
3	2018.01.13_015	1/13/18	PFOA	(1st internal standard)	1.1474	1.133	1.133	1.3	1.3
			8:2 FTS	(2nd internal standard)	1.2467	1.258	1.258	0.9	0.9
4	2018.01.13_001	1/13/18	PFOA	(1st internal standard)	1.1474	1.099	1.099	4.2	4.2
			8:2 FTS	(2nd internal standard)	1.2467	1.211	1.211	2.8	2.8

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42369B96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 9
2nd Reviewer: 2

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.01.13_012	1/13/18	PFOA	(1st internal standard)	1.1474	1.107	1.107	3.5	3.5
			8:2 FTS	(2nd internal standard)	1.2467	1.254	1.254	0.8	0.8
2	2018.01.13_023	1/13/18	PFOA	(1st internal standard)	1.1474	1.134	1.134	1.2	1.2
			8:2 FTS	(2nd internal standard)	1.2467	1.281	1.281	2.7	2.7
3	2018.01.13_031	1/14/18	PFOA	(1st internal standard)	1.1474	1.163	1.163	1.4	1.4
			8:2 FTS	(2nd internal standard)	1.2467	1.313	1.313	5.3	5.3
4	2018.01.13_039	1/14/18	PFOA	(1st internal standard)	1.1474	1.107	1.107	3.5	3.5
			8:2 FTS	(2nd internal standard)	1.2467	1.210	1.210	3.0	3.0

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.01.18_005	1/18/18	PFOA (1st internal standard)	1.1721	1.139	1.139	2.8	2.8
			PFHpS (2nd internal standard)	1.3545	1.467	1.467	8.3	8.3
2	2018.01.18_017	1/18/18	PFOA (1st internal standard)	1.1721	1.102	1.102	6.0	6.0
			PFHpS (2nd internal standard)	1.3545	1.373	1.373	1.3	1.3
3	2018.01.18_028	1/18/18	PFOA (1st internal standard)	1.1721	1.110	1.110	5.3	5.3
			PFHpS (2nd internal standard)	1.3545	1.329	1.329	1.9	1.9
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 15/16

Compound	Spike Added (MS/SD)		Sample Concentration (MS/SD)	Spiked Sample Concentration (MS/SD)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
PFOA	0.00917	0.00926	ND	0.00816	0.00747	89	89	81	81	9	9
PFOS	0.00851	0.00859	0.059	0.0704	0.0659	132	134	102	104	4	4

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-201207/2-A

Compound	Spike Added (ng/kg)		Spike Concentration (ng/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	0.0100	NA	0.00873	NA	87	87				
PFOS	0.00928	↓	0.00851	↓	92	92				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42369B96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: Q
2nd reviewer: Q

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1 PFOS:

Conc. = $\frac{47043)(2.39)(10)(1)(\ )}{308199)(1.1371)(1.09)(1000)(\ )}$

= 0.0029 ng/gs

#	Sample ID	Compound	Reported Concentration ng/gs	Calculated Concentration ( )	Qualification
	1	PFOS	0.0029		

Site: Suffolk County Biota Sampling Evaluation
Laboratory: Eurofins, Edison, NY
Report No.: 320-32834-1
Reviewer: Stella Cuenco, Pei Geng and Christina Rink/Laboratory Data Consultants for P.W. Grosser Consulting
Date: October 18, 2019

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
BC-CR002-A-M	320-32834-1	Fluorinated Alkyl Substances
BC-CR002-B-M	320-32834-3	Fluorinated Alkyl Substances
BC-CR002-D-M	320-32834-7	Fluorinated Alkyl Substances
BC-CR002-E-M	320-32834-9	Fluorinated Alkyl Substances
BC-CR002-F-M	320-32834-11	Fluorinated Alkyl Substances
BC-CR002-G-M	320-32834-13	Fluorinated Alkyl Substances
BC-CR002-H-M	320-32834-15	Fluorinated Alkyl Substances
BC-CR002-I-M	320-32834-17	Fluorinated Alkyl Substances
BC-CR002-J-M	320-32834-19	Fluorinated Alkyl Substances
BC-CR001-A-M	320-32834-21	Fluorinated Alkyl Substances
BC-CR001-C-M	320-32834-25	Fluorinated Alkyl Substances
BC-CR001-D-M	320-32834-27	Fluorinated Alkyl Substances
BC-CR001-H-M	320-32834-35	Fluorinated Alkyl Substances
BC-CR001-I-M	320-32834-37	Fluorinated Alkyl Substances
BC-CR001-J-M	320-32834-39	Fluorinated Alkyl Substances
BC-FR001-A-H	320-32834-42	Fluorinated Alkyl Substances
BC-FR001-E-H	320-32834-50	Fluorinated Alkyl Substances
BC-FR001-F-H	320-32834-52	Fluorinated Alkyl Substances
BC-GA001-D-M	320-32834-63	Fluorinated Alkyl Substances
BC-GA001-D-H	320-32834-64	Fluorinated Alkyl Substances
BC-GA001-E-H	320-32834-66	Fluorinated Alkyl Substances
BC-GA002-A-H	320-32834-74	Fluorinated Alkyl Substances
BC-GA002-B-H	320-32834-76	Fluorinated Alkyl Substances
BC-GA002-C-H	320-32834-78	Fluorinated Alkyl Substances
BC-GA002-E-H	320-32834-82	Fluorinated Alkyl Substances
BC-GA002-F-H	320-32834-84	Fluorinated Alkyl Substances
BC-GA002-G-M	320-32834-85	Fluorinated Alkyl Substances
BC-GA002-J-H	320-32834-92	Fluorinated Alkyl Substances
BC-CR002-F-MDUP	320-32834-11DUP	Fluorinated Alkyl Substances
BC-CR002-I-MMS	320-32834-17MS	Fluorinated Alkyl Substances
BC-CR002-I-MMSD	320-32834-17MSD	Fluorinated Alkyl Substances
BC-FR001-E-HDUP	320-32834-50DUP	Fluorinated Alkyl Substances

Associated QC Samples(s):
Field/Trip Blanks: None Associated
Field Duplicate pair: None Associated

The above-listed tissue samples were collected on October 12 through October 16, 2017 and were analyzed for fluorinated alkyl substances by method 537 modified. The data validation was performed in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,* EPA 540-R-2017-002 (January 2017), modified as necessary to accommodate the non-CLP methodologies used.

The organic data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tunes
- Initial and Continuing Calibrations
- Blanks
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Duplicate Results
- Laboratory Control Sample (LCS)/Standard Reference Material (SRM) Results
- Internal Standards
- Field Duplicate Results
- Moisture Content
- Quantitation Limits and Data Assessment
- Sample Quantitation and Compound Identification

Overall Evaluation of Data and Potential Usability Issues

All results are usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was complete as defined under the requirements for the NYSDEC ASP category B laboratory deliverables.

Holding Times and Sample Preservation

All criteria were met.

LC/MS Tunes

All criteria were met.

Initial and Continuing Calibrations

All criteria were met.

Laboratory Duplicate Results

Laboratory duplicates were performed on samples BC-CR002-F-M and BC-FR001-E-H for fluorinated alkyl substances analysis. The following table lists the duplicate relative percent differences (RPD) outside of control limits in the fluorinated alkyl substances analysis and the resulting validation actions.

Dup ID	Compound	RPD (Limits)	Affected Sample	Validation Action
BC-FR001-E-HDUP	Perfluorooctanesulfonic acid	38 (≤30)	BC-FR001-E-H	J detects

The perfluorooctanesulfonic acid result for the sample listed above may be biased high due to high duplicate relative percent differences. The results can be used for project objectives as estimated values (J) which may have a minor impact on the data usability.

LCS/SRM Results

The following table lists the compounds recovered outside of control limits in the fluorinated alkyl substances analysis and the resulting validation actions.

LCS ID	Compound	LCS %R (Limits)	LCS/D %R (Limits)	RPD (Limits)	Affected Sample	Validation Action
LCS/D 320-202824	Perfluorobutanoic acid	182 (81-133)	147 (81-133)	-	BC-GA001-D-H BC-GA001-E-H BC-GA002-A-H BC-GA002-B-H	J detects
LCS/D 320-202824	Perfluorobutanoic acid	182 (81-133)	147 (81-133)	-	BC-GA001-D-M BC-GA002-C-H	None

- Within control limits

LCS ID	Compound	%R (Limits)	Affected Sample	Validation Action
LCS 320-202186	Perfluorobutanoic acid	243 (81-133)	BC-FR001-A-H BC-FR001-E-H BC-FR001-F-H	J detects

- Within control limits

The perfluorobutanoic acid results for the samples listed above may be biased high due to high LCS/LCSD percent recovery. The results can be used for project objectives as estimated values (J) which may have a minor impact on the data usability.

Validation action was not required for perfluorobutanoic acid due to high LCS/LCSD percent recovery as positive results only are affected and this compound was not detected in the associated samples.

Blanks

Contamination was detected in the associated fluorinated alkyl substances method blank samples. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Blank ID	Compound	Level Detected	Action Level	Associated Samples
MB 320-202186/1-A	Perfluorobutanoic acid	0.00157 mg/Kg	RL	BC-FR001-A-H
	6:2FTS	0.0341 mg/Kg	RL	BC-FR001-E-H
				BC-FR001-F-H
MB 320-202824/1-A	Perfluorobutanoic acid	0.00481 mg/Kg	RL	BC-GA001-D-M
	Perfluorohexanoic acid	0.00162 mg/Kg	RL	BC-GA001-D-H
	Perfluoropentanoic acid	0.000241 mg/Kg	RL	BC-GA001-E-H
	6:2FTS	0.00167 mg/Kg	RL	BC-GA002-A-H
				BC-GA002-B-H
				BC-GA002-C-H
MB 320-202832/1-A	6:2FTS	0.0400 mg/Kg	RL	BC-GA002-E-H
	Perfluorobutanoic acid	0.000490 mg/Kg	RL	BC-GA002-F-H
	Perfluoropentanoic acid	0.000254 mg/Kg	RL	BC-GA002-G-M
	Perfluorooctanoic acid	0.000147 mg/Kg	RL	BC-GA002-J-H
	Perfluorohexanesulfonic acid	0.000112 mg/Kg	RL	
	Perfluorooctanesulfonic acid	0.000291 mg/Kg	RL	
MB 320-200601/1-A	Perfluorohexanesulfonic acid	0.0000834 mg/Kg	RL	BC-CR002-A-M
	Perfluorooctanesulfonic acid	0.0000864 mg/Kg	RL	BC-CR002-B-M
	6:2FTS	0.000396 mg/Kg	RL	BC-CR002-D-M
				BC-CR002-E-M
				BC-CR002-F-M
				BC-CR002-G-M
				BC-CR002-H-M
				BC-CR002-I-M
				BC-CR002-J-M
MB 320-200806/1-A	Perfluorohexanesulfonic acid	0.0000701 mg/Kg	RL	BC-CR001-A-M
	Perfluorooctanesulfonic acid	0.000077 mg/Kg	RL	BC-CR001-C-M
				BC-CR001-D-M
				BC-CR001-H-M
				BC-CR001-I-M
				BC-CR001-J-M

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the RL and > the Action Level, qualification of the data was not required.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
BC-FR001-A-H	Perfluorobutanoic acid	0.0017 mg/Kg	0.0017U mg/Kg
	6:2FTS	0.0061 mg/Kg	0.093U mg/Kg

Sample ID	Compound	Level Detected	Validation Action
BC-FR001-E-H	Perfluorobutanoic acid	0.0049 mg/Kg	0.0049U mg/Kg
BC-FR001-F-H	Perfluorobutanoic acid	0.0025 mg/Kg	0.0025U mg/Kg
BC-GA001-D-M	Perfluorobutanoic acid	0.00053 mg/Kg	0.00094U mg/Kg
	6:2FTS	0.021 mg/Kg	0.021J mg/Kg
BC-GA001-D-H	Perfluorobutanoic acid	0.0028 mg/Kg	0.0028U mg/Kg
BC-GA001-E-H	Perfluorobutanoic acid	0.0046 mg/Kg	0.0046U mg/Kg
	6:2FTS	0.0084 mg/Kg	0.0084J mg/Kg
BC-GA002-A-H	Perfluorobutanoic acid	0.0079 mg/Kg	0.0079U mg/Kg
	6:2FTS	0.024 mg/Kg	0.024J mg/Kg
BC-GA002-B-H	Perfluorobutanoic acid	0.0053 mg/Kg	0.0053U mg/Kg
	6:2FTS	0.020 mg/Kg	0.020J mg/Kg
BC-GA002-C-H	Perfluorobutanoic acid	0.00090 mg/Kg	0.00094U mg/Kg
BC-GA002-E-H	Perfluorobutanoic acid	0.00030 mg/Kg	0.00093U mg/Kg
	Perfluorooctanoic acid	0.00040 mg/Kg	0.00093U mg/Kg
	Perfluorooctanesulfonic acid	0.0091 mg/Kg	0.0093U mg/Kg
BC-GA002-F-H	Perfluorooctanoic acid	0.00069 mg/Kg	0.00093U mg/Kg
BC-GA002-G-M	6:2FTS	0.011 mg/Kg	0.10U mg/Kg
	Perfluorobutanoic acid	0.00078 mg/Kg	0.0010U mg/Kg
	Perfluorooctanoic acid	0.00085 mg/Kg	0.0010U mg/Kg
BC-CR002-A-M	Perfluorohexanesulfonic acid	0.00029 mg/Kg	0.00093U mg/Kg
BC-CR002-B-M	Perfluorohexanesulfonic acid	0.00013 mg/Kg	0.00093U mg/Kg
BC-CR002-D-M	Perfluorohexanesulfonic acid	0.00020 mg/Kg	0.0010U mg/Kg
BC-CR002-E-M	Perfluorohexanesulfonic acid	0.00011 mg/Kg	0.00097U mg/Kg
BC-CR002-F-M	Perfluorohexanesulfonic acid	0.00015 mg/Kg	0.00098U mg/Kg
	Perfluorooctanesulfonic acid	0.00084 mg/Kg	0.00098U mg/Kg
BC-CR002-G-M	Perfluorohexanesulfonic acid	0.00030 mg/Kg	0.00093U mg/Kg
BC-CR002-H-M	Perfluorohexanesulfonic acid	0.000094 mg/Kg	0.0010U mg/Kg
BC-CR002-I-M	Perfluorohexanesulfonic acid	0.00030 mg/Kg	0.0010U mg/Kg
BC-CR002-J-M	Perfluorohexanesulfonic acid	0.00053 mg/Kg	0.00097U mg/Kg
BC-CR001-A-M	Perfluorohexanesulfonic acid	0.00054 mg/Kg	0.0010U mg/Kg
BC-CR001-C-M	Perfluorohexanesulfonic acid	0.00021 mg/Kg	0.0010U mg/Kg
BC-CR001-D-M	Perfluorohexanesulfonic acid	0.00042 mg/Kg	0.0010U mg/Kg
BC-CR001-H-M	Perfluorohexanesulfonic acid	0.00044 mg/Kg	0.00093U mg/Kg
BC-CR001-I-M	Perfluorohexanesulfonic acid	0.00053 mg/Kg	0.00099U mg/Kg
BC-CR001-J-M	Perfluorohexanesulfonic acid	0.00038 mg/Kg	0.00095U mg/Kg

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

Using professional judgement, select 6:2FTS results were qualified as estimated (J) due to blank contamination present and the sample having a high dilution factor applied. The results can be used for project objectives as estimated values (J) which may have a minor impact on the data usability.

A field blank was not associated with this sample set. Validation action was not required on this basis.

MS/MSD Results

MS/MSD analyses were performed on sample BC-CR002-I-M for fluorinated alkyl substances analysis. All criteria were met.

Laboratory Duplicate Results

Laboratory duplicates were performed on samples BC-CR002-F-M and BC-FR001-E-H for fluorinated alkyl substances analysis. The following table lists the duplicate relative percent differences (RPD) outside of control limits in the fluorinated alkyl substances analysis and the resulting validation actions.

Dup ID	Compound	RPD (Limits)	Affected Sample	Validation Action
BC-FR001-E-HDUP	Perfluorooctanesulfonic acid	38 (≤30)	BC-FR001-E-H	J detects

The perfluorooctanesulfonic acid result for the sample listed above may be biased high due to high duplicate relative percent differences. The results can be used for project objectives as estimated values (J) which may have a minor impact on the data usability.

LCS/SRM Results

The following table lists the compounds recovered outside of control limits in the fluorinated alkyl substances analysis and the resulting validation actions.

LCS ID	Compound	LCS %R (Limits)	LCS/D %R (Limits)	RPD (Limits)	Affected Sample	Validation Action
LCS/D 320-202824	Perfluorobutanoic acid	182 (81-133)	147 (81-133)	-	BC-GA001-D-H BC-GA001-E-H BC-GA002-A-H BC-GA002-B-H	J detects
LCS/D 320-202824	Perfluorobutanoic acid	182 (81-133)	147 (81-133)	-	BC-GA001-D-M BC-GA002-C-H	None

- Within control limits

LCS ID	Compound	%R (Limits)	Affected Sample	Validation Action
LCS 320-202186	Perfluorobutanoic acid	243 (81-133)	BC-FR001-A-H BC-FR001-E-H BC-FR001-F-H	J detects

- Within control limits

The perfluorobutanoic acid results for the samples listed above may be biased high due to high LCS/LCSD percent recovery. The results can be used for project objectives as estimated values (J) which may have a minor impact on the data usability.

Validation action was not required for perfluorobutanoic acid due to high LCS/LCSD percent recovery as positive results only are affected and this compound was not detected in the associated samples.

Internal Standards

The following table lists the internal standards recovered outside of control limits and the resulting actions.

Sample	Internal Standard	Area Exceedances (Limits)	Affected Compounds	Validation actions
BC-CR002-I-M	M2-6:2FTS	214 (25-150)	6:2FTS	UJ nondetects
	M2-8:2FTS	214 (25-150)	8:2FTS	UJ nondetects
BC-FR001-A-H	13C2-Perfluorotetradecanoic acid	4 (25-150)	Perfluorotetradecanoic acid	UJ nondetects
BC-FR001-E-H	13C2-Perfluorotetradecanoic acid	20 (25-150)	Perfluorotetradecanoic acid	UJ nondetects
BC-FR001-F-H	13C2-Perfluorotetradecanoic acid	22 (25-150)	Perfluorotetradecanoic acid	UJ nondetects
BC-GA001-D-H	13C4-Perfluorobutanoic acid	3 (25-150)	Perfluorobutanoic acid	J detects/UJ nondetects
	13C5-Perfluoropentanoic acid	6 (25-150)	Perfluoropentanoic acid	J detects/UJ nondetects
	13C2-Perfluorohexanoic acid	4 (25-150)	Perfluorohexanoic acid	J detects/UJ nondetects
	13C4-Perfluoroheptanoic acid	4 (25-150)	Perfluoroheptanoic acid	J detects/UJ nondetects
	13C4-Perfluorooctanoic acid	5 (25-150)	Perfluorooctanoic acid	J detects/UJ nondetects
	13C5-Perfluorononanoic acid	8 (25-150)	Perfluorononanoic acid	J detects/UJ nondetects
	13C2-Perfluorotetradecanoic acid	8 (25-150)	Perfluorotetradecanoic acid	J detects/UJ nondetects
	13C3-Perfluorobutanesulfonic acid	15 (25-150)	Perfluorobutanesulfonic acid	J detects/UJ nondetects
	M2-8:2FTS	20 (25-150)	8:2FTS	J detects/UJ nondetects
BC-GA001-E-H	13C4-Perfluorobutanoic acid	5 (25-150)	Perfluorobutanoic acid	J detects/UJ nondetects
	13C5-Perfluoropentanoic acid	9 (25-150)	Perfluoropentanoic acid	J detects/UJ nondetects
	13C2-Perfluorohexanoic acid	8 (25-150)	Perfluorohexanoic acid	J detects/UJ nondetects
	13C4-Perfluoroheptanoic acid	5 (25-150)	Perfluoroheptanoic acid	J detects/UJ nondetects
	13C4-Perfluorooctanoic acid	13 (25-150)	Perfluorooctanoic acid	J detects/UJ nondetects
	13C5-Perfluorononanoic acid	22 (25-150)	Perfluorononanoic acid	J detects/UJ nondetects
	13C2-Perfluorotetradecanoic acid	14 (25-150)	Perfluorotetradecanoic acid	J detects/UJ nondetects
	13C3-Perfluorobutanesulfonic acid	20 (25-150)	Perfluorobutanesulfonic acid	J detects/UJ nondetects
BC-GA002-A-H	13C4-Perfluorobutanoic acid	6 (25-150)	Perfluorobutanoic acid	J detects/UJ nondetects
	13C5-Perfluoropentanoic acid	11 (25-150)	Perfluoropentanoic acid	J detects/UJ nondetects
	13C2-Perfluorohexanoic acid	11 (25-150)	Perfluorohexanoic acid	J detects/UJ nondetects
	13C4-Perfluoroheptanoic acid	10 (25-150)	Perfluoroheptanoic acid	J detects/UJ nondetects
	13C2-Perfluorotetradecanoic acid	17 (25-150)	Perfluorotetradecanoic acid	J detects/UJ nondetects
BC-GA002-B-H	13C4-Perfluorobutanoic acid	4 (25-150)	Perfluorobutanoic acid	J detects/UJ nondetects
	13C5-Perfluoropentanoic acid	14 (25-150)	Perfluoropentanoic acid	J detects/UJ nondetects
	13C2-Perfluorohexanoic acid	16 (25-150)	Perfluorohexanoic acid	J detects/UJ nondetects
	13C4-Perfluoroheptanoic acid	12 (25-150)	Perfluoroheptanoic acid	J detects/UJ nondetects
BC-GA002-C-H	13C4-Perfluorobutanoic acid	2 (25-150)	Perfluorobutanoic acid	UJ nondetects
	13C5-Perfluoropentanoic acid	8 (25-150)	Perfluoropentanoic acid	UJ nondetects
	13C2-Perfluorohexanoic acid	9 (25-150)	Perfluorohexanoic acid	UJ nondetects
	13C4-Perfluoroheptanoic acid	7 (25-150)	Perfluoroheptanoic acid	UJ nondetects
	13C2-Perfluorotetradecanoic acid	21 (25-150)	Perfluorotetradecanoic acid	UJ nondetects

The 6:2FTS, 8:2FTS, perfluorobutanoic acid, perfluoropentanoic acid, perfluorohexanoic acid, perfluoroheptanoic acid, perfluorooctanoic acid, perfluorononanoic acid, perfluorotetradecanoic acid, and perfluorobutanesulfonic acid results were estimated due to internal standard area exceedances. The bias cannot be determined. The results can be used for project objectives as

estimated values (J) or nondetects with estimated quantitation limits (UJ) which may have a minor impact on the data usability.

Field Duplicate Results

A field duplicate pair was not associated with this sample set. Validation action was not required on this basis.

Moisture Content

All criteria were met.

Quantitation Limits and Data Assessment

Results were reported which were below the reporting limit (RL) and above the method detection limit (MDL) in the fluorinated alkyl substances analysis. These results were qualified as estimated (J) by the laboratory.

Due to high target compound levels or difficult sample matrix, select samples were analyzed at dilutions. The following table lists the sample dilutions which were performed and the results reported. RLs were elevated accordingly.

Sample	Fluorinated Alkyl Substances Analysis Reported
BC-CR002-A-M BC-CR002-B-M BC-CR002-D-M BC-CR002-E-M BC-CR002-F-M BC-CR002-G-M BC-CR002-H-M BC-CR002-J-M BC-CR001-A-M BC-CR001-C-M BC-CR001-D-M BC-CR001-H-M BC-CR001-I-M BC-CR001-J-M BC-FR001-A-H BC-FR001-E-H BC-FR001-F-H BC-GA001-D-M	10-fold dilution for select analytes due to nature of sample matrix

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-A-M Lab Sample ID: 320-32834-1

Matrix: Tissue Lab File ID: 2017.12.29LLB_034.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:26

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.07(g) Date Analyzed: 12/29/2017 19:34

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202096 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00049	J	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.00026	J	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000049	U	0.00093	0.000049
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000056	U	0.00093	0.000056
335-67-1	Perfluorooctanoic acid (PFOA)	0.00012	J	0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00038	J	0.00093	0.000040
335-76-2	Perfluorodecanoic acid (PFDA)	0.00013	J	0.00093	0.000068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0032		0.00093	0.000069
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00021	J	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00034	J	0.00093	0.000048
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00040	J	0.00093	0.000062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00029	J B	0.00093	0.000062
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000067	U	0.00093	0.000067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0026	B	0.00093	0.000072
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00012	J	0.00093	0.000055
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00010	J	0.00093	0.000066
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0061	U	0.0093	0.0061
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0018	U	0.0093	0.0018

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-A-M DL Lab Sample ID: 320-32834-1 DL

Matrix: Tissue Lab File ID: 2018.01.14LLA_007.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:26

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.07(g) Date Analyzed: 01/14/2018 10:08

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203826 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0036	U U	0.093	0.0036
39108-34-4	8:2 FTS	0.0064	U U	0.093	0.0064

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	184	*	25-150
STL02280	M2-8:2 FTS	189	*	25-150

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Initials: CR

FORM I 537 (modified)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-B-M Lab Sample ID: 320-32834-3

Matrix: Tissue Lab File ID: 2017.12.29LLB_036.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:27

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.07(g) Date Analyzed: 12/29/2017 19:49

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202096 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.000093	U	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000049	U	0.00093	0.000049
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000056	U	0.00093	0.000056
335-67-1	Perfluorooctanoic acid (PFOA)	0.00015	J	0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00028	J	0.00093	0.000040
335-76-2	Perfluorodecanoic acid (PFDA)	0.000086	J	0.00093	0.000068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0021		0.00093	0.000069
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00023	J	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00040	J	0.00093	0.000048
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00062	J	0.00093	0.000062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00013	J B	0.00093	0.000062
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000067	U	0.00093	0.000067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0027	B	0.00093	0.000072
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000055	U	0.00093	0.000055
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000094	J	0.00093	0.000066
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0061	U	0.0093	0.0061

0.000130

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-B-M DL Lab Sample ID: 320-32834-3 DL

Matrix: Tissue Lab File ID: 2018.01.14LLA_009.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:27

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.07(g) Date Analyzed: 01/14/2018 10:24

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203826 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.018	U	0.093	0.018
27619-97-2	6:2 FTS	0.0036	U	0.093	0.0036
39108-34-4	8:2 FTS	0.0064	U	0.093	0.0064

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02117	d5-NEtFOSAA	121		25-150
STL02279	M2-6:2 FTS	176	*	25-150
STL02280	M2-8:2 FTS	130		25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-D-M Lab Sample ID: 320-32834-7

Matrix: Tissue Lab File ID: 2017.12.29LLB_040.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:29

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.00(g) Date Analyzed: 12/29/2017 20:21

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202096 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00010	U U	0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000069	U	0.0010	0.000069
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000052	U	0.0010	0.000052
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000060	U	0.0010	0.000060
335-67-1	Perfluorooctanoic acid (PFOA)	0.00050	J J	0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00057	J J	0.0010	0.000043
335-76-2	Perfluorodecanoic acid (PFDA)	0.000073	U U	0.0010	0.000073
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0019		0.0010	0.000074
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00023	J J	0.0010	0.000059
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00044	J	0.0010	0.000051
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00051	J	0.0010	0.000066
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U U	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00020	J B 0.00100	0.0010	0.000066
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000072	U U	0.0010	0.000072
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0016	B	0.0010	0.000077
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000059	U U	0.0010	0.000059
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000071	U	0.0010	0.000071
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0065	U	0.010	0.0065
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0020	U	0.010	0.0020

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-D-M DL Lab Sample ID: 320-32834-7 DL

Matrix: Tissue Lab File ID: 2018.01.14LLA_013.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:29

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.00(g) Date Analyzed: 01/14/2018 10:55

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203826 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0039	U J	0.10	0.0039
39108-34-4	8:2 FTS	0.0068	U J	0.10	0.0068

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	175	*	25-150
STL02280	M2-8:2 FTS	119		25-150

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Initials: CR

FORM I 537 (modified)

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-E-M Lab Sample ID: 320-32834-9

Matrix: Tissue Lab File ID: 2017.12.29LLB_043.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:30

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.03(g) Date Analyzed: 12/29/2017 20:44

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202096 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.000097	U	0.00097	0.000097
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000067	U	0.00097	0.000067
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000050	U	0.00097	0.000050
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000058	U	0.00097	0.000058
335-67-1	Perfluorooctanoic acid (PFOA)	0.00013	J	0.00097	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00031	J	0.00097	0.000042
335-76-2	Perfluorodecanoic acid (PFDA)	0.00012	J	0.00097	0.000071
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0016		0.00097	0.000072
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00023	J	0.00097	0.000057
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00022	J	0.00097	0.000050
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000064	U	0.00097	0.000064
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000097	U	0.00097	0.000097
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00011	J B	0.00097U	0.000064
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000070	U	0.00097	0.000070
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0012	B	0.00097	0.000075
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000057	U	0.00097	0.000057
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000069	U	0.00097	0.000069
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0063	U	0.0097	0.0063
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U	0.0097	0.0019

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-E-M DL Lab Sample ID: 320-32834-9 DL

Matrix: Tissue Lab File ID: 2018.01.14LLA_016.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:30

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.03(g) Date Analyzed: 01/14/2018 11:19

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203826 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0038	U	0.097	0.0038
39108-34-4	8:2 FTS	0.0066	U	0.097	0.0066

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	147		25-150
STL02280	M2-8:2 FTS	126		25-150

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Initials: ER

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-F-M Lab Sample ID: 320-32834-11

Matrix: Tissue Lab File ID: 2017.12.29LLB_045.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:31

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.02(g) Date Analyzed: 12/29/2017 21:00

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202096 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.000098	U U	0.00098	0.000098
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000068	U	0.00098	0.000068
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000051	U	0.00098	0.000051
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000059	U	0.00098	0.000059
335-67-1	Perfluorooctanoic acid (PFOA)	0.00011	U	0.00098	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00011	J J	0.00098	0.000042
335-76-2	Perfluorodecanoic acid (PFDA)	0.00013	J J	0.00098	0.000072
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0011		0.00098	0.000073
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00039	J J	0.00098	0.000058
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00058	J	0.00098	0.000050
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00057	J	0.00098	0.000065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000098	U U	0.00098	0.000098
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00015	J B 0.00098U	0.00098	0.000065
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000071	U U	0.00098	0.000071
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.00084	J B 0.00098U	0.00098	0.000075
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000058	U U	0.00098	0.000058
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00015	J J	0.00098	0.000070
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0064	U U	0.0098	0.0064
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U U	0.0098	0.0019

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-F-M DL Lab Sample ID: 320-32834-11 DL

Matrix: Tissue Lab File ID: 2018.01.14LLA_018.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:31

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.02(g) Date Analyzed: 01/14/2018 11:34

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203826 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0038	U J	0.098	0.0038
39108-34-4	8:2 FTS	0.0067	U J	0.098	0.0067

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	191	*	25-150
STL02280	M2-8:2 FTS	133		25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-G-M Lab Sample ID: 320-32834-13

Matrix: Tissue Lab File ID: 2017.12.29LLB_049.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:32

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.08(g) Date Analyzed: 12/29/2017 21:31

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202096 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.000093	U U	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000048	U	0.00093	0.000048
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000056	U	0.00093	0.000056
335-67-1	Perfluorooctanoic acid (PFOA)	0.00022	J J	0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00045	J	0.00093	0.000040
335-76-2	Perfluorodecanoic acid (PFDA)	0.00013	J	0.00093	0.000068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0027		0.00093	0.000069
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00026	J J	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00033	J	0.00093	0.000047
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00040	J	0.00093	0.000061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U U	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00030	J B 0.00093U	0.00093	0.000061
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000067	U U	0.00093	0.000067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0015	B	0.00093	0.000071
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000055	U U	0.00093	0.000055
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000066	U	0.00093	0.000066
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0060	U	0.0093	0.0060
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0018	U	0.0093	0.0018

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-G-M DL Lab Sample ID: 320-32834-13 DL

Matrix: Tissue Lab File ID: 2018.01.14LLA_022.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:32

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.08(g) Date Analyzed: 01/14/2018 12:06

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203826 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0036	U U	0.093	0.0036
39108-34-4	8:2 FTS	0.0063	U U	0.093	0.0063

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	146		25-150
STL02280	M2-8:2 FTS	122		25-150

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Initials: CR

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-H-M Lab Sample ID: 320-32834-15

Matrix: Tissue Lab File ID: 2017.12.29LLB_051.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:33

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 0.96(g) Date Analyzed: 12/29/2017 21:47

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202096 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00010	U U	0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000072	U	0.0010	0.000072
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000054	U	0.0010	0.000054
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000063	U	0.0010	0.000063
335-67-1	Perfluorooctanoic acid (PFOA)	0.00011	J J	0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00025	J	0.0010	0.000045
335-76-2	Perfluorodecanoic acid (PFDA)	0.00014	J	0.0010	0.000076
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0027		0.0010	0.000077
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00035	J J	0.0010	0.000061
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00037	J	0.0010	0.000053
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00042	J	0.0010	0.000069
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U U	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.000094	J B 0.0010U	0.0010	0.000069
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000075	U U	0.0010	0.000075
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0022	B	0.0010	0.000080
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000082	J J	0.0010	0.000061
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000074	U U	0.0010	0.000074
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0068	U	0.010	0.0068
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0020	U	0.010	0.0020

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-H-M DL Lab Sample ID: 320-32834-15 DL

Matrix: Tissue Lab File ID: 2018.01.14LLA_024.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:33

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 0.96(g) Date Analyzed: 01/14/2018 12:21

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203826 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0041	U J	0.10	0.0041
39108-34-4	8:2 FTS	0.0071	U J	0.10	0.0071

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	169	*	25-150
STL02280	M2-8:2 FTS	128		25-150

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Initials: ER

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-I-M Lab Sample ID: 320-32834-17

Matrix: Tissue Lab File ID: 2017.12.29LLB_054.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:34

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 0.97(g) Date Analyzed: 12/29/2017 22:10

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202096 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00010	U V	0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000071	U	0.0010	0.000071
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000054	U	0.0010	0.000054
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000062	U	0.0010	0.000062
335-67-1	Perfluorooctanoic acid (PFOA)	0.00020	J J	0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00040	J	0.0010	0.000044
335-76-2	Perfluorodecanoic acid (PFDA)	0.00011	J	0.0010	0.000075
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0019		0.0010	0.000076
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00024	J J	0.0010	0.000061
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00037	J	0.0010	0.000053
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00036	J	0.0010	0.000068
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U V	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00030	J B 0.0010U	0.0010	0.000068
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000074	U V	0.0010	0.000074
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0013	B	0.0010	0.000079
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000061	U V	0.0010	0.000061
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000073	U	0.0010	0.000073
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0067	U	0.010	0.0067
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0020	U	0.010	0.0020
27619-97-2	6:2 FTS	0.00040	U UJ	0.010	0.00040
39108-34-4	8:2 FTS	0.00070	U UJ	0.010	0.00070

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Initials: CR

FORM I 537 (modified)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-J-M Lab Sample ID: 320-32834-19

Matrix: Tissue Lab File ID: 2017.12.29LLB_060.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:35

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.03(g) Date Analyzed: 12/29/2017 22:57

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202096 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.000097	U U	0.00097	0.000097
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000067	U	0.00097	0.000067
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000050	U	0.00097	0.000050
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000058	U	0.00097	0.000058
335-67-1	Perfluorooctanoic acid (PFOA)	0.00018	J J	0.00097	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00038	J	0.00097	0.000042
335-76-2	Perfluorodecanoic acid (PFDA)	0.00013	J	0.00097	0.000071
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0036		0.00097	0.000072
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00028	J J	0.00097	0.000057
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00052	J	0.00097	0.000050
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00054	J	0.00097	0.000064
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000097	U U	0.00097	0.000097
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00053	J B 0.000070	0.00097	0.000064
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000070	U U	0.00097	0.000070
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0016	B	0.00097	0.000075
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00012	J J	0.00097	0.000057
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000069	U U	0.00097	0.000069
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0063	U	0.0097	0.0063
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U	0.0097	0.0019

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR002-J-M DL Lab Sample ID: 320-32834-19 DL

Matrix: Tissue Lab File ID: 2018.01.14LLA_033.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 08:35

Extraction Method: SHAKE Date Extracted: 12/19/2017 18:59

Sample wt/vol: 1.03(g) Date Analyzed: 01/14/2018 13:32

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203826 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0038	U J	0.097	0.0038
39108-34-4	8:2 FTS	0.0066	U J	0.097	0.0066

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	138		25-150
STL02280	M2-8:2 FTS	111		25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR001-A-M Lab Sample ID: 320-32834-21

Matrix: Tissue Lab File ID: 2018.01.03LLAX_006.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 09:05

Extraction Method: SHAKE Date Extracted: 12/20/2017 18:47

Sample wt/vol: 0.99(g) Date Analyzed: 01/03/2018 20:51

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202579 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00010	U U	0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000070	U	0.0010	0.000070
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000053	U	0.0010	0.000053
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000061	U	0.0010	0.000061
335-67-1	Perfluorooctanoic acid (PFOA)	0.00019	J J	0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00070	J	0.0010	0.000043
335-76-2	Perfluorodecanoic acid (PFDA)	0.00018	J	0.0010	0.000074
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0036		0.0010	0.000075
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00025	J J	0.0010	0.000060
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00030	J	0.0010	0.000052
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00044	J	0.0010	0.000067
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U U	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00054	J B 0.00100	0.0010	0.000067
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000073	U U	0.0010	0.000073
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0047		0.0010	0.000078
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00015	J J	0.0010	0.000060
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00012	J J	0.0010	0.000072
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0066	U U	0.010	0.0066

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR001-A-M DL Lab Sample ID: 320-32834-21 DL

Matrix: Tissue Lab File ID: 2018.01.12LLC_036.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 09:05

Extraction Method: SHAKE Date Extracted: 12/20/2017 18:47

Sample wt/vol: 0.99(g) Date Analyzed: 01/13/2018 00:20

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203809 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0039	U	0.10	0.0039

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	187	*	25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR001-A-M DL2 Lab Sample ID: 320-32834-21 DL2

Matrix: Tissue Lab File ID: 2018.01.23LLC_002.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 09:05

Extraction Method: SHAKE Date Extracted: 12/20/2017 18:47

Sample wt/vol: 0.99(g) Date Analyzed: 01/23/2018 19:23

Con. Extract Vol.: 10.00(mL) Dilution Factor: 100

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 205291 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.20	U	1.01	0.20
39108-34-4	8:2 FTS	0.069	U	1.01	0.069

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02117	d5-NEtFOSAA	134		25-150
STL02280	M2-8:2 FTS	112		25-150

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Initials: CR

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR001-C-M Lab Sample ID: 320-32834-25

Matrix: Tissue Lab File ID: 2018.01.03LLAX_010.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 09:07

Extraction Method: SHAKE Date Extracted: 12/20/2017 18:47

Sample wt/vol: 1.00(g) Date Analyzed: 01/03/2018 21:22

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202579 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00010	U U	0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000069	U	0.0010	0.000069
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000052	U	0.0010	0.000052
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000060	U	0.0010	0.000060
335-67-1	Perfluorooctanoic acid (PFOA)	0.00016	J J	0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00060	J	0.0010	0.000043
335-76-2	Perfluorodecanoic acid (PFDA)	0.00022	J	0.0010	0.000073
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0039		0.0010	0.000074
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00022	J J	0.0010	0.000059
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00026	J	0.0010	0.000051
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00028	J	0.0010	0.000066
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U U	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00021	J B 0.0010U	0.0010	0.000066
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000072	U U	0.0010	0.000072
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0044		0.0010	0.000077
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00030	J J	0.0010	0.000059
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000071	U U	0.0010	0.000071
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0065	U	0.010	0.0065
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0020	U	0.010	0.0020

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR001-C-M DL Lab Sample ID: 320-32834-25 DL

Matrix: Tissue Lab File ID: 2018.01.12LLC_040.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 09:07

Extraction Method: SHAKE Date Extracted: 12/20/2017 18:47

Sample wt/vol: 1.00(g) Date Analyzed: 01/13/2018 00:51

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203809 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0039	U J	0.10	0.0039
39108-34-4	8:2 FTS	0.0068	U J	0.10	0.0068

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	159	*	25-150
STL02280	M2-8:2 FTS	125		25-150

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Initials: CR

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR001-D-M Lab Sample ID: 320-32834-27

Matrix: Tissue Lab File ID: 2018.01.03LLAX_013.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 09:08

Extraction Method: SHAKE Date Extracted: 12/20/2017 18:47

Sample wt/vol: 0.99(g) Date Analyzed: 01/03/2018 21:46

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202579 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00010	U U	0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000070	U	0.0010	0.000070
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000053	U	0.0010	0.000053
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000061	U	0.0010	0.000061
335-67-1	Perfluorooctanoic acid (PFOA)	0.00018	J J	0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00053	J	0.0010	0.000043
335-76-2	Perfluorodecanoic acid (PFDA)	0.00023	J	0.0010	0.000074
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0050		0.0010	0.000075
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00032	J J	0.0010	0.000060
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00030	J J	0.0010	0.000052
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000067	U U	0.0010	0.000067
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U U	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00042	J B 0.00100	0.0010	0.000067
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000073	U U	0.0010	0.000073
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0032		0.0010	0.000078
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00017	J J	0.0010	0.000060
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000072	U U	0.0010	0.000072
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0066	U U	0.010	0.0066

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR001-D-M DL Lab Sample ID: 320-32834-27 DL

Matrix: Tissue Lab File ID: 2018.01.12LLC_043.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 09:08

Extraction Method: SHAKE Date Extracted: 12/20/2017 18:47

Sample wt/vol: 0.99(g) Date Analyzed: 01/13/2018 01:15

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203809 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.020	U	0.10	0.020
27619-97-2	6:2 FTS	0.0039	U	0.10	0.0039
39108-34-4	8:2 FTS	0.0069	U	0.10	0.0069

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02117	d5-NEtFOSAA	127		25-150
STL02279	M2-6:2 FTS	168	*	25-150
STL02280	M2-8:2 FTS	128		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR001-H-M Lab Sample ID: 320-32834-35

Matrix: Tissue Lab File ID: 2018.01.03LLAX_021.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 09:12

Extraction Method: SHAKE Date Extracted: 12/20/2017 18:47

Sample wt/vol: 1.07(g) Date Analyzed: 01/03/2018 22:49

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202579 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00078	J J	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U U	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000049	U |	0.00093	0.000049
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000056	U |	0.00093	0.000056
335-67-1	Perfluorooctanoic acid (PFOA)	0.00010	U |	0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.0013		0.00093	0.000040
335-76-2	Perfluorodecanoic acid (PFDA)	0.00024	J J	0.00093	0.000068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0049		0.00093	0.000069
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00024	J J	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00027	J J	0.00093	0.000048
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000062	U U	0.00093	0.000062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U U	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00044	J B 0.00043	0.00093	0.000062
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000067	U U	0.00093	0.000067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0049		0.00093	0.000072
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00016	J J	0.00093	0.000055
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000066	U U	0.00093	0.000066

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FORM I 537 (modified)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR001-H-M DL Lab Sample ID: 320-32834-35 DL

Matrix: Tissue Lab File ID: 2018.01.12LLC_051.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 09:12

Extraction Method: SHAKE Date Extracted: 12/20/2017 18:47

Sample wt/vol: 1.07(g) Date Analyzed: 01/13/2018 02:18

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203809 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.061	U	0.093	0.061
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.018	U	0.093	0.018
27619-97-2	6:2 FTS	0.0036	U	0.093	0.0036
39108-34-4	8:2 FTS	0.0064	U	0.093	0.0064

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02118	d3-NMeFOSAA	119		25-150
STL02117	d5-NEtFOSAA	123		25-150
STL02279	M2-6:2 FTS	175	*	25-150
STL02280	M2-8:2 FTS	113		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR001-I-M Lab Sample ID: 320-32834-37

Matrix: Tissue Lab File ID: 2018.01.03LLAX_024.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 09:13

Extraction Method: SHAKE Date Extracted: 12/20/2017 18:47

Sample wt/vol: 1.01(g) Date Analyzed: 01/03/2018 23:12

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202579 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.000099	U V	0.00099	0.000099
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000068	U	0.00099	0.000068
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000051	U	0.00099	0.000051
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000059	U	0.00099	0.000059
335-67-1	Perfluorooctanoic acid (PFOA)	0.00019	J J	0.00099	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00056	J	0.00099	0.000043
335-76-2	Perfluorodecanoic acid (PFDA)	0.00012	J	0.00099	0.000072
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0029		0.00099	0.000073
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00017	J J	0.00099	0.000058
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00020	J J	0.00099	0.000050
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000065	U J	0.00099	0.000065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000099	U V	0.00099	0.000099
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00053	J B 0.000910	0.00099	0.000065
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000071	U V	0.00099	0.000071
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0027		0.00099	0.000076
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000058	U V	0.00099	0.000058
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00014	J J	0.00099	0.000070
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0064	U V	0.0099	0.0064

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR001-I-M DL Lab Sample ID: 320-32834-37 DL

Matrix: Tissue Lab File ID: 2018.01.12LLC_054.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 09:13

Extraction Method: SHAKE Date Extracted: 12/20/2017 18:47

Sample wt/vol: 1.01(g) Date Analyzed: 01/13/2018 02:41

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203809 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.019	U	0.099	0.019
27619-97-2	6:2 FTS	0.0039	U	0.099	0.0039
39108-34-4	8:2 FTS	0.0067	U	0.099	0.0067

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02117	d5-NEtFOSAA	121		25-150
STL02279	M2-6:2 FTS	171	*	25-150
STL02280	M2-8:2 FTS	120		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR001-J-M Lab Sample ID: 320-32834-39

Matrix: Tissue Lab File ID: 2018.01.03LLAX_026.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 09:14

Extraction Method: SHAKE Date Extracted: 12/20/2017 18:47

Sample wt/vol: 1.05(g) Date Analyzed: 01/03/2018 23:28

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202579 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.000095	U V	0.00095	0.000095
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000066	U	0.00095	0.000066
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000050	U	0.00095	0.000050
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000057	U	0.00095	0.000057
335-67-1	Perfluorooctanoic acid (PFOA)	0.00017	J J	0.00095	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00052	J	0.00095	0.000041
335-76-2	Perfluorodecanoic acid (PFDA)	0.00016	J	0.00095	0.000070
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0040		0.00095	0.000070
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00020	J J	0.00095	0.000056
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00022	J J	0.00095	0.000049
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000063	U V	0.00095	0.000063
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000095	U V	0.00095	0.000095
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00038	J B 0.00050	0.00095	0.000063
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000069	U V	0.00095	0.000069
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0024		0.00095	0.000073
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00011	J J	0.00095	0.000056
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000081	J J	0.00095	0.000068
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0062	U V	0.0095	0.0062

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-CR001-J-M DL Lab Sample ID: 320-32834-39 DL

Matrix: Tissue Lab File ID: 2018.01.12LLC_056.d

Analysis Method: 537 (modified) Date Collected: 10/12/2017 09:14

Extraction Method: SHAKE Date Extracted: 12/20/2017 18:47

Sample wt/vol: 1.05(g) Date Analyzed: 01/13/2018 02:57

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203809 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.019	U	0.095	0.019
27619-97-2	6:2 FTS	0.0037	U	0.095	0.0037
39108-34-4	8:2 FTS	0.0065	U	0.095	0.0065

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02117	d5-NEtFOSAA	122		25-150
STL02279	M2-6:2 FTS	187	*	25-150
STL02280	M2-8:2 FTS	117		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-FR001-A-H Lab Sample ID: 320-32834-42

Matrix: Tissue Lab File ID: 2017.01.06LLX_006.d

Analysis Method: 537 (modified) Date Collected: 10/13/2017 08:15

Extraction Method: SHAKE Date Extracted: 01/02/2018 14:56

Sample wt/vol: 1.08(g) Date Analyzed: 01/06/2018 18:29

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202962 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0017	* B UJ	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U U	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.0035	B	0.00093	0.000048
335-67-1	Perfluorooctanoic acid (PFOA)	0.00022	J J	0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00022	J ↓	0.00093	0.000040
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00035	J ↓	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.000047	U U	0.00093	0.000047
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000061	U UJ	0.00093	0.000061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U ↓	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.000061	U ↓	0.00093	0.000061
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000067	U ↓	0.00093	0.000067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0090		0.00093	0.000071
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00020	J J	0.00093	0.000055
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00017	J J	0.00093	0.000066
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0060	U U	0.0093	0.0060

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00992	13C4 PFBA	25		25-150
STL01893	13C5 PFPeA	54		25-150
STL00993	13C2 PFHxA	50		25-150
STL00990	13C4 PFOA	63		25-150
STL00995	13C5 PFNA	90		25-150
STL00998	13C2 PFDoA	130		25-150
STL02116	13C2 PFTeDA	4	*	25-150
STL02337	13C3 PFBS	72		25-150
STL00994	18O2 PFHxS	58		25-150
STL00991	13C4 PFOS	136		25-150
STL01056	13C8 FOSA	93		25-150
STL02118	d3-NMeFOSAA	131		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-FR001-A-H DL Lab Sample ID: 320-32834-42 DL

Matrix: Tissue Lab File ID: 2018.01.14LLB_006.d

Analysis Method: 537 (modified) Date Collected: 10/13/2017 08:15

Extraction Method: SHAKE Date Extracted: 01/02/2018 14:56

Sample wt/vol: 1.08(g) Date Analyzed: 01/14/2018 16:24

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203857 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.00056	U	0.0093	0.00056
335-76-2	Perfluorodecanoic acid (PFDA)	0.00068	U	0.0093	0.00068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00069	U	0.0093	0.00069
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.018	U	0.093	0.018
27619-97-2	6:2 FTS	0.0061	J D B 0.093U	0.093	0.0036

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	36		25-150
STL00996	13C2 PFDA	96		25-150
STL00997	13C2 PFUnA	102		25-150
STL02117	d5-NEtFOSAA	135		25-150
STL02279	M2-6:2 FTS	412	*	25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-FR001-A-H DL2 Lab Sample ID: 320-32834-42 DL2

Matrix: Tissue Lab File ID: 2018.01.23LLB_046.d

Analysis Method: 537 (modified) Date Collected: 10/13/2017 08:15

Extraction Method: SHAKE Date Extracted: 01/02/2018 14:56

Sample wt/vol: 1.08(g) Date Analyzed: 01/23/2018 17:33

Con. Extract Vol.: 10.00(mL) Dilution Factor: 100

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 205283 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
39108-34-4	8:2 FTS	0.063	U	0.93	0.063

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02280	M2-8:2 FTS	99		25-150

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FORM I 537 (modified)

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-FR001-E-H Lab Sample ID: 320-32834-50

Matrix: Tissue Lab File ID: 2017.01.06LLX_016.d

Analysis Method: 537 (modified) Date Collected: 10/13/2017 08:19

Extraction Method: SHAKE Date Extracted: 01/02/2018 14:56

Sample wt/vol: 1.08(g) Date Analyzed: 01/06/2018 19:48

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202962 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0049	* B UJ	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U UJ	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000048	U UJ	0.00093	0.000048
335-67-1	Perfluorooctanoic acid (PFOA)	0.0011		0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00020	J J	0.00093	0.000040
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00049	J J	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00011	J J	0.00093	0.000047
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000061	U UJ	0.00093	0.000061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00088	J J	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.000061	U UJ	0.00093	0.000061
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00039	J J	0.00093	0.000066

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00992	13C4 PFBA	35		25-150
STL01893	13C5 PFPeA	82		25-150
STL00993	13C2 PFHxA	90		25-150
STL00990	13C4 PFOA	96		25-150
STL00995	13C5 PFNA	141		25-150
STL00998	13C2 PFDoA	143		25-150
STL02116	13C2 PFTeDA	20	*	25-150
STL02337	13C3 PFBS	113		25-150
STL00994	18O2 PFHxS	41		25-150
STL01056	13C8 FOSA	121		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-FR001-E-H DL Lab Sample ID: 320-32834-50 DL

Matrix: Tissue Lab File ID: 2018.01.14LLB_016.d

Analysis Method: 537 (modified) Date Collected: 10/13/2017 08:19

Extraction Method: SHAKE Date Extracted: 01/02/2018 14:56

Sample wt/vol: 1.08(g) Date Analyzed: 01/14/2018 17:42

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203857 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.00056	U	0.0093	0.00056
335-76-2	Perfluorodecanoic acid (PFDA)	0.00068	U	0.0093	0.00068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00069	U	0.0093	0.00069
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00067	U	0.0093	0.00067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.019	D	0.0093	0.00071
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00055	U	0.0093	0.00055
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.060	U	0.093	0.060
27619-97-2	6:2 FTS	0.0036	U	0.093	0.0036

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	37		25-150
STL00996	13C2 PFDA	110		25-150
STL00997	13C2 PFUnA	116		25-150
STL00991	13C4 PFOS	100		25-150
STL02118	d3-NMeFOSAA	123		25-150
STL02279	M2-6:2 FTS	681	*	25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-FR001-E-H DL2 Lab Sample ID: 320-32834-50 DL2

Matrix: Tissue Lab File ID: 2018.01.23LLC_015.d

Analysis Method: 537 (modified) Date Collected: 10/13/2017 08:19

Extraction Method: SHAKE Date Extracted: 01/02/2018 14:56

Sample wt/vol: 1.08(g) Date Analyzed: 01/23/2018 21:05

Con. Extract Vol.: 10.00(mL) Dilution Factor: 100

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 205291 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.18	U J	0.93	0.18
39108-34-4	8:2 FTS	0.063	U J	0.93	0.063

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02117	d5-NEtFOSAA	97		25-150
STL02280	M2-8:2 FTS	121		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-FR001-F-H Lab Sample ID: 320-32834-52

Matrix: Tissue Lab File ID: 2017.01.06LLX_019.d

Analysis Method: 537 (modified) Date Collected: 10/13/2017 08:20

Extraction Method: SHAKE Date Extracted: 01/02/2018 14:56

Sample wt/vol: 1.07(g) Date Analyzed: 01/06/2018 20:11

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 202962 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0025	* B UJ	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U UJ	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000049	U	0.00093	0.000049
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000056	U	0.00093	0.000056
335-67-1	Perfluorooctanoic acid (PFOA)	0.00016	J J	0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.000071	J	0.00093	0.000040
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00060	J	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.000048	U UJ	0.00093	0.000048
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000062	U	0.00093	0.000062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U UJ	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.000062	U UJ	0.00093	0.000062
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000074	J J	0.00093	0.000066

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00992	13C4 PFBA	35		25-150
STL01893	13C5 PFPeA	72		25-150
STL00993	13C2 PFHxA	59		25-150
STL01892	13C4 PFHpA	27		25-150
STL00990	13C4 PFOA	80		25-150
STL00995	13C5 PFNA	136		25-150
STL00998	13C2 PFDoA	130		25-150
STL02116	13C2 PFTeDA	22	*	25-150
STL02337	13C3 PFBS	96		25-150
STL00994	18O2 PFHxS	82		25-150
STL01056	13C8 FOSA	93		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-FR001-F-H DL Lab Sample ID: 320-32834-52 DL

Matrix: Tissue Lab File ID: 2018.01.14LLB_019.d

Analysis Method: 537 (modified) Date Collected: 10/13/2017 08:20

Extraction Method: SHAKE Date Extracted: 01/02/2018 14:56

Sample wt/vol: 1.07(g) Date Analyzed: 01/14/2018 18:06

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203857 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
335-76-2	Perfluorodecanoic acid (PFDA)	0.00068	U	0.0093	0.00068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00069	U	0.0093	0.00069
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00067	U	0.0093	0.00067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0084	J D	0.0093	0.00072
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00055	U	0.0093	0.00055
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.061	U	0.093	0.061
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.018	U	0.093	0.018
27619-97-2	6:2 FTS	0.0036	U	0.093	0.0036

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00996	13C2 PFDA	103		25-150
STL00997	13C2 PFUnA	87		25-150
STL00991	13C4 PFOS	93		25-150
STL02118	d3-NMeFOSAA	80		25-150
STL02117	d5-NEtFOSAA	101		25-150
STL02279	M2-6:2 FTS	6538	*	25-150

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-FR001-F-H DL2 Lab Sample ID: 320-32834-52 DL2

Matrix: Tissue Lab File ID: 2018.01.23LLB_050.d

Analysis Method: 537 (modified) Date Collected: 10/13/2017 08:20

Extraction Method: SHAKE Date Extracted: 01/02/2018 14:56

Sample wt/vol: 1.07(g) Date Analyzed: 01/23/2018 18:05

Con. Extract Vol.: 10.00(mL) Dilution Factor: 100

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 205283 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
39108-34-4	8:2 FTS	0.064	U	0.93	0.064

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02280	M2-8:2 FTS	62		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA001-D-M Lab Sample ID: 320-32834-63

Matrix: Tissue Lab File ID: 2018.01.11LLC_011.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 08:33

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:48

Sample wt/vol: 1.06(g) Date Analyzed: 01/11/2018 19:36

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203635 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00053	J B * 0.000941	0.00094	0.000094
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000065	U	0.00094	0.000065
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000049	U	0.00094	0.000049
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000057	U	0.00094	0.000057
335-67-1	Perfluorooctanoic acid (PFOA)	0.00010	U	0.00094	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.000041	U	0.00094	0.000041
335-76-2	Perfluorodecanoic acid (PFDA)	0.00019	J	0.00094	0.000069
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00075	J	0.00094	0.000070
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00069	J	0.00094	0.000056
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00050	J *	0.00094	0.000048
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00074	J	0.00094	0.000062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000094	U	0.00094	0.000094
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.000099	J	0.00094	0.000062
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000068	U	0.00094	0.000068
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0010		0.00094	0.000073
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00011	J	0.00094	0.000056
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00014	J	0.00094	0.000067
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0061	U	0.0094	0.0061

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA001-D-M DL Lab Sample ID: 320-32834-63 DL

Matrix: Tissue Lab File ID: 2018.01.17LLD_008.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 08:33

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:48

Sample wt/vol: 1.06(g) Date Analyzed: 01/18/2018 01:31

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204428 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.018	U ✓	0.094	0.018
27619-97-2	6:2 FTS	0.021	J B D J	0.094	0.0037
39108-34-4	8:2 FTS	0.0064	U ✓	0.094	0.0064

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02117	d5-NEtFOSAA	108		25-150
STL02279	M2-6:2 FTS	121		25-150
STL02280	M2-8:2 FTS	107		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA001-D-H Lab Sample ID: 320-32834-64

Matrix: Tissue Lab File ID: 2018.01.11LLC_012.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 08:33

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:48

Sample wt/vol: 1.04(g) Date Analyzed: 01/11/2018 19:44

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203635 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0028	B * UJ	0.00096	0.000096
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000066	U UJ	0.00096	0.000066
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000050	U UJ	0.00096	0.000050
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000058	U UJ	0.00096	0.000058
335-67-1	Perfluorooctanoic acid (PFOA)	0.00011	U UJ	0.00096	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.000041	U UJ	0.00096	0.000041
335-76-2	Perfluorodecanoic acid (PFDA)	0.00078	J J	0.00096	0.000070
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0021		0.00096	0.000071
307-55-1	Perfluorododecanoic acid (PFDoA)	0.0013		0.00096	0.000057
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.000049	U * V	0.00096	0.000049
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000063	U UJ	0.00096	0.000063
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000096	U UJ	0.00096	0.000096
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0022		0.00096	0.000063
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000069	U V	0.00096	0.000069
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00033	J J	0.00096	0.000057
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00052	J J	0.00096	0.000068
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0063	U V	0.0096	0.0063
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U V	0.0096	0.0019
27619-97-2	6:2 FTS	0.00038	U * V	0.0096	0.00038
39108-34-4	8:2 FTS	0.00065	U V	0.0096	0.00065

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA001-D-H DL Lab Sample ID: 320-32834-64 DL

Matrix: Tissue Lab File ID: 2018.01.17LLD_009.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 08:33

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:48

Sample wt/vol: 1.04(g) Date Analyzed: 01/18/2018 01:38

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204428 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.11	D	0.0096	0.00074

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	94		25-150

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Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA001-E-H Lab Sample ID: 320-32834-66

Matrix: Tissue Lab File ID: 2018.01.11LLC_016.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 08:34

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:48

Sample wt/vol: 1.05(g) Date Analyzed: 01/11/2018 20:15

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203635 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0046	B * J	0.00095	0.000095
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000066	U J	0.00095	0.000066
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000050	U J	0.00095	0.000050
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000057	U J	0.00095	0.000057
335-67-1	Perfluorooctanoic acid (PFOA)	0.00044	J	0.00095	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00020	J	0.00095	0.000041
335-76-2	Perfluorodecanoic acid (PFDA)	0.00045	J	0.00095	0.000070
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00093	J	0.00095	0.000070
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00083	J	0.00095	0.000056
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.000049	U *	0.00095	0.000049
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000063	U J	0.00095	0.000063
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000095	U J	0.00095	0.000095
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.000063	U J	0.00095	0.000063
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000069	U	0.00095	0.000069
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000056	U	0.00095	0.000056
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000069	J	0.00095	0.000068
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0062	U J	0.0095	0.0062
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U	0.0095	0.0019
39108-34-4	8:2 FTS	0.00065	U	0.0095	0.00065

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA001-E-H DL Lab Sample ID: 320-32834-66 DL

Matrix: Tissue Lab File ID: 2018.01.17LLD_014.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 08:34

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:48

Sample wt/vol: 1.05(g) Date Analyzed: 01/18/2018 02:18

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204428 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.14	D	0.0095	0.00073
27619-97-2	6:2 FTS	0.0084	J B D J	0.095	0.0037

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	93		25-150
STL02279	M2-6:2 FTS	439	*	25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-A-H Lab Sample ID: 320-32834-74

Matrix: Tissue Lab File ID: 2018.01.11LLC_024.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:35

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:48

Sample wt/vol: 1.06(g) Date Analyzed: 01/11/2018 21:18

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203635 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0079	B * UJ	0.00094	0.000094
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000065	U UJ	0.00094	0.000065
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000049	U UJ	0.00094	0.000049
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000057	U UJ	0.00094	0.000057
335-67-1	Perfluorooctanoic acid (PFOA)	0.0014		0.00094	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00038	J J	0.00094	0.000041
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00031	J J	0.00094	0.000056
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.000048	U * U	0.00094	0.000048
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000062	U UJ	0.00094	0.000062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000094	U U	0.00094	0.000094
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0067		0.00094	0.000062
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00019	J J	0.00094	0.000067
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0061	U U	0.0094	0.0061

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00992	13C4 PFBA	6	*	25-150
STL01893	13C5 PFPeA	11	*	25-150
STL00993	13C2 PFHxA	11	*	25-150
STL01892	13C4 PFHpA	10	*	25-150
STL00990	13C4 PFOA	39		25-150
STL00995	13C5 PFNA	95		25-150
STL00998	13C2 PFDoA	110		25-150
STL02116	13C2 PFTeDA	17	*	25-150
STL02337	13C3 PFBS	69		25-150
STL00994	18O2 PFHxS	68		25-150
STL01056	13C8 FOSA	127		25-150
STL02118	d3-NMeFOSAA	149		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-A-H DL Lab Sample ID: 320-32834-74 DL

Matrix: Tissue Lab File ID: 2018.01.17LLD_025.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:35

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:48

Sample wt/vol: 1.06(g) Date Analyzed: 01/18/2018 03:44

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204428 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
335-76-2	Perfluorodecanoic acid (PFDA)	0.00069	U	0.0094	0.00069
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00070	U	0.0094	0.00070
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00068	U	0.0094	0.00068
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.079	D	0.0094	0.00073
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00056	U	0.0094	0.00056
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.018	U	0.094	0.018
27619-97-2	6:2 FTS	0.024	J B D	0.094	0.0037
39108-34-4	8:2 FTS	0.0064	U	0.094	0.0064

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00996	13C2 PFDA	91		25-150
STL00997	13C2 PFUnA	99		25-150
STL00991	13C4 PFOS	105		25-150
STL02117	d5-NEtFOSAA	85		25-150
STL02279	M2-6:2 FTS	375	*	25-150
STL02280	M2-8:2 FTS	81		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-B-H Lab Sample ID: 320-32834-76

Matrix: Tissue Lab File ID: 2018.01.11LLC_028.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:36

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:48

Sample wt/vol: 1.00(g) Date Analyzed: 01/11/2018 21:49

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203635 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0053	B * UJ	0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.00037	J B	0.0010	0.000069
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000052	U UJ	0.0010	0.000052
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000060	U UJ	0.0010	0.000060
335-67-1	Perfluorooctanoic acid (PFOA)	0.0015		0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00034	J	0.0010	0.000043
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00027	J	0.0010	0.000059
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.000051	U * UJ	0.0010	0.000051
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00068	J	0.0010	0.000066
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U UJ	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0047		0.0010	0.000066
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000072	U UJ	0.0010	0.000072
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.055		0.0010	0.000077
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000059	U UJ	0.0010	0.000059
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000071	U UJ	0.0010	0.000071

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00992	13C4 PFBA	4	*	25-150
STL01893	13C5 PFPeA	14	*	25-150
STL00993	13C2 PFHxA	16	*	25-150
STL01892	13C4 PFHpA	12	*	25-150
STL00990	13C4 PFOA	70		25-150
STL00995	13C5 PFNA	113		25-150
STL00998	13C2 PFDoA	140		25-150
STL02116	13C2 PFTeDA	26		25-150
STL02337	13C3 PFBS	54		25-150
STL00994	18O2 PFHxS	50		25-150
STL00991	13C4 PFOS	144		25-150
STL01056	13C8 FOSA	106		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-B-H DL Lab Sample ID: 320-32834-76 DL

Matrix: Tissue Lab File ID: 2018.01.17LLD_027.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:36

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:48

Sample wt/vol: 1.00(g) Date Analyzed: 01/18/2018 03:59

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204428 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
335-76-2	Perfluorodecanoic acid (PFDA)	0.00073	U	0.010	0.00073
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00074	U	0.010	0.00074
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.065	U	0.10	0.065
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.020	U	0.10	0.020
27619-97-2	6:2 FTS	0.020	J B D	0.10	0.0039

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00996	13C2 PFDA	106		25-150
STL00997	13C2 PFUnA	118		25-150
STL02118	d3-NMeFOSAA	95		25-150
STL02117	d5-NEtFOSAA	127		25-150
STL02279	M2-6:2 FTS	316	*	25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-B-H DL2 Lab Sample ID: 320-32834-76 DL2

Matrix: Tissue Lab File ID: 2018.01.23LLB_013.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:36

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:48

Sample wt/vol: 1.00(g) Date Analyzed: 01/23/2018 13:15

Con. Extract Vol.: 10.00(mL) Dilution Factor: 100

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 205154 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
39108-34-4	8:2 FTS	0.068	U V	1.00	0.068

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02280	M2-8:2 FTS	94		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-C-H Lab Sample ID: 320-32834-78

Matrix: Tissue Lab File ID: 2018.01.11LLC_030.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:37

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:48

Sample wt/vol: 1.06(g) Date Analyzed: 01/11/2018 22:05

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 203635 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00090	J B * 0.00094 U	0.00094	0.000094
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000065	U UJ	0.00094	0.000065
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000049	U UJ	0.00094	0.000049
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000057	U UJ	0.00094	0.000057
335-67-1	Perfluorooctanoic acid (PFOA)	0.0042		0.00094	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00077	J J	0.00094	0.000041
335-76-2	Perfluorodecanoic acid (PFDA)	0.00047	J	0.00094	0.000069
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00041	J	0.00094	0.000056
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00026	J *	0.00094	0.000048
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000062	U UJ	0.00094	0.000062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0028		0.00094	0.000094
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0063		0.00094	0.000062
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000068	U U	0.00094	0.000068
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.084		0.00094	0.000073
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00011	J J	0.00094	0.000056
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00032	J J	0.00094	0.000067
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0061	U J	0.0094	0.0061

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-C-H DL Lab Sample ID: 320-32834-78 DL

Matrix: Tissue Lab File ID: 2018.01.17LLD_029.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:37

Extraction Method: SHAKE Date Extracted: 01/05/2018 16:48

Sample wt/vol: 1.06(g) Date Analyzed: 01/18/2018 04:15

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204428 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00070	U	0.0094	0.00070
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.018	U	0.094	0.018
27619-97-2	6:2 FTS	0.0037	U	0.094	0.0037
39108-34-4	8:2 FTS	0.0064	U	0.094	0.0064

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00997	13C2 PFUnA	106		25-150
STL02117	d5-NEtFOSAA	103		25-150
STL02279	M2-6:2 FTS	1243	*	25-150
STL02280	M2-8:2 FTS	120		25-150

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LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-E-H Lab Sample ID: 320-32834-82

Matrix: Tissue Lab File ID: 2018.01.15LLB_023.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:39

Extraction Method: SHAKE Date Extracted: 01/05/2018 19:00

Sample wt/vol: 1.07(g) Date Analyzed: 01/16/2018 02:49

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204081 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00030	J B 0.00093U	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U U	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000049	U	0.00093	0.000049
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000056	U	0.00093	0.000056
335-67-1	Perfluorooctanoic acid (PFOA)	0.00040	J B 0.00093U	0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00011	J J	0.00093	0.000040
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00046	J	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00079	J	0.00093	0.000048
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00091	J	0.00093	0.000062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U U	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0016	B	0.00093	0.000062
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00017	J J	0.00093	0.000066

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00992	13C4 PFBA	35		25-150
STL01893	13C5 PFPeA	75		25-150
STL00993	13C2 PFHxA	65		25-150
STL01892	13C4 PFHpA	40		25-150
STL00990	13C4 PFOA	101		25-150
STL00995	13C5 PFNA	146		25-150
STL00998	13C2 PFDoA	111		25-150
STL02116	13C2 PFTeDA	54		25-150
STL02337	13C3 PFBS	91		25-150
STL00994	18O2 PFHxS	95		25-150
STL01056	13C8 FOSA	82		25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-E-H DL Lab Sample ID: 320-32834-82 DL

Matrix: Tissue Lab File ID: 2018.01.15LLAX_046.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:39

Extraction Method: SHAKE Date Extracted: 01/05/2018 19:00

Sample wt/vol: 1.07(g) Date Analyzed: 01/15/2018 22:38

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204078 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
335-76-2	Perfluorodecanoic acid (PFDA)	0.00068	U	0.0093	0.00068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00069	U	0.0093	0.00069
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00067	U	0.0093	0.00067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0091	J D B 0.0093U	0.0093	0.00072
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00055	U	0.0093	0.00055
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.061	U	0.093	0.061
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.018	U	0.093	0.018
27619-97-2	6:2 FTS	0.0036	U *	0.093	0.0036

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00996	13C2 PFDA	111		25-150
STL00997	13C2 PFUnA	93		25-150
STL00991	13C4 PFOS	93		25-150
STL02118	d3-NMeFOSAA	106		25-150
STL02117	d5-NEtFOSAA	119		25-150
STL02279	M2-6:2 FTS	2724	*	25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-E-H DL2 Lab Sample ID: 320-32834-82 DL2

Matrix: Tissue Lab File ID: 2018.01.23LLB_018.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:39

Extraction Method: SHAKE Date Extracted: 01/05/2018 19:00

Sample wt/vol: 1.07(g) Date Analyzed: 01/23/2018 13:54

Con. Extract Vol.: 10.00(mL) Dilution Factor: 100

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 205154 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
39108-34-4	8:2 FTS	0.064	U J	0.93	0.064

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02280	M2-8:2 FTS	95		25-150

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Initials: CR

FORM I 537 (modified)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-F-H Lab Sample ID: 320-32834-84

Matrix: Tissue Lab File ID: 2018.01.15LLB_025.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:40

Extraction Method: SHAKE Date Extracted: 01/05/2018 19:00

Sample wt/vol: 1.08(g) Date Analyzed: 01/16/2018 03:04

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204081 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0046	B	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000048	U	0.00093	0.000048
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000056	U	0.00093	0.000056
335-67-1	Perfluorooctanoic acid (PFOA)	0.00069	J B	0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00022	J	0.00093	0.000040
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00052	J	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00060	J	0.00093	0.000047
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00077	J	0.00093	0.000061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0064	B	0.00093	0.000061
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000066	U	0.00093	0.000066

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00992	13C4 PFBA	40		25-150
STL01893	13C5 PFPeA	73		25-150
STL00993	13C2 PFHxA	63		25-150
STL01892	13C4 PFHpA	31		25-150
STL00990	13C4 PFOA	106		25-150
STL00995	13C5 PFNA	129		25-150
STL00998	13C2 PFDoA	121		25-150
STL02116	13C2 PFTeDA	36		25-150
STL02337	13C3 PFBS	95		25-150
STL00994	18O2 PFHxS	75		25-150
STL01056	13C8 FOSA	114		25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-F-H DL Lab Sample ID: 320-32834-84 DL

Matrix: Tissue Lab File ID: 2018.01.15LLAX_048.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:40

Extraction Method: SHAKE Date Extracted: 01/05/2018 19:00

Sample wt/vol: 1.08(g) Date Analyzed: 01/15/2018 22:53

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204078 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
335-76-2	Perfluorodecanoic acid (PFDA)	0.00068	U	0.0093	0.00068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00069	U	0.0093	0.00069
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00067	U	0.0093	0.00067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.051	D B	0.0093	0.00071
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00055	U	0.0093	0.00055
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.060	U	0.093	0.060
27619-97-2	6:2 FTS	0.0036	U *	0.093	0.0036

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00996	13C2 PFDA	119		25-150
STL00997	13C2 PFUnA	113		25-150
STL00991	13C4 PFOS	109		25-150
STL02118	d3-NMeFOSAA	141		25-150
STL02279	M2-6:2 FTS	1995	*	25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-F-H DL2 Lab Sample ID: 320-32834-84 DL2

Matrix: Tissue Lab File ID: 2018.01.23LLB_019.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:40

Extraction Method: SHAKE Date Extracted: 01/05/2018 19:00

Sample wt/vol: 1.08(g) Date Analyzed: 01/23/2018 14:01

Con. Extract Vol.: 10.00(mL) Dilution Factor: 100

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 205154 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.18	U	0.93	0.18
39108-34-4	8:2 FTS	0.063	U	0.93	0.063

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02117	d5-NEtFOSAA	105		25-150
STL02280	M2-8:2 FTS	97		25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-G-M Lab Sample ID: 320-32834-85

Matrix: Tissue Lab File ID: 2018.01.15LLB_026.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:41

Extraction Method: SHAKE Date Extracted: 01/05/2018 19:00

Sample wt/vol: 1.00(g) Date Analyzed: 01/16/2018 03:12

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204081 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00078	J B 0.0010U	0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000069	U U	0.0010	0.000069
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000052	U	0.0010	0.000052
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000060	U	0.0010	0.000060
335-67-1	Perfluorooctanoic acid (PFOA)	0.00085	J B 0.0010U	0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00016	J J	0.0010	0.000043
335-76-2	Perfluorodecanoic acid (PFDA)	0.00022	J	0.0010	0.000073
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00087	J	0.0010	0.000074
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00036	J	0.0010	0.000059
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00045	J	0.0010	0.000051
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00050	J J	0.0010	0.000066
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U U	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0018	B	0.0010	0.000066
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00025	J J	0.0010	0.000072
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0035	B	0.0010	0.000077
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00012	J J	0.0010	0.000059
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.00018	J J	0.0010	0.000071

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-G-M DL Lab Sample ID: 320-32834-85 DL

Matrix: Tissue Lab File ID: 2018.01.15LLAX_049.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:41

Extraction Method: SHAKE Date Extracted: 01/05/2018 19:00

Sample wt/vol: 1.00(g) Date Analyzed: 01/15/2018 23:01

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204078 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.065	U	0.10	0.065
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.020	U	0.10	0.020
27619-97-2	6:2 FTS	0.011	J D B *	0.10	0.0039
39108-34-4	8:2 FTS	0.0068	U	0.10	0.0068

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02118	d3-NMeFOSAA	111		25-150
STL02117	d5-NEtFOSAA	115		25-150
STL02279	M2-6:2 FTS	153	*	25-150
STL02280	M2-8:2 FTS	115		25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-J-H Lab Sample ID: 320-32834-92

Matrix: Tissue Lab File ID: 2018.01.15LLB_035.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:44

Extraction Method: SHAKE Date Extracted: 01/05/2018 19:00

Sample wt/vol: 1.02(g) Date Analyzed: 01/16/2018 04:23

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204081 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0023	B	0.00098	0.000098
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000068	U	0.00098	0.000068
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000051	U	0.00098	0.000051
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000059	U	0.00098	0.000059
335-67-1	Perfluorooctanoic acid (PFOA)	0.0024	B	0.00098	0.00011
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000065	U	0.00098	0.000065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000098	U	0.00098	0.000098
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0062	B	0.00098	0.000065
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000070	U	0.00098	0.000070

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00992	13C4 PFBA	54		25-150
STL01893	13C5 PFPeA	101		25-150
STL00993	13C2 PFHxA	79		25-150
STL01892	13C4 PFHpA	32		25-150
STL00990	13C4 PFOA	104		25-150
STL02116	13C2 PFTeDA	25		25-150
STL02337	13C3 PFBS	129		25-150
STL00994	18O2 PFHxS	81		25-150
STL01056	13C8 FOSA	133		25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-J-H DL Lab Sample ID: 320-32834-92 DL

Matrix: Tissue Lab File ID: 2018.01.15LLAX_057.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:44

Extraction Method: SHAKE Date Extracted: 01/05/2018 19:00

Sample wt/vol: 1.02(g) Date Analyzed: 01/16/2018 00:04

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 204078 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-95-1	Perfluorononanoic acid (PFNA)	0.00042	U	0.0098	0.00042
335-76-2	Perfluorodecanoic acid (PFDA)	0.00072	U	0.0098	0.00072
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00073	U	0.0098	0.00073
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00058	U	0.0098	0.00058
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00050	U	0.0098	0.00050
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00071	U	0.0098	0.00071
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.092	D B	0.0098	0.00075
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00058	U	0.0098	0.00058
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.064	U	0.098	0.064
27619-97-2	6:2 FTS	0.0038	U *	0.098	0.0038

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00995	13C5 PFNA	111		25-150
STL00996	13C2 PFDA	134		25-150
STL00997	13C2 PFUnA	127		25-150
STL00998	13C2 PFDoA	116		25-150
STL00991	13C4 PFOS	119		25-150
STL02118	d3-NMeFOSAA	135		25-150
STL02279	M2-6:2 FTS	933	*	25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-32834-1

SDG No.:

Client Sample ID: BC-GA002-J-H DL2 Lab Sample ID: 320-32834-92 DL2

Matrix: Tissue Lab File ID: 2018.01.23LLB_023.d

Analysis Method: 537 (modified) Date Collected: 10/16/2017 09:44

Extraction Method: SHAKE Date Extracted: 01/05/2018 19:00

Sample wt/vol: 1.02(g) Date Analyzed: 01/23/2018 14:33

Con. Extract Vol.: 10.00(mL) Dilution Factor: 100

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 205154 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.19	U	0.98	0.19
39108-34-4	8:2 FTS	0.067	U	0.98	0.067

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02117	d5-NEtFOSAA	109		25-150
STL02280	M2-8:2 FTS	158	*	25-150

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Initials: CR

LDC #: 42369C96
SDG #: 320-32834-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 6/14/18
Page: 1 of 2
Reviewer: 9
2nd Reviewer: 0

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537-Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD ≤ 20.0 %, r² ≥ 0.990, ICV = 30%
IV.	Continuing calibration	A	CCV = 30%
V.	Laboratory Blanks	SW	
VI.	Field blanks	N	~~EB001, FB001~~
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates ~~DUP~~	A/A	SW
IX.	Laboratory control samples	SW	LCS/D, SRM
X.	Field duplicates	N	
XI.	Internal standards	SW	
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	R.S BC-CR002-A-M (1/10 X – IS high)	320-32834-1	Tissue	10/12/17
2	U.R.S BC-CR002-B-M	320-32834-3	Tissue	10/12/17
3	BC-CR002-D-M	320-32834-7	Tissue	10/12/17
4	BC-CR002-E-M	320-32834-9	Tissue	10/12/17
5	BC-CR002-F-M	320-32834-11	Tissue	10/12/17
6	BC-CR002-G-M	320-32834-13	Tissue	10/12/17
7	BC-CR002-H-M	320-32834-15	Tissue	10/12/17
8	BC-CR002-I-M	320-32834-17	Tissue	10/12/17
9	R/S.U BC-CR002-J-M (1/10X – IS high)	320-32834-19	Tissue	10/12/17
10	BC-CR001-A-M (1/10/100X)	320-32834-21	Tissue	10/12/17
11	BC-CR001-C-M (1/10X – IS)	320-32834-25	Tissue	10/12/17
12	U.R.S BC-CR001-D-M	320-32834-27	Tissue	10/12/17
13	T.U.R.S BC-CR001-H-M	320-32834-35	Tissue	10/12/17
14	U.R.S BC-CR001-I-M	320-32834-37	Tissue	10/12/17

LDC #: 42369C96
SDG #: 320-32834-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 6/4/18
Page: 2 of 2
Reviewer: 1
2nd Reviewer: 0

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537-Modified)

	Client ID	Lab ID	Matrix	Date
15	BC-CR001-J-M (1/10x - IS out) U.R.5	320-32834-39	Tissue	10/12/17
16 3	BC-FR001-A-H (1/10/100x)	320-32834-42	Tissue	10/13/17
17	BC-FR001-E-H	320-32834-50	Tissue	10/13/17
18	BC-FR001-F-H	320-32834-52	Tissue	10/13/17
19 4	BC-GA001-D-M (1/10x)	320-32834-63	Tissue	10/16/17
20	BC-GA001-D-H	320-32834-64	Tissue	10/16/17
21	BC-GA001-E-H	320-32834-66	Tissue	10/16/17
22	BC-GA002-A-H	320-32834-74	Tissue	10/16/17
23	BC-GA002-B-H	320-32834-76	Tissue	10/16/17
24	BC-GA002-C-H	320-32834-78	Tissue	10/16/17
25 5	BC-GA002-E-H	320-32834-82	Tissue	10/16/17
26	BC-GA002-F-H	320-32834-84	Tissue	10/16/17
27	BC-GA002-G-M	320-32834-85	Tissue	10/16/17
28	BC-GA002-J-H	320-32834-92	Tissue	10/16/17
29	BC-CR002-F-MDUP	320-32834-11DUP	Tissue	10/12/17
30	BC-CR002-I-MMS	320-32834-17MS	Tissue	10/12/17
31	BC-CR002-I-MMSD	320-32834-17MSD	Tissue	10/12/17
32	BC-FR001-E-HDUP	320-32834-50DUP	Tissue	10/13/17
33				
34				
35				

Notes:

	MB 320-200601/1-A	MB 320-20832/1-A				
	MB 320-200806/2-A					
	MB 320-202186/1-A					
	MB 320-20824/1-A					

LDC #: 42369C96

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: 0

Method: LCMS (EPA Method 537)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) < 30%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration < 30%?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 42396C96

VALIDATION FINDINGS CHECKLIST

Reviewer: Q
2nd Reviewer: Q

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		✓		
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?.			✓	
XI. Internal standards				
Were internal standard area counts within ± 50% of the associated calibration standard?		✓		
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. ~~N-methyl perfluorooctanesulfonamidoacetic acid~~ (NMeFOSAA)			
U. ~~N-Ethyl perfluorooctanesulfonamidoacetic acid (~~NEtFOSAA)			

LDC #: ~~43369-96~~

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: 9
2nd Reviewer: C

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

~~N~~ Y N N/A Were all samples associated with a given method blank?
~~Y~~ N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
~~N~~ Y N N/A Was a method blank performed with each extraction batch?
~~Y~~ N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 1/3/18 **Blank analysis date:** 1/11/18
Conc. units: ~~MS~~ ng/L **Associated samples:** 16-18

Compound	Blank ID		*(10X) 16	*(10X) 17	18	Sample Identification				
MB 320-20218/1-A										
P	0.0015J		0.001J / ~~0.0093~~	0.0049 / ~~0.0094~~	0.0025 / ~~0.0093~~					
R	~~0.0341~~									
	0.0341		0.0061* / 0.0931	0.619*						

Blank extraction date: 1/5/18 **Blank analysis date:** 1/11/18 **Associated samples:** 19-24
Conc. units: ~~MS~~ ng/L

Compound	Blank ID	*(10X) 19	20		*(10X) 21	22	*(10X) 23	24	Sample Identification	
MB 320-20324/1-A										
P	0.0048J	0.00053J / ~~0.0094U~~	~~0.0026~~		0.0046 / ~~0.0045~~	0.0079 / ~~0.0094~~	0.0053 / ~~0.0090~~ 0.00037J / 0.0031U	0.00090J / 0.0094U		
A	0.00162									
Q	0.00024J									
R	0.00167	0.021* J / ~~0.094U~~			0.0084*J / ~~0.0094U~~	0.024*J / ~~0.0094U~~	0.020*J / 0.10U	~~qual J~~		

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 42369C96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: AR
2nd Reviewer: AR

METHOD: LC/MS PFCs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 01/05/18 **Blank analysis date:** 01/15/18

Conc. units: mg/Kg **Associated samples:** 25-28

Compound	Blank ID	Sample Identification						
	MB 320-202832/1-A	25 (10X*)	26	27(10X*)	~~92~~ 28			
R	0.0400			0.011*/0.10U	~~0.0023/0.00098U~~			
P	0.000490	0.00030/0.00093U		0.00078/0.0010U				
Q	0.000254							
C	0.000147	0.00040/0.00093U	0.00069/0.00093U	0.00085/0.0010U				
K	0.000112							
M	0.000291	0.0091*/0.0093U						
	<RL							

LDC #: 42369C96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS PFCs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 12/19/17 **Blank analysis date:** 12/29/17

Conc. units: mg/Kg **Associated samples:** 1-9

Compound	Blank ID	Sample Identification						
	MB 320-200601/1-A	1	2	3	4	5	6	7
K	0.0000834	0.00029/0.00093U	0.00013/0.00093U	0.00020/0.0010U	0.00011/0.00097U	0.00015/0.00098U	0.00030/0.00093U	0.000094/ 0.0010U
M	0.0000864					0.00084/0.00098U		
R	0.000396							
	<RL							

Compound	Blank ID	Sample Identification						
	MB 320-200601/1-A	8	9					
K	0.0000834	0.00030/0.0010U	0.00053/0.00097U					
M	0.0000864							
R	0.000396							
	<RL							

LDC #: 42369C96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS PFCs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 12/20/17 **Blank analysis date:** 01/03/18

Conc. units: mg/Kg **Associated samples:** 10-15

Compound	Blank ID	Sample Identification						
[redacted]	MB 320-200806/1-A	10	11	12	13	14	15	
K	0.0000701	0.00054/0.0010U	0.00021/0.0010U	0.00042/0.0010U	0.00044/0.0093U	0.00053/0.00099U	0.00038/0.00095U	
M	0.000077							
	<RL							

LDC #: 42369C96

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: M
2nd Reviewer: _____

METHOD: LC/MS PFAS (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y (N) N/A Were all duplicate sample relative percent differences (RPD) ≤ QC limits?

#	Date	Duplicate ID	Compound	RPD (Limits)	Associated Samples	Qualifications
		32	M	38 (≤30)	17 (det)	J det/A

Comments: _____

LDC #: 43369C96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: Q
2nd Reviewer: Q

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

[✓ Y] N N/A Was a LCS required?

Y [✓ N] N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	LCS/D 320-202824	P	182 (81-133)	147 (81-133)	( )	19-24, MB	J dets/P
			( )	( )	( )	(dets = 20-23)	
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
	LCS 320-202186	P	243 (81-133)	( )	( )	16-18, MB (dets)	J dets/P
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

LDC #: 43369C96

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 4
Reviewer: 9
2nd Reviewer: 0

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		MB 320-200601/1-A	13C4 PFBA	9 (25-125)		J (all) / A
			13C5 PFPeA	18		
		30 (MS)	M2-R	216		No qual
			M2-S	207		
		31 (MSD)	↓	236		↓
				214		
		MB 320-200806/1-A	d3-T	158		J (all) / A
			M2-R	304		
			M2-S	585		
		MB 320-202186/1-A	13C4 PFBA	0.9		
			13C5 PFPeA	2		
			13C2 PFHxA	3		
			13C4 PFHpA	5		
			13C4 PFOA	6		
			13C5 PFNA	6		
			13C2 PFDA	4		
			13C2 PFUnA	13		
			13C3 PFBS	10		
			18O2 PFHxS	18		
			13C8 FOSA	23		
			d3-T	12		
			d5-U	19		
			M2-R	5		
			M2-S	8		

LDC #: 43596c96

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 9
2nd Reviewer: 2

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		MB 320-20284/1-A	13C4 PFBA	3 (25-125)		J/UJ/P
			13C5 PFPeA	4		
			13C2 PFHxA	6		
			13C4 PFHpA	8		
			13C4 PFOA	10		
			13C5 PFNA	21		
			13C3 PFBS	15		
			M2-R	15		
		MB 320-20284/4-A	13C4 PFBA	2		
			13C5 PFPeA	3		
			13C2 PFHxA	4		
			13C4 PFHpA	6		
			13C4 PFOA	7		
			13C5 PFNA	11		
			13C3 PFBS	11		
			M2-R	7		
		29 (lab dup)	M2-R	ITT (25-125)		~~No qual~~ J/UJ/P
		32 (lab dup)	M2-R	STD		J/UJ/P

LDC #: 42364-96

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 4
2nd Reviewer: 2

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1-3, 5, 7, 10, 11	M2-R	out		No qual (<10x)
		12-18, 21-28	M2-S	↓		
		8 (ND)	M2-R	214 (25-150)		J (H) P (R)
			M2-S	214		↓ (S)
		16 (ND)	13C2-PFTeDA	4		J (H) P (E)
		17 (ND)	↓	20		↓
		18 (ND)	↓	22		↓
		20 (lab + ND)	13C4 PFBA	3		J (H) P (A-D, I, J, P, Q, S)
			13C5 PFPeA	6		
			13C2 PFHxA	4		
			13C4 PFHpA	4		
			13C4 PFOA	5		
			13C5 PFNA	8		
			13C2-PFDeDA	8		
			13C3-PFBS	15		
			M2-S	20		↓
						(qual A-D, I, J, P, Q, S)

LDC #: 42346e96

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 4 of 9
Reviewer: 9
2nd Reviewer: 2

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		21 (dob ND)	13C4 PFBA	5 (25-150)		J (NA) P (A-D, I, J, P-Q)
			13C5 PFPeA	9		
			13C2 PFHxA	8		
			13C4 PFHpA	5		
			13C4 PFOA	13		
			13C5 PFNA	22		
			13C2 PFDeA	14		
			13C3 PFBS	20		
		22 (dob ND)	13C4 PFBA	6		J (NA) P (A-B, I, P-Q)
			13C5 PFPeA	11		
			13C2 PFHxA	11		
			13C4 PFHpA	10		
			13C2 PFDeA	17		
		23 (dob ND)	13C4 PFBA	4		J (NA) P (A-B, P-Q)
			13C5 PFPeA	14		
			13C2 PFHxA	16		
			13C4 PFHpA	12		
		24 (ND)	13C4 PFBA	2		J (NA) P (A-B, I, P-Q)
			13C5 PFPeA	8		
			13C2 PFHxA	9		
			13C4 PFHpA	7		
			13C2 PFDeA	21		

LDC #: 42369C96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: a

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (2.5 std)	Recalculated RRF (2.5 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	1/3/18	PFOA (1st internal standard)	1.1336	1.1336	1.1474	1.1474	4.8	4.8
	(A8_N)		PFOS (2nd internal standard)	1.1137	1.1137	1.1371	1.1371	3.4	3.4
			(3rd internal standard)						
2	ICAL	1/17/18	PFOA (1st internal standard)	1.1344	1.1344	1.1721	1.1721	6.9	6.9
	(A8_N)		PFOS (2nd internal standard)	1.1321	1.1321	1.1194	1.1194	3.4	3.4
			(3rd internal standard)						
3	ICAL	12/26/17	PFOA (1st internal standard)	1.0465	1.0465	1.0586	1.0586	5.6	5.6
			PFOS (2nd internal standard)	1.0482	1.0482	1.0732	1.0732	2.6	2.6
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42369C96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2017.01.29_030	12/29/17	PFOA	(1st internal standard)	1.0586	1.061	1.061	0.2	0.2
			PFOS	(2nd internal standard)	1.0732	1.112	1.112	3.6	3.6
				(3rd internal standard)					
2	2017.01.29_041	12/29/17	PFOA	(1st internal standard)	1.0586	1.063	1.063	0.4	0.4
			PFOS	(2nd internal standard)	1.0732	1.042	1.042	2.9	2.9
				(3rd internal standard)					
3	2017.12.29_052	12/29/17	PFOA	(1st internal standard)	1.0586	1.078	1.078	1.8	1.8
			PFOS	(2nd internal standard)	1.0732	1.047	1.047	2.5	2.5
4	2018.01.03_001	1/3/18	PFOA	(1st internal standard)	1.1474	1.069	1.069	6.8	6.8
			PFOS	(2nd internal standard)	1.1371	1.095	1.095	3.7	3.7

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42369C96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2017.01.03_012	1/3/18	PFOA	(1st internal standard)	1.1474	1.134	1.134	1.2	1.2
			PFOS	(2nd internal standard)	1.1371	1.092	1.092	4.0	4.0
				(3rd internal standard)					
2	2017.01.03_023	1/3/18	PFOA	(1st internal standard)	1.1474	1.047	1.047	8.8	8.8
			PFOS	(2nd internal standard)	1.1371	1.096	1.096	3.6	3.6
				(3rd internal standard)					
3	2017.01.06_001	1/6/18	PFOA	(1st internal standard)	1.1474	1.094	1.094	4.7	4.7
			PFOS	(2nd internal standard)	1.1371	1.110	1.110	2.4	2.4
4	2017.01.06_012	1/6/18	PFOA	(1st internal standard)	1.1474	1.106	1.106	3.6	3.6
			PFOS	(2nd internal standard)	1.1371	1.128	1.128	0.8	0.8

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.01.11_004	1/11/18	PFOA	(1st internal standard)	1.1474	1.111	1.111	3.2	3.2
			PFOS	(2nd internal standard)	1.1371	1.020	1.020	10.3	10.3
				(3rd internal standard)					
2	2018.01.11_015	1/11/18	PFOA	(1st internal standard)	1.1474	1.130	1.130	1.5	1.5
			PFOS	(2nd internal standard)	1.1371	1.104	1.104	2.9	2.9
				(3rd internal standard)					
3	2018.01.11_026	1/11/18	PFOA	(1st internal standard)	1.1474	1.093	1.093	4.8	4.8
			PFOS	(2nd internal standard)	1.1371	1.058	1.058	7.0	7.0
4	2018.01.12_031	1/12/18	PFOA	(1st internal standard)	1.1474	1.111	1.111	3.2	3.2
			PFOS	(2nd internal standard)	1.1371	1.127	1.127	0.9	0.9

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2017.01.12_042	1/13/18	PFOA	(1st internal standard)	1.1474	1.079	1.079	6.0	6.0
			PFOS	(2nd internal standard)	1.1371	1.034	1.034	9.0	9.0
				(3rd internal standard)					
2	2017.01.12_053	1/13/18	PFOA	(1st internal standard)	1.1474	1.137	1.137	0.9	0.9
			PFOS	(2nd internal standard)	1.1371	1.173	1.173	3.2	3.2
				(3rd internal standard)					
3	2018.01.14_002	1/14/18	PFOA	(1st internal standard)	1.1474	1.102	1.102	3.9	3.9
			PFOS	(2nd internal standard)	1.1371	1.094	1.094	3.8	3.8
4	2018.01.14_014	1/14/18	PFOA	(1st internal standard)	1.1474	1.144	1.144	0.3	0.6
			PFOS	(2nd internal standard)	1.1371	1.095	1.095	3.7	3.7

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42369C96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 4
2nd Reviewer: C

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.01.14_025	1/14/18	PFOA	(1st internal standard)	1.1474	1.074	1.074	6.4	6.4
			PFOS	(2nd internal standard)	1.1371	1.037	1.037	8.8	8.8
				(3rd internal standard)					
2	2018.01.14B_001	1/14/18	PFOA	(1st internal standard)	1.1474	1.118	1.118	2.6	2.6
			PFOS	(2nd internal standard)	1.1371	1.117	1.117	1.8	1.8
				(3rd internal standard)					
3	2018.01.14B_012	1/14/18	PFOA	(1st internal standard)	1.1474	1.143	1.143	0.4	0.4
			PFOS	(2nd internal standard)	1.1371	1.118	1.118	1.6	1.6
4	2018.01.15_041	1/15/18	PFOA	(1st internal standard)	1.1474	1.099	1.099	4.2	4.2
			PFOS	(2nd internal standard)	1.1371	1.118	1.118	1.7	1.7

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.01.15_021	1/16/18	PFOA	(1st internal standard)	1.1474	1.135	1.135	1.0	1.0
			PFOS	(2nd internal standard)	1.1371	1.097	1.097	3.5	3.5
				(3rd internal standard)					
2	2018.01.15_032	1/16/18	PFOA	(1st internal standard)	1.1474	1.126	1.126	1.9	1.9
			PFOS	(2nd internal standard)	1.1371	1.062	1.062	6.6	6.6
				(3rd internal standard)					
3	2018.01.17_001	1/18/18	PFOA	(1st internal standard)	1.1721	1.100	1.100	6.1	6.1
			PFOS	(2nd internal standard)	1.1194	1.055	1.055	5.8	5.8
4	2018.01.17_012	1/18/18	PFOA	(1st internal standard)	1.1721	1.159	1.159	1.1	1.1
			PFOS	(2nd internal standard)	1.1194	1.121	1.121	0.1	0.1

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.01.17_023	1/18/18	PFOA	(1st internal standard)	1.1721	1.105	1.105	5.7	5.7
			PFOS	(2nd internal standard)	1.1194	1.054	1.054	5.9	5.9
2	2018.01.23_006	1/23/18	PFOA	(1st internal standard)	1.1721	1.127	1.127	3.8	3.8
			PFOS	(2nd internal standard)	1.1194	1.114	1.114	0.4	0.4
3	2018.01.23_017	1/23/18	PFOA	(1st internal standard)	1.1721	1.101	1.101	6.0	6.0
			PFOS	(2nd internal standard)	1.1194	1.094	1.094	2.2	2.2
4	2018.01.23_045	1/23/18	PFOA	(1st internal standard)	1.1721	1.147	1.147	2.1	2.1
			PFOS	(2nd internal standard)	1.1194	1.106	1.106	1.2	1.2

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.01.23C_012	1/23/18	PFOA (1st internal standard)	1.1721	1.108	1.108	5.5	5.5
			PFOS (2nd internal standard)	1.1194	1.095	1.095	2.2	2.2
2	2018.01.15_052	1/15/18	PFOA (1st internal standard)	1.1474	1.091	1.091	4.9	4.9
			PFOS (2nd internal standard)	1.1371	1.116	1.116	1.9	1.9
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: [illegible]

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: O

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 30/31

Compound	Spike Added (ng/L)		Sample Concentration (ng/L)	Spiked Sample Concentration (ng/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
PFOA	0.00935	0.00962	0.00020 U NDR	0.00908	0.00917	95 97R	95 97R	93 95R	93 95R	1	1
PFOS	0.00867	0.00892	0.0013	0.00997	0.0102	99	99	99	101	2	2

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: [illegible]

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = | LCSC - LCSDC | * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-200601

Compound	Spike Added (MS/MSD)		Spike Concentration (MS/MSD)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	0.0100	NA	0.0960	NA	96	96				
PFOS	0.0928	↓	0.0100	↓	108	108				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42369C96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: Q
2nd reviewer: Q

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, PFOS:

Conc. = $\frac{(42586)(2.39)(10.00)(1)(\quad)}{(346838)(\text{IS\#})(1.07)(1.0732)(1000)}$

= 0.0026 MS/kg

#	Sample ID	Compound	Reported Concentration MS/kg	Calculated Concentration ( )	Qualification
	1	PFOS	0.0026		

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

P.W. Grosser Consulting
630 Johnson Ave, Suite 7
Bohemia, NY 11716
ATTN: Ms. Heather Moran-Botta.
hmoran-botta@pwgrosser.com

October 18, 2019

SUBJECT: Revised Suffolk County Biota Sampling Evaluation, SHD1705, Data Usability Summary Report

Dear Ms. Moran-Botta,

Enclosed are the revised validation reports for the fraction listed below. These SDGs were received on August 21, 2018. Attachment 1 is a summary of the samples that were reviewed for each analysis.

- The laboratory re-issued the reports to correct for a prep factor correction. The detection limits were lowered.

LDC Project #42956_RV1:

SDG #	Fraction
320-31604-1, 320-39893-1 320-39933-1, 320-40237-1 320-40241-1, 320-40365-1 320-40607-1, 320-40641-1	Fluorinated Alkyl Substances

The data validation was performed under Category B guidelines using quality control summaries provided by the laboratory. The analyses were validated using the following documents, as applicable to each method:

- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, EPA 540-R-2017-002; January 2017

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink

Christina Rink
crink@lab-data.com
Project Manager/Senior Chemist

5,311 pages-ADV (Validate 20% per SDG) Attachment 1

NY DUSR Category B **LDC #42956 (P.W. Grosser Consulting - Bohemia, NY / Suffolk County Biota Sampling Evaluation, SHD1705)**

LDC	SDG#	DATE REC'D	(3) DATE DUE	PFCs -Mod (537M)		PFCs -Mod (537M)																													
Matrix:	Water/Soil/Tissue			W	S	T	-	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	320-31604-1	08/21/18	09/12/18	1	1	-	-																												
B	320-39893-1	08/21/18	09/12/18	1	0	-	-																												
C	320-39933-1	08/21/18	09/12/18	3	0	-	-																												
D	320-40237-1	08/21/18	09/12/18	-	-	3	0																												
E	320-40241-1	08/21/18	09/12/18	-	-	5	0																												
F	320-40365-1	08/21/18	09/12/18	1	0	-	-																												
G	320-40607-1	08/21/18	09/12/18	1	0	-	-																												
H	320-40641-1	08/21/18	09/12/18	-	-	6	0																												
Total	J/CR			7	1	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22

These sample counts do not include MS, MSD, or DUP's.

Site: Suffolk County Biota Sampling Evaluation
Laboratory: TestAmerica, Inc., Edison, NY
Report No.: 320-31604-1
Reviewer: Pei Geng and Christina Rink/Laboratory Data Consultants for P.W. Grosser Consulting
Date: September 7, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
SP002	320-31604-2	Perfluorinated Hydrocarbons
FB001	320-31604-3	Perfluorinated Hydrocarbons
SP002MS	320-31604-2MS	Perfluorinated Hydrocarbons
SP002MSD	320-31604-2MSD	Perfluorinated Hydrocarbons

Associated QC Samples(s):
Field/Trip Blanks: FB001
Field Duplicate pair: None Associated

The above-listed soil and water samples were collected on September 12, 2017 and were analyzed for perfluorinated hydrocarbons by method 537 modified. The data validation was performed in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,* EPA 540-R-2017-002 (January 2017), modified as necessary to accommodate the non-CLP methodologies used.

The organic data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tunes
- Initial and Continuing Calibrations
- Blanks
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Labeled Compounds
- Field Duplicate Results
- Moisture Content
- Quantitation Limits and Data Assessment
- Sample Quantitation and Compound Identification

Overall Evaluation of Data and Potential Usability Issues

All results are usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was complete as defined under the requirements for the NYSDEC ASP category B laboratory deliverables.

Holding Times and Sample Preservation

All criteria were met.

LC/MS Tunes

All criteria were met.

Initial and Continuing Calibrations

Initial calibration:

Compounds that did not meet criteria are summarized in the following table.

Date	Instrument ID	Compound	IC %D	Associated Samples		Validation Action
9/18/17	IC-7	Perfluorobutanesulfonic acid	32.9	SP002		UJ nondetects
9/28/17	IC-7	Perfluorobutanesulfonic acid	34.5	FB001		UJ nondetects

X = Initial calibration (IC) relative standard deviation (%RSD) > 35; estimate (J/UJ) positive and nondetect results.
XX = Continuing calibration (CC) percent difference (%D) > 30; estimate (J/UJ) positive and nondetect results.
SS = Second source verification percent difference (%D) > 30; estimate (J/UJ) positive and nondetect results.
+ = Response factor (RRF) < validation criteria; estimate (J/UJ) positive and nondetect results.

The perfluorobutanesulfonic acid results were estimated due to true value exceedances. The bias cannot be determined. The results can be used for project objectives as nondetects with estimated quantitation limits (UJ) which may have a minor impact on the data usability.

Continuing calibration:

Date	Instrument ID	Compound	CC %D	Associated Samples		Validation Action
09/23/17	2017.09.23A.004	13C2-Perfluorodecanoic acid	31.0	SP002	XX	J detects/UJ nondetects
		d3-N-Methyl perfluorooctanesulfonamidoacetic acid	51.1		XX	J detects/UJ nondetects
		13C2-Perfluoroundecanoic acid	49.7		XX	J detects/UJ nondetects
		d5-N-Ethyl perfluorooctanesulfonamidoacetic acid	53.9		XX	J detects/UJ nondetects
		13C2-Perfluorododecanoic acid	46.4		XX	J detects/UJ nondetects
09/28/17	2017.09.28A.037	13C2-Perfluorododecanoic acid	43.1	FB001	XX	UJ nondetects

X = Initial calibration (IC) relative standard deviation (%RSD) > 20; estimate (J/UJ) positive and nondetect results.
XX = Continuing calibration (CC) percent difference (%D) > 20; estimate (J/UJ) positive and nondetect results.
SS = Second source verification percent difference (%D) > 30; estimate (J/UJ) positive and nondetect results.
+ = Response factor (RRF) < validation criteria; estimate (J/UJ) positive and nondetect results.

The perfluorodecanoic acid, n-methyl perfluorooctanesulfonamidoacetic acid, perfluoroundecanoic acid, n-ethyl perfluorooctanesulfonamidoacetic acid, and perfluorododecanoic acid results for the samples listed above were estimated due to continuing calibration exceedances. The bias cannot be determined. The results can be used for project objectives as estimated values (J) or nondetects with estimated quantitation limits (UJ) which may have a minor impact on the data usability.

Blanks

Contamination was detected in the associated perfluorinated hydrocarbons method blank samples. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Blank ID	Compound	Level Detected	Action Level	Associated Samples
MB 320-186052/1-A	Perfluorononanoic acid	1.672 ng/L	RL	FB001
	Perfluorodecanoic acid	0.641 ng/L	RL	
	Perfluoroundecanoic acid	1.243 ng/L	RL	
	Perfluorododecanoic acid	0.663 ng/L	RL	
	Perfluorotridecanoic acid	0.708 ng/L	RL	
	Perfluorotetradecanoic acid	0.671 ng/L	RL	

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the RL and > the Action Level, qualification of the data was not required.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
FB001	Perfluorotetradecanoic acid	0.20 ng/L	1.97U ng/L

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

Contamination was detected in the field blank sample FB001 for the perfluorinated hydrocargons analysis. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Field Blank ID	Compound	Level Detected	Action Level	Associated Samples
FB001	Perfluorotetradecanoic acid	0.20 ng/L	RL	SP002
	Perfluorohexanesulfonic acid	2.16 ng/L	RL	FB001
	Perfluorooctanesulfonic acid	2.22 ng/L	RL	

No samples were qualified since the associated sample results were greater than the action level.

MS/MSD Results

MS/MSD analyses were performed on sample SP002 for perfluorinated hydrocarbons analysis. All criteria were met.

LCS Results

The following table lists the compounds recovered outside of control limits in the fluorinated alkyl substances analysis and the resulting validation actions.

LCS ID	Compound	LCS %R (Limits)	LCS/D %R (Limits)	RPD (Limits)	Affected Sample	Validation Action
LCS/D 320-186052	Perfluorotridecanoic acid	-	-	39 (≤30)	FB001	UJ nondetects

- Within control limits

The perfluorotridecanoic acid result was estimated due to LCS/LCSD relative percent difference exceedance. The bias cannot be determined. The result can be used for project objectives as a nondetect with an estimated quantitation limit (UJ) which may have a minor impact on the data usability.

Labeled Compounds

The following table lists the labeled compounds recovered outside of control limits and the resulting actions.

Sample	Labeled Compound	%R (Limits)	Affected Compounds	Validation actions
SP002	13C2-Perfluoroundecanoic acid	168 (25-150)	Perfluoroundecanoic acid	J detects/UJ nondetects
	13C2-Perfluorododecanoic acid	168 (25-150)	Perfluorododecanoic acid	J detects/UJ nondetects
	d3-N-Methyl perfluorooctanesulfonamidoacetic acid	154 (25-150)	N-Methyl perfluorooctanesulfonamidoacetic acid	J detects/UJ nondetects
	d5-N-Ethyl perfluorooctanesulfonamidoacetic acid	167 (25-150)	N-Ethyl perfluorooctanesulfonamidoacetic acid	J detects/UJ nondetects

The perfluoroundecanoic acid, perfluorododecanoic acid, n-methyl perfluorooctanesulfonamidoacetic acid, and n-ethyl perfluorooctanesulfonamidoacetic acid results were estimated due to labeled compounds percent recovery exceedances. The bias cannot be determined. The results can be used for project objectives as estimated values (J) or nondetects with estimated quantitation limits (UJ) which may have a minor impact on the data usability.

Field Duplicate Results

A field duplicate pair was not associated with this sample set. Validation action was not required on this basis.

Moisture Content

All criteria were met.

Quantitation Limits and Data Assessment

Results were reported which were below the reporting limit (RL) and above the method detection limit (MDL) in the perfluorinated hydrocarbons analysis. These results were qualified as estimated (J) by the laboratory.

Dilutions were not required for perfluorinated hydrocarbons analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-31604-1

SDG No.:

Client Sample ID: SP002 | Lab Sample ID: 320-31604-2

Matrix: Solid | Lab File ID: 2017.09.23A_011.d

Analysis Method: 537 (modified) | Date Collected: 09/12/2017 09:35

Extraction Method: SHAKE | Date Extracted: 09/19/2017 11:59

Sample wt/vol: 4.98(g) | Date Analyzed: 09/23/2017 13:03

Con. Extract Vol.: 1.0(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: 8.4 | GPC Cleanup:(Y/N) N

Analysis Batch No.: 186086 | Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000078	U	0.00022	0.000078
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000096	U	0.00022	0.000096
335-67-1	Perfluorooctanoic acid (PFOA)	0.00013	J	0.00022	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00011	J	0.00022	0.000091
335-76-2	Perfluorodecanoic acid (PFDA)	0.00013	J	0.00022	0.000062
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00035		0.00022	0.00012
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00013	U	0.00022	0.00013
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	0.00022		0.00022	0.00010
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000064	U	0.00022	0.000064
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00011	U	0.00022	0.00011
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00044		0.00022	0.00013
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0023		0.00022	0.00014
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	0.0014	U	0.0022	0.0014
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	0.00043	U	0.0022	0.00043

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	114		25-150
STL00990	13C4 PFOA	121		25-150
STL00995	13C5 PFNA	137		25-150
STL00996	13C2 PFDA	136		25-150
STL00997	13C2 PFUnA	168	*	25-150
STL00998	13C2 PFDoA	168	*	25-150
STL00994	18O2 PFHxS	102		25-150
STL00991	13C4 PFOS	107		25-150
STL01892	13C4-PFHpA	122		25-150
STL02116	13C2-PFTeDA	126		25-150
STL02118	d3-NMeFOSAA	154	*	25-150
STL02117	d5-NEtFOSAA	167	*	25-150
STL02337	13C3-PFBS	101		25-150

SEP 1 9 2017

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-31604-1

SDG No.:

Client Sample ID: FB001 | Lab Sample ID: 320-31604-3

Matrix: Water | Lab File ID: 2017.09.28A_046.d

Analysis Method: 537 (modified) | Date Collected: 09/12/2017 09:45

Extraction Method: 3535 | Date Extracted: 09/25/2017 09:46

Sample wt/vol: 254(mL) | Date Analyzed: 09/28/2017 07:55

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 186780 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
307-24-4	Perfluorohexanoic acid (PFHxA)	0.77	U U	1.97	0.77
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.79	U	1.97	0.79
335-67-1	Perfluorooctanoic acid (PFOA)	0.74	U	1.97	0.74
375-95-1	Perfluorononanoic acid (PFNA)	0.64	U	1.97	0.64
335-76-2	Perfluorodecanoic acid (PFDA)	0.43	U	1.97	0.43
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.74	U	1.97	0.74
307-55-1	Perfluorododecanoic acid (PFDoA)	0.57	U U	1.97	0.57
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	0.54	U * U	1.97	0.54
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.20	J B 19 70	1.97	0.20
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.90	U U	1.97	0.90
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.16		1.97	0.86
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.22		1.97	1.26
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	4.94	U U	19.7	4.94
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	5.55	U U	19.7	5.55

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	83		25-150
STL00990	13C4 PFOA	90		25-150
STL00995	13C5 PFNA	88		25-150
STL00996	13C2 PFDA	97		25-150
STL00997	13C2 PFUnA	90		25-150
STL00998	13C2 PFDoA	106		25-150
STL00994	18O2 PFHxS	79		25-150
STL02116	13C2-PFTeDA	134		25-150
STL00991	13C4 PFOS	82		25-150
STL02337	13C3-PFBS	73		25-150
STL01892	13C4-PFHpA	92		25-150
STL02118	d3-NMeFOSAA	74		25-150
STL02117	d5-NEtFOSAA	73		25-150

SEP 1 1 2017

Initials: CR

LDC #: 42956A96
SDG #: 320-31604-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 9/5/13
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: LC/MS Perfluorinated Hydrocarbons (EPA Method 537-Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	SW/A	RSD≤30%. Tune/ICV ≤30%
IV.	Continuing calibration	SW	CCV≤30%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	FB=2
~~VII.~~	~~Surrogate spikes~~	N	
VIII.	Matrix spike/Matrix spike duplicates	~~A~~ N	
IX.	Laboratory control samples	SW	LCS/D
X.	Field duplicates	N	
XI.	Labeled Compounds	SW	
XII.	Compound quantitation RL/LOQ/LODs	SW	Results < RL – Note/A
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	SP002	320-31604-2	Soil	09/12/17
2	FB001	320-31604-3	Water	09/12/17
3	SP002MS	320-31604-2MS	Soil	09/12/17
4	SP002MSD	320-31604-2MSD	Soil	09/12/17
5				
6				
7				
8				

Notes:

LDC #: 42954A90

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: Q
2nd Reviewer: C

Method: LC/MS PFOS/PFOAs (EPA Method 537M)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 35%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?		✓		
IIIb.Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 30%		✓		
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Laboratory Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?			✓	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VIII. Matrix spike/Matrix spike duplicates				

LDC #: 42956A96

VALIDATION FINDINGS CHECKLIST

Reviewer: 1
2nd Reviewer: C

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IV. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		✓		
X. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XI. Internal standards				
Were internal standard area counts within acceptance limits?		✓		
XII. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #~~42765A96~~

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer:

METHOD: LCMS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
Y N N/A Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?
Y N N/A Were all percent relative standard deviations (%RSD) ≤ ~~20%?~~ ~~35%~~ ?
Y N N/A Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?

#	Date	Standard ID	Compound	Finding %RSD/r^2	Finding %D (True value)	Associated Samples	Qualifications
	9/18/17	IC-7	J		32.9	All soils (ND)	Y/N/~~AP~~(J)
	9/25/17	IC-7	J		34.5	All H2Os	Y/N/~~AP~~(J)

LDC #: ~~42956A~~ 96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 0

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

~~Y~~ N N/A Was a continuing calibration standard analyzed after every 10 injections for each instrument?

Y ~~N~~ N/A Were all continuing calibration percent differences (%D) ≤30 %?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Finding RRF (Limit:)	Associated Samples	Qualifications
	~~9/23/17~~	~~2017.09.23A.004~~	~~13C2~~				
	9/23/17	2017.09.23A.004	13C2-PFDA	31.0		All Soils (detect ND)	J/UJ/A
			d3-NMeFOSAA	51.1			
			13C2-PFUnA	49.7			
			d5-NEtFOSAA	53.9			
			13C2-PFDoA	46.4			(qual E, F, & T.U)
	9/28/17	2017.09.28A.026	13C2-PFDoA	82.6		MB	J/UJ/A
			13C2-PFTeDA	34.5			
	9/28/17	2017.09.28A.037	13C2-PFDoA	43.1		All H2Os (ND)	J/UJ/A (F)

LDC #: ~~42956A96~~

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: 9
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: ~~9/5/17~~ **Blank analysis date:** 9/28/17
Conc. units: ng/L **Associated samples:** All H2Os

Compound	Blank ID	Sample Identification								
	MB 320-186053/1-A	2								
D	1.6T2									
E	0.641									
F	1.343									
G	0.663									
H	0.T08									
I	0.6T1		0.20/1.9TU							

Blank extraction date: _____ **Blank analysis date:** _____ **Associated samples:** _____
Conc. units: _____

Compound	Blank ID	Sample Identification								

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 43956A96

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: 1
2nd Reviewer: 2

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: ng/L **Associated sample units:** ng/kg
Sampling date: 9/12/17
Field blank type: (circle one) Trip Blank/Field Blank / Rinsate / Other: FB Associated Samples: All

Compound	Blank ID	Sample Identification								
	2									
I <	0.20									
K	2.16									
M	2.22									

Blank units: _____ **Associated sample units:** _____
Sampling date: _____
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

LDC #: 40956A96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: q
2nd Reviewer: Q

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

[✓ Y] N N/A Was a LCS required?

Y [✓ N] N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	LCS/D 320-186052	H	( )	( )	39 (≤30)	All H2Os (ND)	J/UJ/P
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

LDC #: 42956A96

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 9
2nd Reviewer: 9

METHOD: LC/MS PFAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (dob5HND)	13C2-PFUnA	168 (25-150)		J/UJ/A (F)
			13C2-PFDoA	168		(G)
			d3-NMeFOSAA	154		(T)
			d5-NEtFOSAA	167		(U)
		3 (MS)	13C2-PFUnA	153 (25-150)		No qual
		4 (MSD)		153		
		MB 320-186053/1-A	13C2-PFDoA	161 (25-150)		J/UJ/A
			13C2-PFTeDA	167		

LDC #: 42956A96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (50 std)	Recalculated RRF (50 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	9/18/17	PFOA (1st internal standard)	1.0503	1.0503	1.0761	1.0761	10.1	10.1
	(A8_N)		PFOS (2nd internal standard)	1.0325	1.0325	1.0914	1.0914	12.8	12.8
			(3rd internal standard)						
2	ICAL	9/28/17	PFOA (1st internal standard)	1.0707	1.0707	1.0815	1.0815	9.9	9.9
	(A8_N)		PFOS (2nd internal standard)	1.0481	1.0481	1.0415	1.0415	5.5	5.5
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42956A96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2017.09.23A.004	9/23/17	PFOA	(1st internal standard)	1.0761	1.075	1.075	0.1	0.1
			PFOS	(2nd internal standard)	1.0914	1.044	1.044	4.4	4.4
2	2017.09.28A.026	9/28/17	PFOA	(1st internal standard)	1.0815	1.039	1.039	3.9	3.9
			PFOS	(2nd internal standard)	1.0415	1.042	1.042	0.0	0.0
3	2017.09.28A.037	9/28/17	PFOA	(1st internal standard)	1.0815	1.103	1.103	2.0	2.0
			PFOS	(2nd internal standard)	1.0415	1.048	1.048	0.6	0.6
4									

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 49568A90

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 3A

Compound	Spike Added (MS/MSD)		Sample Concentration MS/MSD	Spiked Sample Concentration (MS/MSD)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
PFOA	0.00438	0.00441	0.00013	0.00464	0.00465	103	103	102	102	0	0
PFOS	0.00406	0.00409	0.0023	0.0064T	0.0066	102	103	105	106	2	2

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: ~~42156A76~~

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: CL
2nd Reviewer: CL

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = | LCSC - LCSDC | * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-186052

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	40.0	40.0	47.61	46.40	119	119	116	116	3	3
PFOS	37.1	37.1	44.74	43.39	121	121	117	117	3	3

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43956A96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, PFOA:

Conc. = $\frac{(130096)(50.0)(1)(1)(\quad)}{(103838)(1.076)(4.98)(0.916)(1000)}$

= 0.000128 ng/kg

#	Sample ID	Compound	Reported Concentration ng/kg	Calculated Concentration ( )	Qualification
	1	PFOA	0.00013		

Site: Suffolk County Biota Sampling Evaluation
Laboratory: TestAmerica, Inc., Edison, NY
Report No.: 320-39893-1
Reviewer: Pei Geng and Christina Rink/Laboratory Data Consultants for P.W. Grosser Consulting
Date: September 7, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
MW-CR001-B	320-39893-1	Fluorinated Alkyl Substances

Associated QC Samples(s):
Field/Trip Blanks: EB004, FB004
Field Duplicate pair: None Associated

The above-listed water sample was collected on May 3, 2018 and was analyzed for fluorinated alkyl substances by method 537 modified. The data validation was performed in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,* EPA 540-R-2017-002 (January 2017), modified as necessary to accommodate the non-CLP methodologies used.

The organic data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tunes
- Initial and Continuing Calibrations
- Blanks
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Labeled Compounds
- Field Duplicate Results
- Quantitation Limits and Data Assessment
- Sample Quantitation and Compound Identification

Overall Evaluation of Data and Potential Usability Issues

All results are usable as reported or usable with minor qualification due to laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was complete as defined under the requirements for the NYSDEC ASP category B laboratory deliverables.

Holding Times and Sample Preservation

All criteria were met.

LC/MS Tunes

All criteria were met.

Initial and Continuing Calibrations

All criteria were met.

Blanks

Contamination was detected in the associated fluorinated alkyl substances method blank samples. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Blank ID	Compound	Level Detected	Action Level	Associated Samples
MB 320-227661/1-A	Perfluorobutanoic acid	0.567 ng/L	RL	MW-CR001-B
	Perfluorohexanesulfonic acid	0.268 ng/L	RL	

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the RL and > the Action Level, qualification of the data was not required.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
MW-CR001-B	Perfluorobutanoic acid	1.79 ng/L	1.99U ng/L

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

Contamination was detected in the equipment blank sample EB004 and field blank sample FB004 for fluorinated alkyl substances analysis. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Field Blank ID	Compound	Level Detected	Action Level	Associated Samples
EB004	Perfluorobutanoic acid	0.62 ng/L	RL	MW-CR001-B
FB004	Perfluorobutanoic acid	0.67 ng/L	RL	MW-CR001-B
	Perfluorohexanoic acid	1.19 ng/L	RL	
	6:2FTS	8.26 ng/L	RL	

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and $\leq$ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and $\leq$ the Action Level, qualify the result as not detected (U) at the reported concentration.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
MW-CR001-B	Perfluorobutanoic acid	1.79 ng/L	1.99U ng/L

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

MS/MSD Results

MS/MSD analyses were not associated with this sample set. Validation action was not required on this basis.

LCS Results

All criteria were met.

Labeled Compounds

All criteria were met.

Field Duplicate Results

A field duplicate pair was not associated with this sample set. Validation action was not required on this basis.

Quantitation Limits and Data Assessment

Results were reported which were below the reporting limit (RL) and above the method detection limit (MDL) in the fluorinated alkyl substances analysis. These results were qualified as estimated (J) by the laboratory.

Dilutions were not required for fluorinated alkyl substances analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-39893-1

SDG No.:

Client Sample ID: MW-CR001-B | Lab Sample ID: 320-39893-1

Matrix: Water | Lab File ID: 2018.06.18LLAA_059.d

Analysis Method: 537 (modified) | Date Collected: 05/30/2018 10:15

Extraction Method: 3535 | Date Extracted: 06/06/2018 15:54

Sample wt/vol: 251.6(mL) | Date Analyzed: 06/18/2018 18:21

Con. Extract Vol.: 10(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 229705 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	1.79	J B 1990	1.99	0.35
2706-90-3	Perfluoropentanoic acid (PFPeA)	3.88		1.99	0.49
307-24-4	Perfluorohexanoic acid (PFHxA)	3.96		1.99	0.58
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.53	J J	1.99	0.25
335-67-1	Perfluorooctanoic acid (PFOA)	3.09		1.99	0.84
375-95-1	Perfluorononanoic acid (PFNA)	1.84	J J	1.99	0.27
335-76-2	Perfluorodecanoic acid (PFDA)	0.31	U U	1.99	0.31
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.09	U	1.99	1.09
307-55-1	Perfluorododecanoic acid (PFDoA)	0.55	U	1.99	0.55
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.29	U	1.99	1.29
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.29	U	1.99	0.29
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.42	J J	1.99	0.20
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	5.89	B	1.99	0.17
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.22	J J	1.99	0.19
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	10.5		1.99	0.54
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.32	U U	1.99	0.32
754-91-6	Perfluorooctane Sulfonamide (FOSA)	0.35	U	1.99	0.35
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	3.08	U	19.9	3.08
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	1.89	U	19.9	1.89
27619-97-2	6:2 FTS	1.99	U	19.9	1.99
39108-34-4	8:2 FTS	1.99	U	19.9	1.99

SEP 11 2018

Initials: CR

LDC #: 42956B96
SDG #: 320-39893-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 9/5/18
Page: 1 of 1
Reviewer: 9
2nd Reviewer:

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537-Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	~~RSD≤35%~~ r^2 True/ICV ≤ 30%
IV.	Continuing calibration	A	CCV ≤ 30%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	FB004, EB004
~~VII.~~	~~Surrogate spikes~~	N	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Labeled Compounds	A	
XII.	Compound quantitation RL/LOQ/LODs	SA	results < RL - J det/B
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-CR001-B	320-39893-1	Water	05/30/18
2				
3				
4				
5				
6				
7				
8				

Notes:

LDC #: 47956B96

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: LC/MS PFOS/PFOAs (EPA Method 537M)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%? 35.7%	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?	✓			
IIIb.Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 30%	✓			
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Laboratory Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓	✓		
VI. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?			✓	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VIII. Matrix spike/Matrix spike duplicates				

LDC #: 42956B96

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
IV. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XI. Internal standards				
Were internal standard area counts within acceptance limits?	✓			
XII. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data	✓			
Overall assessment of data was found to be acceptable.				

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #~~42956B96~~

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: 9
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 6/6/18 **Blank analysis date:** 6/13/18
Conc. units: ng/L **Associated samples:** All

Compound	Blank ID	Sample Identification								
	MB320-22766 1/A-A	1								
P	0.567		1.79/1.99V							
K	0.268									

Blank extraction date:_____ **Blank analysis date:**_____ **Associated samples:**_____
Conc. units:_____

Compound	Blank ID	Sample Identification								

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 42956B96

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: 2

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were field blanks identified in this SDG?

Y N N/A Were target compounds detected in the field blanks?

Blank units: ng/L **Associated sample units:** ng/L

Sampling date: 5/30/18

Field blank type: (circle one) Trip Blank/Field Blank / Rinsate / Other: _____ Associated Samples: All

Compound	Blank ID	Bk ID	Sample Identification							
	FB004	EB004		1						
P	0.67	0.62		1.79/1.99U						
A	1.19									
R	8.26									

Blank units: _____ **Associated sample units:** _____

Sampling date: _____

Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

LDC #: 42956B96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: C

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (2.5 std)	Recalculated RRF (2.5 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	6/5/18	PFOA (1st internal standard)	1.1508	1.1508	1.2025	1.2025	9.9	9.9
	(A8_N)		PFOS (2nd internal standard)	1.1740	1.1740	1.1873	1.1873	4.4	4.4
			(3rd internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: [illegible]

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-22766 1

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	40.0	40.0	34.93	36.20	87	87	90	90	4	4
PFOS	37.1	37.1	33.53	34.14	90	90	92	92	2	2

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: ~~41756B96~~

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: 0

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, PFOS

Conc. = $\frac{(458460)(2.39)(10)(1)(\quad)}{(371564)(1.187)(0.7516)(\quad)}$

= 10.5 ng/L

#	Sample ID	Compound	Reported Concentration ~~ng/L~~	Calculated Concentration ( )	Qualification
	1	PFOS	10.5		

Site: Suffolk County Biota Sampling Evaluation
Laboratory: TestAmerica, Inc., Edison, NY
Report No.: 320-39933-1
Reviewer: Pei Geng and Christina Rink/Laboratory Data Consultants for P.W. Grosser Consulting
Date: September 7, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
FW-SP003-B	320-39933-3	Fluorinated Alkyl Substances
MW-SP002-B	320-39933-4	Fluorinated Alkyl Substances
FW-FR004-B	320-39933-13	Fluorinated Alkyl Substances

Associated QC Samples(s):
Field/Trip Blanks: EB005, FB005
Field Duplicate pair: None Associated

The above-listed water samples were collected on May 31, 2018 and were analyzed for fluorinated alkyl substances by method 537 modified. The data validation was performed in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,* EPA 540-R-2017-002 (January 2017), modified as necessary to accommodate the non-CLP methodologies used.

The organic data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tunes
- Initial and Continuing Calibrations
- Blanks
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Labeled Compounds
- Field Duplicate Results
- Quantitation Limits and Data Assessment
- Sample Quantitation and Compound Identification

Overall Evaluation of Data and Potential Usability Issues

All results are usable as reported or usable with minor qualification due to laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was complete as defined under the requirements for the NYSDEC ASP category B laboratory deliverables.

Holding Times and Sample Preservation

All criteria were met.

LC/MS Tunes

All criteria were met.

Initial and Continuing Calibrations

Initial calibration:

Compounds that did not meet criteria are summarized in the following table.

Date	Instrument ID	Compound	IC %D (Limits)	Associated Samples		Validation Action
06/22/18	ICL1	Perfluorooctanoic acid	53.0 (≤50)	FW-SP003-B MW-SP002-B FW-FR004-B		J detects

X = Initial calibration (IC) relative standard deviation (%RSD) > 35; estimate (J/UJ) positive and nondetect results.
XX = Continuing calibration (CC) percent difference (%D) > 30; estimate (J/UJ) positive and nondetect results.
SS = Second source verification percent difference (%D) > 30; estimate (J/UJ) positive and nondetect results.
+ = Response factor (RRF) < validation criteria; estimate (J/UJ) positive and nondetect results.

The perfluorooctanoic acid results were estimated due to percent difference exceedance. The bias cannot be determined. The results can be used for project objectives as estimated values (J) which may have a minor impact on the data usability.

Continuing calibration:

All criteria were met.

Blanks

Contamination was detected in the associated fluorinated alkyl substances method blank samples. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Blank ID	Compound	Level Detected	Action Level	Associated Samples
MB 320-227761/1-A	Perfluorohexanesulfonic acid 6:2FTS	0.264 ng/L 8.335 ng/L	RL RL	FW-SP003-B MW-SP002-B FW-FR004-B

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the RL and > the Action Level, qualification of the data was not required.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
FW-SP003-B	6:2FTS	4.85 ng/L	20.7U ng/L
MW-SP002-B	Perfluorohexanesulfonic acid 6:2FTS	0.49 ng/L 4.07 ng/L	1.99U ng/L 19.9U ng/L
FW-FR004-B	Perfluorohexanesulfonic acid 6:2FTS	1.46 ng/L 2.53 ng/L	2.03U ng/L 20.3U ng/L

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

Contamination was detected in the equipment blank sample EB005 and field blank sample FB005 for fluorinated alkyl substances analysis. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Field Blank ID	Compound	Level Detected	Action Level	Associated Samples
EB005	Perfluorohexanesulfonic acid	0.31 ng/L	RL	FW-SP003-B MW-SP002-B FW-FR004-B
FB005	Perfluorohexanesulfonic acid	0.26 ng/L	RL	FW-SP003-B MW-SP002-B FW-FR004-B

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
MW-SP002-B	Perfluorohexanesulfonic acid	0.49 ng/L	1.99U ng/L
FW-FR004-B	Perfluorohexanesulfonic acid	1.46 ng/L	2.03U ng/L

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

MS/MSD Results

MS/MSD analyses were not associated with this sample set. Validation action was not required on this basis.

LCS Results

All criteria were met.

Labeled Compounds

All criteria were met.

Field Duplicate Results

A field duplicate pair was not associated with this sample set. Validation action was not required on this basis.

Quantitation Limits and Data Assessment

Results were reported which were below the reporting limit (RL) and above the method detection limit (MDL) in the fluorinated alkyl substances analysis. These results were qualified as estimated (J) by the laboratory.

Dilutions were not required for fluorinated alkyl substances analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-39933-1

SDG No.:

Client Sample ID: FW-SP003-B | Lab Sample ID: 320-39933-3

Matrix: Water | Lab File ID: 2018.06.24LLA_033.d

Analysis Method: 537 (modified) | Date Collected: 05/31/2018 10:00

Extraction Method: 3535 | Date Extracted: 06/07/2018 10:52

Sample wt/vol: 241.2(mL) | Date Analyzed: 06/25/2018 02:28

Con. Extract Vol.: 10.0(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 230707 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	1.97	J J	2.07	0.36
2706-90-3	Perfluoropentanoic acid (PFPeA)	2.23		2.07	0.51
307-24-4	Perfluorohexanoic acid (PFHxA)	2.45		2.07	0.60
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.51	J J	2.07	0.26
335-67-1	Perfluorooctanoic acid (PFOA)	4.24	J J	2.07	0.88
375-95-1	Perfluorononanoic acid (PFNA)	0.99	J J	2.07	0.28
335-76-2	Perfluorodecanoic acid (PFDA)	0.66	J J	2.07	0.32
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.14	U U	2.07	1.14
307-55-1	Perfluorododecanoic acid (PFDoA)	0.57	U	2.07	0.57
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.35	U	2.07	1.35
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.30	U	2.07	0.30
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.04	J J	2.07	0.21
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	3.70	B	2.07	0.18
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.22	J J	2.07	0.20
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	11.7		2.07	0.56
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.33	U U	2.07	0.33
754-91-6	Perfluorooctane Sulfonamide (FOSA)	0.36	U	2.07	0.36
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	3.21	U	20.7	3.21
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	1.97	U	20.7	1.97
27619-97-2	6:2 FTS	4.85	J B 20.7 U	20.7	2.07
39108-34-4	8:2 FTS	2.07	U U	20.7	2.07

SEP 11 2018

Initials: CE

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-39933-1

SDG No.:

Client Sample ID: MW-SP002-B | Lab Sample ID: 320-39933-4

Matrix: Water | Lab File ID: 2018.06.24LLA_034.d

Analysis Method: 537 (modified) | Date Collected: 05/31/2018 10:50

Extraction Method: 3535 | Date Extracted: 06/07/2018 10:52

Sample wt/vol: 251.5(mL) | Date Analyzed: 06/25/2018 02:36

Con. Extract Vol.: 10.0(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 230707 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.77	J J	1.99	0.35
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.49	U U	1.99	0.49
307-24-4	Perfluorohexanoic acid (PFHxA)	0.58	U U	1.99	0.58
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.0	J J	1.99	0.25
335-67-1	Perfluorooctanoic acid (PFOA)	0.84	J J	1.99	0.84
375-95-1	Perfluorononanoic acid (PFNA)	0.35	J J	1.99	0.27
335-76-2	Perfluorodecanoic acid (PFDA)	0.31	U U	1.99	0.31
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.09	U	1.99	1.09
307-55-1	Perfluorododecanoic acid (PFDoA)	0.55	U	1.99	0.55
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.29	U	1.99	1.29
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.29	U	1.99	0.29
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.25	J J	1.99	0.20
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.49	J B 19.9U	1.99	0.17
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.19	U U	1.99	0.19
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.78	J J	1.99	0.54
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.32	U U	1.99	0.32
754-91-6	Perfluorooctane Sulfonamide (FOSA)	0.35	U	1.99	0.35
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	3.08	U	19.9	3.08
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	1.89	U	19.9	1.89
27619-97-2	6:2 FTS	4.07	J B 19.9U	19.9	1.99
39108-34-4	8:2 FTS	1.99	U U	19.9	1.99

SEP 11 2018

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-39933-1

SDG No.:

Client Sample ID: FW-FR004-B | Lab Sample ID: 320-39933-13

Matrix: Water | Lab File ID: 2018.06.24LLA_046.d

Analysis Method: 537 (modified) | Date Collected: 05/31/2018 14:20

Extraction Method: 3535 | Date Extracted: 06/07/2018 10:52

Sample wt/vol: 246.2(mL) | Date Analyzed: 06/25/2018 04:14

Con. Extract Vol.: 10.0(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 230707 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	1.42	J	2.03	0.36
2706-90-3	Perfluoropentanoic acid (PFPeA)	1.50	J	2.03	0.50
307-24-4	Perfluorohexanoic acid (PFHxA)	1.77	J	2.03	0.59
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.92	J	2.03	0.25
335-67-1	Perfluorooctanoic acid (PFOA)	2.49		2.03	0.86
375-95-1	Perfluorononanoic acid (PFNA)	1.57	J	2.03	0.27
335-76-2	Perfluorodecanoic acid (PFDA)	0.31	U	2.03	0.31
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.12	U	2.03	1.12
307-55-1	Perfluorododecanoic acid (PFDoA)	0.56	U	2.03	0.56
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.32	U	2.03	1.32
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.29	U	2.03	0.29
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.72	J	2.03	0.20
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.46	J B 2.03U	2.03	0.17
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.19	U	2.03	0.19
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	1.84	J	2.03	0.55
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.32	U	2.03	0.32
754-91-6	Perfluorooctane Sulfonamide (FOSA)	0.36	U	2.03	0.36
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	3.15	U	20.3	3.15
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	1.93	U	20.3	1.93
27619-97-2	6:2 FTS	2.53	J B 20.3U	20.3	2.03
39108-34-4	8:2 FTS	2.03	U	20.3	2.03

SEP 11 2018

Initials: ER

LDC #: 42956C96
SDG #: 320-39933-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 9/5/18
Page: 1 of 1
Reviewer: 1
2nd Reviewer: 0

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537-Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	SW/A	%RSD ≤ 30%. True/ICV ≤ 30%
IV.	Continuing calibration	A	CCV ≤ 30%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	EB005, FB005
~~VII.~~	~~Surrogate spikes~~	N	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	N	
XI.	Labeled Compounds	A	
XII.	Compound quantitation RL/LOQ/LODs	SW	results < RL - J+/A
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	FW-SP003-B	320-39933-3	Water	05/31/18
2	MW-SP002-B	320-39933-4	Water	05/31/18
3	FW-FR004-B	320-39933-13	Water	05/31/18
4				
5				
6				
7				
8				

Notes:

LDC #: 49956C96

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: G

Method: LC/MS PFOS/PFOAs (EPA Method 537M)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?		✓		
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 30%	✓			
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Laboratory Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?		✓		
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VIII. Matrix spike/Matrix spike duplicates				

LDC #: 42956 96

VALIDATION FINDINGS CHECKLIST

Reviewer:
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IV. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XI. Internal standards				
Were internal standard area counts within acceptance limits?	✓			
XII. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #: 42956c96

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: 9
2nd Reviewer:

METHOD: LCMS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
Y N N/A Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?
Y N N/A Were all percent relative standard deviations (%RSD) ≤ 20%?
Y N N/A Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?

#	Date	Standard ID	Compound	Finding %RSD/r^2	Finding %D (True value)	Associated Samples	Qualifications
	6/27/18	ICAL (lowest std)	C		53.0 (≤50%)		J/UH/A (Det)

LDC #: 42956c96

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 2

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 6/7/18 **Blank analysis date:** 6/25/18
Conc. units: ng/L **Associated samples:** All U

Compound	Blank ID	Sample Identification								
	MB320-22761/1-A	1	2	3						
K	0.264			0.49/1.99	1.46/2.03					
R	8.335		4.85/20.7	4.01/19.9	2.53/20.3					

Blank extraction date: _____ **Blank analysis date:** _____ **Associated samples:** _____
Conc. units: _____

Compound	Blank ID	Sample Identification								

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: ~~42956C96~~

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: 2

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

(Y) N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: ng/L **Associated sample units:** ng/L
Sampling date: 5/31/18
Field blank type: (circle one) Trip Blank/Field Blank / Rinsate / Other:_____ Associated Samples: All

Compound	Blank ID	BK ID		Sample Identification						
	EB005	FB005		2	3					
K	0.31	0.26		0.49/1.99U	1.46/3.03U					

Blank units:_____ **Associated sample units:**_____
Sampling date:_____
Field blank type: (circle one) Field Blank / Rinsate / Other:_____ Associated Samples:_____

Compound	Blank ID	Sample Identification								

LDC #: 42956C96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: [signature]

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (2.5 std)	Recalculated RRF (2.5 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	6/22/18	PFOA (1st internal standard)	1.1686	1.1686	1.2202	1.2202	12.5	12.5
	(A8_N)		PFOS (2nd internal standard)	1.1307	1.1307	1.1375	1.1375	3.9	3.9
			(3rd internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42956C96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.06.24.028	6/25/18	PFOA (1st internal standard)	1.2202	1.199	1.199	1.7	1.7
			PFOS (2nd internal standard)	1.1375	1.175	1.175	3.3	3.3
2	2018.06.24.039	6/25/18	PFOA (1st internal standard)	1.2202	1.060	1.060	13.1	13.1
			PFOS (2nd internal standard)	1.1375	1.119	1.119	1.7	1.7
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 49560'96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: Q
2nd Reviewer: Q

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = | LCSC - LCSDC | * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-22776/

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	40.0	NA	35.81	NA	89	89				
PFOS	37.1	↓	34.45	↓	93	93				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42956c96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: 0

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1 PFOA

Conc. = $\frac{(211961)(2.5)(10.0)(1)(\quad)}{(424888)(1.202)(0.2412)(\quad)}$

= 4.24 ng/L

#	Sample ID	Compound	Reported Concentration (ng/L)	Calculated Concentration ( )	Qualification
	1	PFOA	4.24		

Site: Suffolk County Biota Sampling Evaluation
Laboratory: Eurofins, Inc., Edison, NY
Report No.: 320-40237-1
Reviewer: Stella Cuenco, Pei Geng and Christina Rink/Laboratory Data Consultants for P.W. Grosser Consulting
Date: October 18, 2019

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
CL-SP001-A	320-40237-1	Fluorinated Alkyl Substances
CL-FR001-A	320-40237-6	Fluorinated Alkyl Substances
CL-GA002-A	320-40237-11	Fluorinated Alkyl Substances
CL-FR001-AMS	320-40237-6MS	Fluorinated Alkyl Substances
CL-FR001-AMSD	320-40237-6MSD	Fluorinated Alkyl Substances

Associated QC Samples(s):
Field/Trip Blanks: None Associated
Field Duplicate pair: None Associated

The above-listed water samples were collected on May 18 through May 31, 2018 and were analyzed for fluorinated alkyl substances by method 537 modified. The data validation was performed in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,* EPA 540-R-2017-002 (January 2017), modified as necessary to accommodate the non-CLP methodologies used.

The organic data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tunes
- Initial and Continuing Calibrations
- Blanks
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS)/Standard Reference Materials (SRM) Results
- Labeled Compounds
- Field Duplicate Results
- Quantitation Limits and Data Assessment
- Sample Quantitation and Compound Identification

Overall Evaluation of Data and Potential Usability Issues

All results are usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was complete as defined under the requirements for the NYSDEC ASP category B laboratory deliverables.

Holding Times and Sample Preservation

All criteria were met.

LC/MS Tunes

All criteria were met.

Initial and Continuing Calibrations

All criteria were met.

Blanks

Contamination was detected in the associated fluorinated alkyl substances method blank samples. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Blank ID	Compound	Level Detected	Action Level	Associated Samples
MB 320-230549/1-A	Perfluorobutanoic acid	0.000265 mg/Kg	RL	CL-SP001-A
	Perfluorononanoic acid	0.0000616 mg/Kg	RL	CL-FR001-A
	Perfluorodecanoic acid	0.000114 mg/Kg	RL	CL-GA002-A
	Perfluorotetradecanoic acid	0.000135 mg/Kg	RL	
	Perfluorohexanesulfonic acid	0.000164 mg/Kg	RL	
	Perfluorooctanesulfonic acid	0.000251 mg/Kg	RL	
	6:2FTS	0.000513 mg/Kg	RL	

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the RL and > the Action Level, qualification of the data was not required.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
CL-SP001-A	Perfluorodecanoic acid	0.00020 mg/Kg	0.00093U mg/Kg
	Perfluorohexanesulfonic acid	0.000091 mg/Kg	0.00093U mg/Kg
	Perfluorooctanesulfonic acid	0.00014 mg/Kg	0.00093U mg/Kg
CL-FR001-A	Perfluorobutanoic acid	0.00016 mg/Kg	0.00093U mg/Kg
	Perfluorohexanesulfonic acid	0.00011 mg/Kg	0.00093U mg/Kg
CL-GA002-A	Perfluorobutanoic acid	0.00012 mg/Kg	0.00095U mg/Kg
	Perfluorononanoic acid	0.000044 mg/Kg	0.00095U mg/Kg
	Perfluorohexanesulfonic acid	0.00016 mg/Kg	0.00095U mg/Kg
	Perfluorooctanesulfonic acid	0.00052 mg/Kg	0.00095U mg/Kg

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

A field blank was not associated with this sample set. Validation action was not required on this basis.

MS/MSD Results

MS/MSD analyses were performed on sample CL-FR001-A for fluorinated alkyl substances analysis. All criteria were met.

LCS/SRM Results

The following table lists the compounds recovered outside of control limits in the fluorinated alkyl substances analysis and the resulting validation actions.

SRM ID	Compound	SRM %R (Limits)	Affected Sample	Validation Action
LCSSRM 320-2305219	Perfluorooctanesulfonic acid	84.5 (93.4-106.6)	CL-SP001-A CL-FR001-A CL-GA002-A	UJ nondetects

The perfluorooctanesulfonic acid results may be biased low due to low SRM percent recovery. The results can be used for project objectives as nondetects with estimated quantitation limits (UJ) which may have a minor impact on the data usability.

Labeled Compounds

The following table lists the labeled compounds recovered outside of control limits and the resulting actions.

Sample	Labeled Compound	%R (Limits)	Affected Compounds	Validation actions
CL-FR001-A	M2-6:2FTS	282 (25-150)	6:2FTS	UJ nondetects
	M2-8:2FTS	322 (25-150)	8:2FTS	UJ nondetects

The 6:2FTS and 8:2FTS results were estimated due to labeled compounds percent recovery exceedances. The bias cannot be determined. The results can be used for project objectives as nondetects with estimated quantitation limits (UJ) which may have a minor impact on the data usability.

Field Duplicate Results

A field duplicate pair was not associated with this sample set. Validation action was not required on this basis.

Quantitation Limits and Data Assessment

Results were reported which were below the reporting limit (RL) and above the method detection limit (MDL) in the fluorinated alkyl substances analysis. These results were qualified as estimated (J) by the laboratory.

Due to high target compound levels or difficult sample matrix, select samples were analyzed at dilutions. The following table lists the sample dilutions which were performed and the results reported. RLs were elevated accordingly.

Sample	Fluorinated Alkyl Substances Analysis Reported
CL-SP001-A CL-GA002-A	10-fold dilution for select analytes due to high target compound levels

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40237-1

SDG No.:

Client Sample ID: CL-SP001-A Lab Sample ID: 320-40237-1

Matrix: Tissue Lab File ID: 2018.07.01LLB_053.d

Analysis Method: 537 (modified) Date Collected: 05/31/2018 12:00

Extraction Method: SHAKE Date Extracted: 06/22/2018 19:24

Sample wt/vol: 1.07(g) Date Analyzed: 07/01/2018 22:13

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232017 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.000093	U U	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000049	U	0.00093	0.000049
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000056	U	0.00093	0.000056
335-67-1	Perfluorooctanoic acid (PFOA)	0.00011	J J	0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.000040	U U	0.00093	0.000040
335-76-2	Perfluorodecanoic acid (PFDA)	0.000068	U U	0.00093	0.000068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00020	J B 0.000093U	0.00093	0.000069
307-55-1	Perfluorododecanoic acid (PFDoA)	0.000055	U U	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.000048	U	0.00093	0.000048
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000062	U	0.00093	0.000062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.000091	J B 0.000093U	0.00093	0.000062
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000067	U U	0.00093	0.000067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.00014	J B *0.000093UJ	0.00093	0.000072
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000055	U U	0.00093	0.000055
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000066	U	0.00093	0.000066
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0061	U	0.0093	0.0061
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0018	U	0.0093	0.0018

OCT 18 2019

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40237-1

SDG No.:

Client Sample ID: CL-SP001-A DL Lab Sample ID: 320-40237-1 DL

Matrix: Tissue Lab File ID: 2018.07.05LLA_042.d

Analysis Method: 537 (modified) Date Collected: 05/31/2018 12:00

Extraction Method: SHAKE Date Extracted: 06/22/2018 19:24

Sample wt/vol: 1.07(g) Date Analyzed: 07/06/2018 09:46

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232681 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0036	U V	0.093	0.0036
39108-34-4	8:2 FTS	0.0064	U V	0.093	0.0064

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	172	*	25-150
STL02280	M2-8:2 FTS	196	*	25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40237-1

SDG No.:

Client Sample ID: CL-FR001-A Lab Sample ID: 320-40237-6

Matrix: Tissue Lab File ID: 2018.07.01LLB_060.d

Analysis Method: 537 (modified) Date Collected: 05/18/2018 12:00

Extraction Method: SHAKE Date Extracted: 06/22/2018 19:24

Sample wt/vol: 1.07(g) Date Analyzed: 07/01/2018 23:08

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232017 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00016	J B 0.00093U	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U U	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000049	U	0.00093	0.000049
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000056	U	0.00093	0.000056
335-67-1	Perfluorooctanoic acid (PFOA)	0.00010	U	0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.000040	U	0.00093	0.000040
335-76-2	Perfluorodecanoic acid (PFDA)	0.000068	U	0.00093	0.000068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.000069	U	0.00093	0.000069
307-55-1	Perfluorododecanoic acid (PFDoA)	0.000055	U	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.000048	U	0.00093	0.000048
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.000062	U	0.00093	0.000062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00011	J B 0.00093U	0.00093	0.000062
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000067	U U	0.00093	0.000067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.000072	U * UJ	0.00093	0.000072
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000055	U U	0.00093	0.000055
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000066	U	0.00093	0.000066
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0061	U	0.0093	0.0061
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0018	U	0.0093	0.0018
27619-97-2	6:2 FTS	0.00036	U UJ	0.0093	0.00036
39108-34-4	8:2 FTS	0.00064	U UJ	0.0093	0.00064

OCT 18 2019

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40237-1

SDG No.:

Client Sample ID: CL-GA002-A Lab Sample ID: 320-40237-11

Matrix: Tissue Lab File ID: 2018.07.01LLB_067.d

Analysis Method: 537 (modified) Date Collected: 06/07/2018 12:00

Extraction Method: SHAKE Date Extracted: 06/22/2018 19:24

Sample wt/vol: 1.05(g) Date Analyzed: 07/02/2018 00:03

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232017 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00012	J B 0.00095U	0.00095	0.000095
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000066	U U	0.00095	0.000066
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000050	U	0.00095	0.000050
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000057	U	0.00095	0.000057
335-67-1	Perfluorooctanoic acid (PFOA)	0.00011	J J	0.00095	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.000044	J B 0.00095U	0.00095	0.000041
335-76-2	Perfluorodecanoic acid (PFDA)	0.000070	U U	0.00095	0.000070
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.000070	U	0.00095	0.000070
307-55-1	Perfluorododecanoic acid (PFDoA)	0.000056	U	0.00095	0.000056
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.000049	U	0.00095	0.000049
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000095	U	0.00095	0.000095
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00016	J B 0.00095U	0.00095	0.000063
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000069	U U	0.00095	0.000069
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.00052	J B *0.0009SUJ	0.00095	0.000073
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000056	U U	0.00095	0.000056
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000068	U	0.00095	0.000068
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0062	U	0.0095	0.0062
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U	0.0095	0.0019

OCT 18 2019

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40237-1

SDG No.:

Client Sample ID: CL-GA002-A DL Lab Sample ID: 320-40237-11 DL

Matrix: Tissue Lab File ID: 2018.07.05LLA_055.d

Analysis Method: 537 (modified) Date Collected: 06/07/2018 12:00

Extraction Method: SHAKE Date Extracted: 06/22/2018 19:24

Sample wt/vol: 1.05(g) Date Analyzed: 07/06/2018 11:28

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232681 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00063	U	0.0095	0.00063
27619-97-2	6:2 FTS	0.0037	U	0.095	0.0037
39108-34-4	8:2 FTS	0.0065	U	0.095	0.0065

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02116	13C2 PFTeDA	27		25-150
STL02279	M2-6:2 FTS	131		25-150
STL02280	M2-8:2 FTS	155	*	25-150

OCT 18 2019

Initials: CR

LDC #: 42956D96
SDG #: 320-40237-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 9/6/18
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537-Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	RSDs ≤ 30%. %Rec / ICV = 30%
IV.	Continuing calibration	A	CCV ≤ 30%
V.	Laboratory Blanks	SW A	
VI.	Field blanks	N	
~~VII.~~	~~Surrogate spikes~~	N	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	SW	LCS, SRM
X.	Field duplicates	N	
XI.	Labeled Compounds	SW	
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	CL-SP001-A (1/10x)	320-40237-1	Tissue	05/31/18
2	CL-FR001-A	320-40237-6	Tissue	06/18/18
3	CL-GA002-A (1/10x)	320-40237-11	Tissue	06/07/18
4	CL-FR001-AMS	320-40237-6MS	Tissue	06/18/18
5	CL-FR001-AMSD	320-40237-6MSD	Tissue	06/18/18
6				
7				
8				

Notes:

LDC #: 42961D76

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 1Q
2nd Reviewer:

Method: LC/MS PFOS/PFOAs (EPA Method 537M)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. LC/MS instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 30%	✓			
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Laboratory Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓	~~✓~~	~~✓~~	
VI. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?			✓	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VIII. Matrix spike/Matrix spike duplicates				

LDC #: 40956D96

VALIDATION FINDINGS CHECKLIST

Page: 4 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IV. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			SRM
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XI. Internal standards				
Were internal standard area counts within acceptance limits?		✓		
XII. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #: 42956D96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFCs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 06/22/18 **Blank analysis date:** 07/01/18
Conc. units: mg/Kg **Associated samples:** All

Compound	Blank ID	Sample Identification						
	MB 320-230549/1-A	1	2	3				
P	0.000265		0.00016/0.00093U	0.00012/0.00095U				
D	0.0000616			0.000044/0.00095U				
F	0.000114	0.00020/0.00093U						
I	0.000135							
K	0.000164	0.000091/0.00093U	0.00011/0.00093U	0.00016/0.00095U				
M	0.000251	0.00014/0.00093U		0.00052/0.00095U				
R	0.000513							
	<RL							

Blank extraction date: **Blank analysis date:**
Conc. units: **Associated samples:**

Compound	Blank ID	Sample Identification						
	<RL							

LDC #: 42456D96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

[✓ Y] N N/A Was a LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	LCS/LCSD ID	Compound	~~LCS~~ SRM %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	LCSSRM 320-230219	M	84.5 (93.4-106.6)	( )	( )	All (ND)	J/UJ/P
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		
			( )	( )	( )		

LDC #: ~~42660B6~~

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 0

METHOD: LC/MS PFAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

~~Y~~ N N/A Were all internal standard area counts within 50-150% limits?

Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1	M2-6:2FTS	172 (25-150)		No Qual (NDX)
			M2-8:2FTS	196		
		2 (ND)	M2-6:2FTS	282		J/UJ/A (R) (S)
			M2-8:2FTS	322		
		3	M2-8:2FTS	155		No Qual (NDX)
		MB320-23549/1-A	M2-6:2FTS	199 (25-150)		J/UJ/A
			M2-8:2FTS	314		
			13C4-PFBA	10		
		4 (MS)	13C2-PFTeDA	24 (25-150)		No Qual
			M2-6:2FTS	250		
			M2-8:2FTS	285		
		5 (MSD)	M2-6:2FTS	256		
			M2-8:2FTS	285		
		13PFOA not in 2-3. No ass'd TCL				

LDC #: 42956D96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: 2

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (2.5 std)	Recalculated RRF (2.5 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	6/29/18	PFBA (1st internal standard)	1.0109	1.0109	1.0174	1.0174	4.9	4.9
	(A8_N)		PFOS (2nd internal standard)	1.1612	1.1612	1.1628	1.1628	3.0	3.0
			(3rd internal standard)						
2	ICAL	7/5/18	PFBA (1st internal standard)	1.0130	1.0130	1.0214	1.0214	6.4	6.4
	(A8_N)		PFOS (2nd internal standard)	1.1768	1.1768	1.1681	1.1681	4.6	4.6
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42956D96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.07.01.049	7/1/18	PFBA	(1st internal standard)	1.0174	0.9710	0.9710	4.6	4.6
			PFOS	(2nd internal standard)	1.1628	1.128	1.128	3.0	3.0
2	2018.07.01.059	7/1/18	PFBA	(1st internal standard)	1.0174	0.997	0.997	2.0	2.0
			PFOS	(2nd internal standard)	1.1628	1.157	1.157	0.5	0.5
3	2018.07.05.038	7/6/18	PFBA	(1st internal standard)	1.0214	1.000	1.000	2.1	2.1
			PFOS	(2nd internal standard)	1.1681	1.185	1.185	1.5	1.5
4	2018.07.05.049	7/6/18	PFBA	(1st internal standard)	1.0214	0.9853	0.9853	3.5	3.5
			PFOS	(2nd internal standard)	1.1681	1.112	1.112	4.8	4.8

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 4/5

Compound	Spike Added (ng/L)		Sample Concentration (ng/L)	Spiked Sample Concentration (ng/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
PFOA	0.00982	0.0101	ND	0.00862	0.00930	88	88	92	92	8	8
PFOS	0.00910	0.00937	V	0.00833	0.00880	91	91	94	94	6	6

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-330549

Compound	Spike Added (MS/D		Spike Concentration (MS/D		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
~~PFOA~~	0.0100	NA	0.00957	NA	96	96				
PFOS	0.00928	V	0.00823	V	89	89				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42956D9V

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: SJ
2nd reviewer: [signature]

METHOD: LC/MS PFAS (EPA Method 537M)

(Y) N N/A Were all reported results recalculated and verified for all level IV samples?
(Y) N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, PFOS

Conc. = $\frac{(24911)(2.39)(10)(\quad)(\quad)}{(3524261)(1.1628)(1.07)(1000)}$

= 0.000136 ng/kg

#	Sample ID	Compound	Reported Concentration (ng/kg)	Calculated Concentration (ng/kg)	Qualification
	1	PFOS	0.00014	0.00014	-

Site: Suffolk County Biota Sampling Evaluation
Laboratory: Eurofins, Edison, NY
Report No.: 320-40241-1
Reviewer: Stella Cuenco, Pei Geng, and Christina Rink/Laboratory Data Consultants for P.W. Grosser Consulting
Date: October 18, 2019

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
AE-CR001-A	320-40241-11	Fluorinated Alkyl Substances
AE-CR001-B	320-40241-12	Fluorinated Alkyl Substances
AE-CR001-C	320-40241-13	Fluorinated Alkyl Substances
AE-CR001-D	320-40241-14	Fluorinated Alkyl Substances
AE-CR002-D	320-40241-23	Fluorinated Alkyl Substances

Associated QC Samples(s):
Field/Trip Blanks: None Associated
Field Duplicate pair: None Associated

The above-listed tissue samples were collected on May 30 through June 6, 2018 and were analyzed for fluorinated alkyl substances by method 537 modified. The data validation was performed in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,* EPA 540-R-2017-002 (January 2017), modified as necessary to accommodate the non-CLP methodologies used.

The organic data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tunes
- Initial and Continuing Calibrations
- Blanks
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS)/Standard Reference Materials (SRM) Results
- Labeled Compounds
- Field Duplicate Results
- Moisture Content
- Quantitation Limits and Data Assessment
- Sample Quantitation and Compound Identification

Overall Evaluation of Data and Potential Usability Issues

All results are usable as reported or usable with minor qualification due to laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was complete as defined under the requirements for the NYSDEC ASP category B laboratory deliverables.

Holding Times and Sample Preservation

All criteria were met.

LC/MS Tunes

All criteria were met.

Initial and Continuing Calibrations

All criteria were met.

Blanks

Contamination was detected in the associated fluorinated alkyl substances method blank samples. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Blank ID	Compound	Level Detected	Action Level	Associated Samples
MB 320-230329/1-A	Perfluorononanoic acid	0.0000613 mg/Kg	RL	AE-CR001-A
	Perfluorohexanesulfonic acid	0.0000777 mg/Kg	RL	AE-CR001-B
	6:2FTS	0.000528 mg/Kg	RL	AE-CR001-C
				AE-CR001-D

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the RL and > the Action Level, qualification of the data was not required.

6:2FTS was detected in samples AE-CR001-B and AE-CR001-C at less than the RL. Using professional judgment, no data were qualified for these samples due to 20X dilution performed to this compound.

A field blank was not associated with this sample set. Validation action was not required on this basis.

MS/MSD Results

MS/MSD analyses were not associated with this sample set. Validation action was not required on this basis.

LCS/SRM Results

The following table lists the compounds recovered outside of control limits in the fluorinated alkyl substances analysis and the resulting validation actions.

SRM ID	Compound	SRM %R (Limits)	Affected Sample	Validation Action
LCSSRM 320-230337	Perfluorooctanesulfonic acid	93.3 (93.4-106.6)	AE-CR002-D	J detects

The perfluorooctanesulfonic acid result may be biased low due to low SRM percent recovery. The result can be used for project objectives as an estimated value (J) which may have a minor impact on the data usability.

Labeled Compounds

All criteria were met.

Field Duplicate Results

A field duplicate pair was not associated with this sample set. Validation action was not required on this basis.

Moisture Content

All criteria were met.

Quantitation Limits and Data Assessment

Results were reported which were below the reporting limit (RL) and above the method detection limit (MDL) in the fluorinated alkyl substances analysis. These results were qualified as estimated (J) by the laboratory.

Due to high target compound levels or difficult sample matrix, select samples were analyzed at dilutions. The following table lists the sample dilutions which were performed and the results reported. RLs were elevated accordingly.

Sample	Fluorinated Alkyl Substances Analysis Reported
AE-CR001-A AE-CR001-D	10-fold dilution for select analytes due to high target compound levels
AE-CR001-B AE-CR001-C AE-CR002-D	20-fold dilution for select analytes due to high target compound levels

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40241-1

SDG No.:

Client Sample ID: AE-CR001-A Lab Sample ID: 320-40241-11

Matrix: Tissue Lab File ID: 2018.07.01LLB_023.d

Analysis Method: 537 (modified) Date Collected: 06/06/2018 10:30

Extraction Method: SHAKE Date Extracted: 06/21/2018 16:53

Sample wt/vol: 0.98(g) Date Analyzed: 07/01/2018 18:18

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232013 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00088	J J	0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000070	U U	0.0010	0.000070
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000053	U	0.0010	0.000053
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000061	U	0.0010	0.000061
335-67-1	Perfluorooctanoic acid (PFOA)	0.00014	J J	0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.0015	B	0.0010	0.000044
335-76-2	Perfluorodecanoic acid (PFDA)	0.00046	J J	0.0010	0.000074
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.011		0.0010	0.000076
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00040	J J	0.0010	0.000060
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00056	J J	0.0010	0.000052
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U U	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0013	B	0.0010	0.000067
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00030	J J	0.0010	0.000073
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.028		0.0010	0.000079
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.0010		0.0010	0.000060
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000072	U U	0.0010	0.000072
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0066	U	0.010	0.0066
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0020	U	0.010	0.0020

OCT 18 2019

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40241-1

SDG No.:

Client Sample ID: AE-CR001-A DL Lab Sample ID: 320-40241-11 DL

Matrix: Tissue Lab File ID: 2018.07.02LLBB_022.d

Analysis Method: 537 (modified) Date Collected: 06/06/2018 10:30

Extraction Method: SHAKE Date Extracted: 06/21/2018 16:53

Sample wt/vol: 0.98(g) Date Analyzed: 07/03/2018 05:01

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232191 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00067	U	0.010	0.00067
27619-97-2	6:2 FTS	0.0040	U	0.10	0.0040
39108-34-4	8:2 FTS	0.0069	U	0.10	0.0069

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02116	13C2 PFTeDA	32		25-150
STL02279	M2-6:2 FTS	154	*	25-150
STL02280	M2-8:2 FTS	187	*	25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40241-1

SDG No.:

Client Sample ID: AE-CR001-B Lab Sample ID: 320-40241-12

Matrix: Tissue Lab File ID: 2018.07.01LLB_024.d

Analysis Method: 537 (modified) Date Collected: 06/06/2018 10:32

Extraction Method: SHAKE Date Extracted: 06/21/2018 16:53

Sample wt/vol: 0.99(g) Date Analyzed: 07/01/2018 18:26

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232013 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0019		0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.00015	J	0.0010	0.000070
307-24-4	Perfluorohexanoic acid (PFHxA)	0.00039	J	0.0010	0.000053
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000080	J	0.0010	0.000061
335-67-1	Perfluorooctanoic acid (PFOA)	0.00036	J	0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.0014	B	0.0010	0.000043
335-76-2	Perfluorodecanoic acid (PFDA)	0.00029	J	0.0010	0.000074
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0066		0.0010	0.000075
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00020	J	0.0010	0.000060
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00035	J	0.0010	0.000052
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00045	J	0.0010	0.000067
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0019	B	0.0010	0.000067
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00022	J	0.0010	0.000073
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.030		0.0010	0.000078
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.0010		0.0010	0.000060
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000072	U	0.0010	0.000072
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0066	U	0.010	0.0066
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0020	U	0.010	0.0020

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40241-1

SDG No.:

Client Sample ID: AE-CR001-B DL Lab Sample ID: 320-40241-12 DL

Matrix: Tissue Lab File ID: 2018.07.04LLA_027.d

Analysis Method: 537 (modified) Date Collected: 06/06/2018 10:32

Extraction Method: SHAKE Date Extracted: 06/21/2018 16:53

Sample wt/vol: 0.99(g) Date Analyzed: 07/04/2018 06:59

Con. Extract Vol.: 10.00(mL) Dilution Factor: 20

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232418 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.012	J D B J	0.20	0.0079
39108-34-4	8:2 FTS	0.014	U U	0.20	0.014

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	103		25-150
STL02280	M2-8:2 FTS	148		25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40241-1

SDG No.:

Client Sample ID: AE-CR001-C Lab Sample ID: 320-40241-13

Matrix: Tissue Lab File ID: 2018.07.01LLB_025.d

Analysis Method: 537 (modified) Date Collected: 06/06/2018 10:34

Extraction Method: SHAKE Date Extracted: 06/21/2018 16:53

Sample wt/vol: 1.00(g) Date Analyzed: 07/01/2018 18:34

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232013 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00089	J	0.0010	0.00010
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000069	U	0.0010	0.000069
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000052	U	0.0010	0.000052
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000060	U	0.0010	0.000060
335-67-1	Perfluorooctanoic acid (PFOA)	0.00022	J	0.0010	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.0029	B	0.0010	0.000043
335-76-2	Perfluorodecanoic acid (PFDA)	0.00044	J	0.0010	0.000073
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0082		0.0010	0.000074
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00027	J	0.0010	0.000059
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00032	J	0.0010	0.000051
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00037	J	0.0010	0.000066
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00010	U	0.0010	0.00010
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0019	B	0.0010	0.000066
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00023	J	0.0010	0.000072
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.039		0.0010	0.000077
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00075	J	0.0010	0.000059
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000071	U	0.0010	0.000071
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0065	U	0.010	0.0065
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0020	U	0.010	0.0020

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40241-1

SDG No.:

Client Sample ID: AE-CR001-C DL Lab Sample ID: 320-40241-13 DL

Matrix: Tissue Lab File ID: 2018.07.05LLA_020.d

Analysis Method: 537 (modified) Date Collected: 06/06/2018 10:34

Extraction Method: SHAKE Date Extracted: 06/21/2018 16:53

Sample wt/vol: 1.00(g) Date Analyzed: 07/05/2018 17:56

Con. Extract Vol.: 10.00(mL) Dilution Factor: 20

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232613 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.012	J D B J	0.20	0.0078
39108-34-4	8:2 FTS	0.014	U U	0.20	0.014

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	129		25-150
STL02280	M2-8:2 FTS	175	*	25-150

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40241-1

SDG No.:

Client Sample ID: AE-CR001-D Lab Sample ID: 320-40241-14

Matrix: Tissue Lab File ID: 2018.07.01LLB_028.d

Analysis Method: 537 (modified) Date Collected: 06/06/2018 10:36

Extraction Method: SHAKE Date Extracted: 06/21/2018 16:53

Sample wt/vol: 1.01(g) Date Analyzed: 07/01/2018 18:58

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232013 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0018		0.00099	0.000099
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000068	J	0.00099	0.000068
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000051	U	0.00099	0.000051
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000059	U	0.00099	0.000059
335-67-1	Perfluorooctanoic acid (PFOA)	0.00026	J	0.00099	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.0022	B	0.00099	0.000043
335-76-2	Perfluorodecanoic acid (PFDA)	0.00075	J	0.00099	0.000072
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.024		0.00099	0.000073
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00038	J	0.00099	0.000058
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00038	J	0.00099	0.000050
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00044	J	0.00099	0.000065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000099	U	0.00099	0.000099
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0014	B	0.00099	0.000065
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00058	J	0.00099	0.000071
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.067		0.00099	0.000076
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.0038		0.00099	0.000058
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000070	U	0.00099	0.000070
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0064	U	0.0099	0.0064
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U	0.0099	0.0019

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40241-1

SDG No.:

Client Sample ID: AE-CR001-D DL Lab Sample ID: 320-40241-14 DL

Matrix: Tissue Lab File ID: 2018.07.02LLBB_025.d

Analysis Method: 537 (modified) Date Collected: 06/06/2018 10:36

Extraction Method: SHAKE Date Extracted: 06/21/2018 16:53

Sample wt/vol: 1.01(g) Date Analyzed: 07/03/2018 05:25

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232191 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 FTS	0.0039	U V	0.099	0.0039
39108-34-4	8:2 FTS	0.0067	U V	0.099	0.0067

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	155	*	25-150
STL02280	M2-8:2 FTS	191	*	25-150

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Initials: CR

FORM I 537 (modified)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40241-1

SDG No.:

Client Sample ID: AE-CR002-D Lab Sample ID: 320-40241-23

Matrix: Tissue Lab File ID: 2018.07.01LLB_044.d

Analysis Method: 537 (modified) Date Collected: 05/30/2018 10:06

Extraction Method: SHAKE Date Extracted: 06/21/2018 18:03

Sample wt/vol: 1.01(g) Date Analyzed: 07/01/2018 21:03

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 232015 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00080	J J	0.00099	0.000099
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000068	U U	0.00099	0.000068
307-24-4	Perfluorohexanoic acid (PFHxA)	0.0027		0.00099	0.000051
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000059	U U	0.00099	0.000059
335-67-1	Perfluorooctanoic acid (PFOA)	0.00056	J J	0.00099	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.0020	B	0.00099	0.000043
335-76-2	Perfluorodecanoic acid (PFDA)	0.00084	J J	0.00099	0.000072
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.017	B	0.00099	0.000073
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00046	J J	0.00099	0.000058
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00040	J J	0.00099	0.000050
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00032	J J	0.00099	0.000065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000099	U U	0.00099	0.000099
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0041		0.00099	0.000065
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00043	J J	0.00099	0.000071
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.037	* J	0.00099	0.000076
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.0059		0.00099	0.000058
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000070	U U	0.00099	0.000070
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0064	U U	0.0099	0.0064

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40241-1

SDG No.:

Client Sample ID: AE-CR002-D Lab Sample ID: 320-40241-23

Matrix: Tissue Lab File ID: 2018.07.09LLB_008.d

Analysis Method: 537 (modified) Date Collected: 05/30/2018 10:06

Extraction Method: SHAKE Date Extracted: 06/21/2018 18:03

Sample wt/vol: 1.01(g) Date Analyzed: 07/09/2018 19:58

Con. Extract Vol.: 10.00(mL) Dilution Factor: 20

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 233100 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.039	U	0.20	0.039
27619-97-2	6:2 FTS	0.0077	U	0.20	0.0077
39108-34-4	8:2 FTS	0.013	U	0.20	0.013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02117	d5-NEtFOSAA	126		25-150
STL02279	M2-6:2 FTS	155	*	25-150
STL02280	M2-8:2 FTS	164	*	25-150

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Initials: CR

LDC #: 42956E96
SDG #: 320-40241-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 9/5/18
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537-Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤35%, %R/ICV≤30%
IV.	Continuing calibration	A	CCV≤30%
V.	Laboratory Blanks	SW/A	
VI.	Field blanks	N	
~~VII.~~	~~Surrogate spikes~~	N	
VIII.	Matrix spike/Matrix spike duplicates	~~A~~	~~insufficient sample~~
IX.	Laboratory control samples	SW	LCS/D, SRM
X.	Field duplicates	N	
XI.	Labeled Compounds	N	
XII.	Compound quantitation RL/LOQ/LODs	SW	Results<RL-Note/A
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	AE-CR001-A (1/10x)	320-40241-11	Tissue	06/06/18
2	AE-CR001-B (1/20x)	320-40241-12	Tissue	06/06/18
3	AE-CR001-C ↓	320-40241-13	Tissue	06/06/18
4	AE-CR001-D (1/10x)	320-40241-14	Tissue	06/06/18
5 2	AE-CR002-D (1/20x)	320-40241-23	Tissue	05/30/18
6				
7				
8				

Notes:

1	MB 320-230329						
2	↓ -230337						

LDC #: 42956Z96

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer:

Method: LC/MS PFOS/PFOAs (EPA Method 537M)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 35%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) < 30%	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) < 30%	✓			
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Laboratory Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓	✓		
VI. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?			✓	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VIII. Matrix spike/Matrix spike duplicates				

LDC #: 42956296

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: 6

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IV. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			SRM
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XI. Internal standards				
Were internal standard area counts within acceptance limits?		✓		
XII. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #: 42956E96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JL
2nd Reviewer: CS

METHOD: LC/MS PFCs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?

Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?

Y N N/A Was a method blank performed with each extraction batch?

Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 06/21/18 **Blank analysis date:** 07/01/18

Conc. units: mg/Kg **Associated samples:** 1-4

Compound	Blank ID	(20X)	(20X)	Sample Identification				
	MB 320-230329/1-A	2	3					
D	0.0000613							
K	0.0000777							
R	0.000528	0.012	0.012	< RL but 20X dilution performed due to this cpd. No qual using pof judgment				
	<RL							

Blank extraction date: 06/21/18 **Blank analysis date:** 07/01/18

Conc. units: mg/Kg **Associated samples:** 5

Compound	Blank ID	Sample Identification						
	MB 320-230337/1-A							
D	0.0000870							
F	0.0000792							
	<RL							

LDC #: [illegible]-10

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: q
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

[✓ Y] N N/A Was a LCS required?

[✓ Y] N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	LCS/LCSD ID	Compound	~~LCS~~ SRM %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	LCSSRM	M	93.3 (93.4-106.6)	( )	( )	5. MP (dets)	J/UJ/P
	320-230337		( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

LDC #: 43956296

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 9
2nd Reviewer: 9

METHOD: LC/MS PFAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

Y (N) N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (ND)	M2-6:2FTS	154 (25-150)		No Qual (10X)
			M2-8:2FTS	187		
		3 (ND)	↓	175		(20X)
		4 (ND)	M2-6:2FTS	155		(10X)
			M2-8:2FTS	191		
		5 (ND)	↓	155		(20X)
				164		
		MB 320-23032 9/A	↓	370		J/UJ/F
				410		
		13PFOA	out in	some Spl.	No ass'd TCL.	

LDC #: 42956E96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: 9

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (2.5 std)	Recalculated RRF (2.5 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	6/29/18	PFBA (1st internal standard)	1.0109	1.0109	1.0174	1.0174	4.9	4.9
	(A8_N)		PFOS (2nd internal standard)	1.1612	1.1612	1.1628	1.1628	3.0	3.0
			(3rd internal standard)						
2	ICAL	7/5/18	PFBA (1st internal standard)	1.0130	1.0130	1.0214	1.0214	6.4	6.4
	(A8_N)		PFOS (2nd internal standard)	1.1768	1.1768	1.1681	1.1681	4.6	4.6
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42956E96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 9
2nd Reviewer: 2

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.07.01.005	7/1/18	PFBA	(1st internal standard)	1.0174	0.9924	0.9924	2.5	2.5
			PFOS	(2nd internal standard)	1.1628	1.143	1.143	1.7	1.7
2	2018.07.01.016	7/1/18	PFBA	(1st internal standard)	1.0174	1.015	1.015	0.2	0.2
			PFOS	(2nd internal standard)	1.1628	1.155	1.155	0.6	0.6
3	2018.07.01.027	7/1/18	PFBA	(1st internal standard)	1.0174	0.9709	0.9709	4.6	4.6
			PFOS	(2nd internal standard)	1.1628	1.141	1.141	1.9	1.9
4	2018.07.01.037	7/1/18	PFBA	(1st internal standard)	1.0174	1.002	1.002	1.5	1.5
			PFOS	(2nd internal standard)	1.1628	1.146	1.146	1.4	1.4

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42956E96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 4
2nd Reviewer: 2

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.07.02.016	7/2/18	PFBA	(1st internal standard)	1.0174	1.007	1.007	1.0	1.0
			PFOS	(2nd internal standard)	1.1628	1.159	1.159	0.3	0.3
2	2018.07.05.014	7/5/18	PFBA	(1st internal standard)	1.0214	0.9759	0.9759	4.5	4.5
			PFOS	(2nd internal standard)	1.1681	1.085	1.085	7.1	7.1
3	2018.07.09.005	7/9/18	PFBA	(1st internal standard)	1.0214	0.9803	0.9803	4.0	4.0
			PFOS	(2nd internal standard)	1.1681	1.122	1.122	3.9	3.9
4									

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = | LCSC - LCSDC | * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-230329

Compound	Spike Added (MSS)		Spike Concentration (MSS)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFBA	0.0100	NA	0.00979	NA	98	98				
PFOS	0.00978	V	0.00870	V	89	89				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 40965E96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: A
2nd reviewer: A

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 2, PFBA:

Conc. = $\frac{(381644)(2.5)(10)(1)(\quad)}{(510787)(1.0174)(0.99)(1030)(\quad)}$

= 0.00185 ng/g

#	Sample ID	Compound	Reported Concentration ng/g	Calculated Concentration ( )	Qualification
	2	PFBA	0.0019		

Site: Suffolk County Biota Sampling Evaluation
Laboratory: TestAmerica, Inc., Edison, NY
Report No.: 320-40365-1
Reviewer: Pei Geng and Christina Rink/Laboratory Data Consultants for P.W. Grosser Consulting
Date: September 7, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
FB007	320-40365-1	Fluorinated Alkyl Substances

Associated QC Samples(s):
Field/Trip Blanks: FB007
Field Duplicate pair: None Associated

The above-listed water sample was collected on June 11, 2018 and was analyzed for fluorinated alkyl substances by method 537 modified. The data validation was performed in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,* EPA 540-R-2017-002 (January 2017), modified as necessary to accommodate the non-CLP methodologies used.

The organic data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tunes
- Initial and Continuing Calibrations
- Blanks
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Labeled Compounds
- Field Duplicate Results
- Quantitation Limits and Data Assessment
- Sample Quantitation and Compound Identification

Overall Evaluation of Data and Potential Usability Issues

All results are usable as reported or usable with minor qualification due to laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was complete as defined under the requirements for the NYSDEC ASP category B laboratory deliverables.

Holding Times and Sample Preservation

All criteria were met.

LC/MS Tunes

All criteria were met.

Initial and Continuing Calibrations

All criteria were met.

Blanks

Contamination was detected in the associated fluorinated alkyl substances method blank samples. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Blank ID	Compound	Level Detected	Action Level	Associated Samples
MB 320-229812/1-A	Perfluorobutanoic acid	0.435 ng/L	RL	FB007
	Perfluorohexanesulfonic acid	0.279 ng/L	RL	

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the RL and > the Action Level, qualification of the data was not required.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
FB007	Perfluorobutanoic acid	0.78 ng/L	1.82U ng/L
	Perfluorohexanesulfonic acid	0.27 ng/L	1.82U ng/L

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

Contamination was detected in the field blank sample FB007 for fluorinated alkyl substances analysis. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Field Blank ID	Compound	Level Detected	Action Level	Associated Samples
FB007	Perfluorobutanoic acid	0.78 ng/L	RL	No associated samples
	Perfluorohexanesulfonic acid	0.27 ng/L	RL	in this SDG

MS/MSD Results

MS/MSD analyses were not associated with this sample set. Validation action was not required on this basis.

LCS Results

All criteria were met.

Labeled Compounds

All criteria were met.

Field Duplicate Results

A field duplicate pair was not associated with this sample set. Validation action was not required on this basis.

Quantitation Limits and Data Assessment

Results were reported which were below the reporting limit (RL) and above the method detection limit (MDL) in the fluorinated alkyl substances analysis. These results were qualified as estimated (J) by the laboratory.

Dilutions were not required for fluorinated alkyl substances analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-40365-1

SDG No.:

Client Sample ID: FB007 | Lab Sample ID: 320-40365-1

Matrix: Water | Lab File ID: 2018.06.29LLC_072.d

Analysis Method: 537 (modified) | Date Collected: 06/11/2018 11:00

Extraction Method: 3535 | Date Extracted: 06/19/2018 11:06

Sample wt/vol: 274.6(mL) | Date Analyzed: 06/30/2018 15:29

Con. Extract Vol.: 10(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 231925 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.78	J B 1.82U	1.82	0.32
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.45	U U	1.82	0.45
307-24-4	Perfluorohexanoic acid (PFHxA)	0.53	U	1.82	0.53
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.23	U	1.82	0.23
335-67-1	Perfluorooctanoic acid (PFOA)	0.77	U	1.82	0.77
375-95-1	Perfluorononanoic acid (PFNA)	0.25	U	1.82	0.25
335-76-2	Perfluorodecanoic acid (PFDA)	0.28	U	1.82	0.28
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.00	U	1.82	1.00
307-55-1	Perfluorododecanoic acid (PFDoA)	0.50	U	1.82	0.50
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.18	U	1.82	1.18
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.26	U	1.82	0.26
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.18	U	1.82	0.18
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.27	J B 1.82U	1.82	0.15
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.17	U U	1.82	0.17
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.49	U	1.82	0.49
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.29	U	1.82	0.29
754-91-6	Perfluorooctane Sulfonamide (FOSA)	0.32	U	1.82	0.32
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	2.82	U	18.2	2.82
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	1.73	U	18.2	1.73
27619-97-2	6:2 FTS	1.82	U	18.2	1.82
39108-34-4	8:2 FTS	1.82	U	18.2	1.82

SEP 11 2018

Initials: CK

LDC #: 42956F96
SDG #: 320-40365-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 9/5/18
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537-Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD<35%. True/ICV=30%
IV.	Continuing calibration	A	CCV=30%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	FB=1
~~VII.~~	~~Surrogate spikes~~	N	
VIII.	Matrix spike/Matrix spike duplicates	N	Insufficient sp/
IX.	Laboratory control samples	A	LCS/0
X.	Field duplicates	N	
XI.	Labeled Compounds	A	
XII.	Compound quantitation RL/LOQ/LODs	SW	ug/L FB < RL - Lots/A
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	FB007	320-40365-1	Water	06/11/18
2				
3				
4				
5				
6				
7				
8				

Notes:

LDC #: 43956F96

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: Q
2nd Reviewer: Q

Method: LC/MS PFOS/PFOAs (EPA Method 537M)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?	✓			
IIIb.Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 30%	✓			
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Laboratory Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?			✓	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VIII. Matrix spike/Matrix spike duplicates				

LDC #: 42956F96

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 9
2nd Reviewer: a

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
IV. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XI. Internal standards				
Were internal standard area counts within acceptance limits?	✓			
XII. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #: 43954F96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 9
2nd Reviewer: [signature]

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 6/19/18 **Blank analysis date:** 6/20/18
Conc. units: NG/L **Associated samples:** All U

Compound	Blank ID	Sample Identification								
	MB320-29812/1-A	1								
PFOS	0.435		0.78/1.82							
PFOA	0.279		0.27/1.82							

Blank extraction date: _____ **Blank analysis date:** _____ **Associated samples:** _____
Conc. units: _____

Compound	Blank ID	Sample Identification								

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 42956F96

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: 0

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: ng/L **Associated sample units:** —
Sampling date: 6/11/18
Field blank type: (circle one) Trip Blank/Field Blank / Rinsate / Other:_____ Associated Samples: None

Compound	Blank ID	Sample Identification								
	1									
P	0.78									
K	0.27									

Blank units:_____ **Associated sample units:**_____
Sampling date:_____
Field blank type: (circle one) Field Blank / Rinsate / Other:_____ Associated Samples:_____

Compound	Blank ID	Sample Identification								

LDC #: 42956F96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: 2

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (2.5 std)	Recalculated RRF (2.5 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	6/29/18	PFBA (1st internal standard)	1.0109	1.0109	1.0174	1.0174	4.9	4.9
	(A8_N)		PFOS (2nd internal standard)	1.1612	1.1612	1.1628	1.1628	3.0	3.0
			(3rd internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42956F96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.06.29.068	6/30/18	PFBA (1st internal standard)	1.0174	1.000	1.000	1.7	1.7
			PFOS (2nd internal standard)	1.1628	1.109	1.109	4.6	4.6
2								
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42956746

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: A
2nd Reviewer: A

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-229812

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	40.0	40.0	38.53	35.65	96	96	89	89	8	8
PFOS	37.1	37.1	32.30	31.96	87	87	86	86	1	1

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: ~~42954F96~~

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: R
2nd reviewer: C

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, ~~PFBA~~

Conc. = $\frac{(5752)(2.50)(10)(1)(\quad)}{(661064)(1.0174)(0.7146)(\quad)(\quad)}$

= 0.78 ng/L

#	Sample ID	Compound	Reported Concentration (ng/L)	Calculated Concentration ( )	Qualification
	1	~~PFBA~~	0.78		

Site: Suffolk County Biota Sampling Evaluation
Laboratory: TestAmerica, Inc., Edison, NY
Report No.: 320-40607-1
Reviewer: Pei Geng and Christina Rink/Laboratory Data Consultants for P.W. Grosser Consulting
Date: September 10, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
FB009	320-40607-1	Fluorinated Alkyl Substances

Associated QC Samples(s):
Field/Trip Blanks: FB009
Field Duplicate pair: None Associated

The above-listed water sample was collected on June 21, 2018 and was analyzed for fluorinated alkyl substances by method 537 modified. The data validation was performed in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,* EPA 540-R-2017-002 (January 2017), modified as necessary to accommodate the non-CLP methodologies used.

The organic data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tunes
- Initial and Continuing Calibrations
- Blanks
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Labeled Compounds
- Field Duplicate Results
- Quantitation Limits and Data Assessment
- Sample Quantitation and Compound Identification

Overall Evaluation of Data and Potential Usability Issues

All results are usable as reported or usable with minor qualification due to laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was complete as defined under the requirements for the NYSDEC ASP category B laboratory deliverables.

Holding Times and Sample Preservation

All criteria were met.

LC/MS Tunes

All criteria were met.

Initial and Continuing Calibrations

All criteria were met.

Blanks

Contamination was detected in the associated fluorinated alkyl substances method blank samples. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Blank ID	Compound	Level Detected	Action Level	Associated Samples
MB 320-2325031/1-A	Perfluorobutanoic acid	0.452 ng/L	RL	FB009
	Perfluorohexanesulfonic acid	0.320 ng/L	RL	

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the RL and > the Action Level, qualification of the data was not required.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
FB009	Perfluorobutanoic acid	0.59 ng/L	1.75U ng/L
	Perfluorohexanesulfonic acid	0.22 ng/L	1.75U ng/L

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

Contamination was detected in the field blank sample FB009 for fluorinated alkyl substances analysis. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Field Blank ID	Compound	Level Detected	Action Level	Associated Samples
FB009	Perfluorobutanoic acid	0.59 ng/L	RL	No associated samples
	Perfluorohexanesulfonic acid	0.22 ng/L	RL	in this SDG

MS/MSD Results

MS/MSD analyses were not associated with this sample set. Validation action was not required on this basis.

LCS Results

All criteria were met.

Labeled Compounds

All criteria were met.

Field Duplicate Results

A field duplicate pair was not associated with this sample set. Validation action was not required on this basis.

Quantitation Limits and Data Assessment

Results were reported which were below the reporting limit (RL) and above the method detection limit (MDL) in the fluorinated alkyl substances analysis. These results were qualified as estimated (J) by the laboratory.

Dilutions were not required for fluorinated alkyl substances analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-40607-1

SDG No.:

Client Sample ID: FB009 | Lab Sample ID: 320-40607-1

Matrix: Water | Lab File ID: 2018.07.07LLA_021.d

Analysis Method: 537 (modified) | Date Collected: 06/21/2018 14:00

Extraction Method: 3535 | Date Extracted: 07/05/2018 09:56

Sample wt/vol: 286.2(mL) | Date Analyzed: 07/07/2018 17:19

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 232822 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.59	J B 1.75U	1.75	0.31
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.43	U U	1.75	0.43
307-24-4	Perfluorohexanoic acid (PFHxA)	0.51	U	1.75	0.51
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.22	U	1.75	0.22
335-67-1	Perfluorooctanoic acid (PFOA)	0.74	U	1.75	0.74
375-95-1	Perfluorononanoic acid (PFNA)	0.24	U	1.75	0.24
335-76-2	Perfluorodecanoic acid (PFDA)	0.27	U	1.75	0.27
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.96	U	1.75	0.96
307-55-1	Perfluorododecanoic acid (PFDoA)	0.48	U	1.75	0.48
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.14	U	1.75	1.14
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.25	U	1.75	0.25
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.17	U	1.75	0.17
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.22	J B 1.75U	1.75	0.15
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.17	U U	1.75	0.17
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.47	U	1.75	0.47
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.28	U	1.75	0.28
754-91-6	Perfluorooctane Sulfonamide (FOSA)	0.31	U	1.75	0.31
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	2.71	U	17.5	2.71
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	1.66	U	17.5	1.66
27619-97-2	6:2 FTS	1.75	U	17.5	1.75
39108-34-4	8:2 FTS	1.75	U	17.5	1.75

SEP 11 2018

Initials: CZ

LDC #: 42956G96 **VALIDATION COMPLETENESS WORKSHEET** Date: 9/5/18
SDG #: 320-40607-1 Category B Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: R
2nd Reviewer: R

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537-Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	~~RSD~~ <35%. RRF/ICV <30%
IV.	Continuing calibration	A	CCV <30%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	FB=1
~~VII.~~	~~Surrogate spikes~~	N	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient sp
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Labeled Compounds	A	
XII.	Compound quantitation RL/LOQ/LODs	SW	results < RL - J flags/A
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	FB009	320-40607-1	Water	06/21/18
2				
3				
4				
5				
6				
7				
8				

Notes:

LDC #: 42956T96

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: Q
2nd Reviewer: Q

Method: LC/MS PFOS/PFOAs (EPA Method 537M)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?	✓			
IIIb.Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 30%	✓			
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Laboratory Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?			✓	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VIII. Matrix spike/Matrix spike duplicates				

LDC #: 42956E96

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: 2

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
IV. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XI. Internal standards				
Were internal standard area counts within acceptance limits?	✓			
XII. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #: 42956F96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 9
2nd Reviewer: C

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 7/5/18 **Blank analysis date:** 7/7/18
Conc. units: ng/L **Associated samples:** #11

Compound	Blank ID	Sample Identification								
MB 320-23503 1/1-A		1								
P	0.452		0.59/1.75 U							
K	0.320		0.25/1.75 U							

Blank extraction date: _____ **Blank analysis date:** _____ **Associated samples:** _____
Conc. units: _____

Compound	Blank ID	Sample Identification								

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: ~~46956E96~~

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

(Y) N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: ng/L **Associated sample units:** —
Sampling date: 4/24/18
Field blank type: (circle one) Trip Blank/Field Blank / Rinsate / Other:_____ Associated Samples: —

Compound	Blank ID	Sample Identification								
	1									
P	0.59									
K	0.22									

Blank units:_____ **Associated sample units:**_____
Sampling date:_____
Field blank type: (circle one) Field Blank / Rinsate / Other:_____ Associated Samples:_____

Compound	Blank ID	Sample Identification								

LDC #: 42956F96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (2.5 std)	Recalculated RRF (2.5 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	7/5/18	PFBA (1st internal standard)	1.0130	1.0130	1.0214	1.0214	6.4	6.4
	(A8_N)		PFOS (2nd internal standard)	1.1768	1.1768	1.1681	1.1681	4.6	4.6
			(3rd internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42956G96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.07.07.005	7/7/18	PFBA	(1st internal standard)	1.0214	0.9738	0.9738	4.7	4.7
			PFOS	(2nd internal standard)	1.1681	1.091	1.091	6.6	6.6
2	2018.07.07.016	7/7/18	PFBA	(1st internal standard)	1.0214	1.017	1.017	0.4	0.4
			PFOS	(2nd internal standard)	1.1681	1.190	1.190	1.9	1.9
3									
4									

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-23503

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
~~PFBA~~	40.0	40.0	36.41	36.75	91	91	92	92	1	1
~~PFOS~~	37.1	37.1	34.98	33.67	94	94	91	91	4	4

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: ~~42956F96~~

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: 0

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1 , PFBA

Conc. = $\frac{(42006)(0.5)(10.0)(1)(\quad)}{(61160)(1.024)(0.862)(\quad)(\quad)}$

= 0.59 ng/L

#	Sample ID	Compound	Reported Concentration (ng/L)	Calculated Concentration ( )	Qualification
	1	PFBA	0.59		

Site: Suffolk County Biota Sampling Evaluation
Laboratory: Eurofins, Edison, NY
Report No.: 320-40641-1
Reviewer: Stella Cuenco, Pei Geng, and Christina Rink/Laboratory Data Consultants for P.W. Grosser Consulting
Date: October 18, 2019

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
AE-GA002-A	320-40641-1	Fluorinated Alkyl Substances
AE-GA002-B	320-40641-2	Fluorinated Alkyl Substances
AE-GA002-E	320-40641-5	Fluorinated Alkyl Substances
AE-GA002-G	320-40641-7	Fluorinated Alkyl Substances
AE-FR-003-B	320-40641-12	Fluorinated Alkyl Substances
AE-FR-003-C	320-40641-13	Fluorinated Alkyl Substances
AE-GA002-AMS	320-40641-1MS	Fluorinated Alkyl Substances
AE-GA002-AMSD	320-40641-1MSD	Fluorinated Alkyl Substances

Associated QC Samples(s):
Field/Trip Blanks: None Associated
Field Duplicate pair: None Associated

The above-listed tissue samples were collected on June 8 through June 13, 2018 and were analyzed for fluorinated alkyl substances by method 537 modified. The data validation was performed in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,* EPA 540-R-2017-002 (January 2017), modified as necessary to accommodate the non-CLP methodologies used.

The organic data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tunes
- Initial and Continuing Calibrations
- Blanks
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS)/Standard Reference Material (SRM) Results
- Labeled Compounds
- Field Duplicate Results
- Moisture Content
- Quantitation Limits and Data Assessment
- Sample Quantitation and Compound Identification

Overall Evaluation of Data and Potential Usability Issues

All results are usable as reported or usable with minor qualification due to sample matrix or laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was complete as defined under the requirements for the NYSDEC ASP category B laboratory deliverables.

Holding Times and Sample Preservation

All criteria were met.

LC/MS Tunes

All criteria were met.

Initial and Continuing Calibrations

Initial calibration:

All criteria were met.

Continuing calibration:

Date	Instrument ID	Compound	CC %D	Associated Samples	Affected Compound		Validation Action
07/19/18	2018.07.19_043	M2-8:2FTS	74.8	AE-FR-003-C	8:2FTS	XX	UJ nondetects

X = Initial calibration (IC) relative standard deviation (%RSD) > 20; estimate (J/UJ) positive and nondetect results.
XX = Continuing calibration (CC) percent difference (%D) > 20; estimate (J/UJ) positive and nondetect results.
SS = Second source verification percent difference (%D) > 30; estimate (J/UJ) positive and nondetect results.
+ = Response factor (RRF) < validation criteria; estimate (J/UJ) positive and nondetect results.

The 8:2FTS result was estimated due to continuing calibration exceedance. The bias cannot be determined. The result can be used for project objectives as a nondetect with an estimated quantitation limit (UJ) which may have a minor impact on the data usability.

Blanks

Contamination was detected in the associated fluorinated alkyl substances method blank samples. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Blank ID	Compound	Level Detected	Action Level	Associated Samples
MB 320-233298/1-A	Perfluoroundecanoic acid	0.000109 mg/Kg	RL	AE-GA002-A
	Perfluorohexanesulfonic acid	0.0000890 mg/Kg	RL	AE-GA002-B
	6:2FTS	0.000827 mg/Kg	RL	AE-GA002-E
				AE-GA002-G
				AE-FR-003-B
				AE-FR-003-C

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the RL and > the Action Level, qualification of the data was not required.

Qualified sample results are listed in the table below.

Sample ID	Compound	Level Detected	Validation Action
AE-GA002-A	Perfluoroundecanoic acid	0.00049 mg/Kg	0.00094U mg/Kg
AE-GA002-B	Perfluoroundecanoic acid	0.00050 mg/Kg	0.00096U mg/Kg
AE-GA002-E	Perfluoroundecanoic acid	0.00050 mg/Kg	0.00098U mg/Kg
	6:2FTS	0.00064 mg/Kg	0.0098U mg/Kg
AE-GA002-G	Perfluoroundecanoic acid	0.00056 mg/Kg	0.00096U mg/Kg
AE-FR-003-B	Perfluorohexanesulfonic acid	0.00043 mg/Kg	0.00093U mg/Kg
AE-FR-003-C	Perfluoroundecanoic acid	0.00073 mg/Kg	0.00093U mg/Kg
	Perfluorohexanesulfonic acid	0.00037 mg/Kg	0.00093U mg/Kg

These results can be used for project objectives as nondetects (U) which may have a minor impact on the data usability.

A field blank was not associated with this sample set. Validation action was not required on this basis.

MS/MSD Results

MS/MSD analyses were performed in sample AE-GA002-A in fluorinated alkyl substances analysis. All criteria were met.

LCS/SRM Results

All criteria were met.

Labeled Compounds

The following table lists the labeled compounds recovered outside of control limits and the resulting actions.

Sample	Labeled Compound	%R (Limits)	Affected Compounds	Validation actions
AE-GA002-A	M2-6:2FTS	200 (25-150)	6:2FTS	UJ nondetects
	M2-8:2FTS	235 (25-150)	8:2FTS	UJ nondetects
AE-GA002-B	M2-6:2FTS	228 (25-150)	6:2FTS	UJ nondetects
	M2-8:2FTS	291 (25-150)	8:2FTS	UJ nondetects
AE-GA002-E	M2-6:2FTS	261 (25-150)	6:2FTS	UJ nondetects
	M2-8:2FTS	231 (25-150)	8:2FTS	UJ nondetects
AE-GA002-G	M2-6:2FTS	205 (25-150)	6:2FTS	UJ nondetects
	M2-8:2FTS	335 (25-150)	8:2FTS	UJ nondetects
AE-FR-003-B	M2-6:2FTS	191 (25-150)	6:2FTS	UJ nondetects
	M2-8:2FTS	250 (25-150)	8:2FTS	UJ nondetects
AE-FR-003-C	M2-6:2FTS	295 (25-150)	6:2FTS	UJ nondetects

The 6:2FTS and 8:2FTS results for the samples listed above were estimated due to labeled compounds percent recovery exceedances. The bias cannot be determined. The results can be used for project objectives as nondetects with estimated quantitation limits (UJ) which may have a minor impact on the data usability.

Field Duplicate Results

A field duplicate pair was not associated with this sample set. Validation action was not required on this basis.

Moisture Content

All criteria were met.

Quantitation Limits and Data Assessment

Results were reported which were below the reporting limit (RL) and above the method detection limit (MDL) in the fluorinated alkyl substances analysis. These results were qualified as estimated (J) by the laboratory.

Dilutions were not required for fluorinated alkyl substances analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40641-1

SDG No.:

Client Sample ID: AE-GA002-A Lab Sample ID: 320-40641-1

Matrix: Tissue Lab File ID: 2018.07.18LLB_032.d

Analysis Method: 537 (modified) Date Collected: 06/13/2018 09:00

Extraction Method: SHAKE Date Extracted: 07/10/2018 15:57

Sample wt/vol: 1.06(g) Date Analyzed: 07/18/2018 19:02

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 234758 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00099		0.00094	0.000094
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000065	U U	0.00094	0.000065
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000049	U	0.00094	0.000049
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000057	U	0.00094	0.000057
335-67-1	Perfluorooctanoic acid (PFOA)	0.00036	J J	0.00094	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00023	J	0.00094	0.000041
335-76-2	Perfluorodecanoic acid (PFDA)	0.00030	J	0.00094	0.000069
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00049	J B U	0.00094	0.000070
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00047	J J	0.00094	0.000056
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00078	J	0.00094	0.000048
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00086	J	0.00094	0.000062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00016	J	0.00094	0.000094
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0068	B	0.00094	0.000062
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000068	U U	0.00094	0.000068
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.036		0.00094	0.000073
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00023	J J	0.00094	0.000056
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000067	U U	0.00094	0.000067
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0061	U	0.0094	0.0061
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0018	U	0.0094	0.0018
27619-97-2	6:2 FTS	0.00037	U UJ	0.0094	0.00037
39108-34-4	8:2 FTS	0.00064	U UJ	0.0094	0.00064

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40641-1

SDG No.:

Client Sample ID: AE-GA002-B Lab Sample ID: 320-40641-2

Matrix: Tissue Lab File ID: 2018.07.19LLC_027.d

Analysis Method: 537 (modified) Date Collected: 06/13/2018 09:05

Extraction Method: SHAKE Date Extracted: 07/10/2018 15:57

Sample wt/vol: 1.04(g) Date Analyzed: 07/19/2018 20:14

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 235043 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0056		0.00096	0.000096
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000066	U J	0.00096	0.000066
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000050	U	0.00096	0.000050
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000058	U	0.00096	0.000058
335-67-1	Perfluorooctanoic acid (PFOA)	0.00023	J J	0.00096	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00019	J	0.00096	0.000041
335-76-2	Perfluorodecanoic acid (PFDA)	0.00025	J	0.00096	0.000070
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00050	J B 0.00096U	0.00096	0.000071
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00038	J J	0.00096	0.000057
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00048	J	0.00096	0.000049
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00091	J	0.00096	0.000063
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00014	J	0.00096	0.000096
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0031	B	0.00096	0.000063
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00023	J J	0.00096	0.000069
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00011	J J	0.00096	0.000057
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000068	U U	0.00096	0.000068
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0063	U	0.0096	0.0063
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U	0.0096	0.0019
27619-97-2	6:2 FTS	0.00038	U UJ	0.0096	0.00038
39108-34-4	8:2 FTS	0.00065	U UJ	0.0096	0.00065

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40641-1

SDG No.:

Client Sample ID: AE-GA002-B DL Lab Sample ID: 320-40641-2 DL

Matrix: Tissue Lab File ID: 2018.07.20LLBBB_064.d

Analysis Method: 537 (modified) Date Collected: 06/13/2018 09:05

Extraction Method: SHAKE Date Extracted: 07/10/2018 15:57

Sample wt/vol: 1.04(g) Date Analyzed: 07/21/2018 01:03

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 235302 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.16	D	0.0096	0.00074

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	84		25-150

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40641-1

SDG No.:

Client Sample ID: AE-GA002-E Lab Sample ID: 320-40641-5

Matrix: Tissue Lab File ID: 2018.07.19LLC_033.d

Analysis Method: 537 (modified) Date Collected: 06/13/2018 09:20

Extraction Method: SHAKE Date Extracted: 07/10/2018 15:57

Sample wt/vol: 1.02(g) Date Analyzed: 07/19/2018 21:01

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 235043 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0013		0.00098	0.000098
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000068	U → UJ	0.00098	0.000068
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000051	U	0.00098	0.000051
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000059	U	0.00098	0.000059
335-67-1	Perfluorooctanoic acid (PFOA)	0.00023	J → J	0.00098	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00013	J	0.00098	0.000042
335-76-2	Perfluorodecanoic acid (PFDA)	0.00019	J	0.00098	0.000072
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00050	J B → 0.00098U	0.00098	0.000073
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00051	J → J	0.00098	0.000058
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00076	J	0.00098	0.000050
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00067	J	0.00098	0.000065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00013	J	0.00098	0.000098
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0018	B	0.00098	0.000065
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00016	J → J	0.00098	0.000071
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.014		0.00098	0.000075
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.000071	J → J	0.00098	0.000058
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000070	U → UJ	0.00098	0.000070
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0064	U	0.0098	0.0064
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U	0.0098	0.0019
27619-97-2	6:2 FTS	0.00064	J B → 0.00098UJ	0.0098	0.00038
39108-34-4	8:2 FTS	0.00067	U → UJ	0.0098	0.00067

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40641-1

SDG No.:

Client Sample ID: AE-GA002-G Lab Sample ID: 320-40641-7

Matrix: Tissue Lab File ID: 2018.07.19LLC_035.d

Analysis Method: 537 (modified) Date Collected: 06/08/2018 09:30

Extraction Method: SHAKE Date Extracted: 07/10/2018 15:57

Sample wt/vol: 1.04(g) Date Analyzed: 07/19/2018 21:17

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 235043 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.0016		0.00096	0.000096
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000066	U J	0.00096	0.000066
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000050	U	0.00096	0.000050
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000058	U	0.00096	0.000058
335-67-1	Perfluorooctanoic acid (PFOA)	0.00030	J J	0.00096	0.00011
375-95-1	Perfluorononanoic acid (PFNA)	0.00024	J	0.00096	0.000041
335-76-2	Perfluorodecanoic acid (PFDA)	0.00030	J	0.00096	0.000070
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00056	J B 0.00096J	0.00096	0.000071
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00048	J J	0.00096	0.000057
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.000049	U J	0.00096	0.000049
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00074	J J	0.00096	0.000063
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000096	U J	0.00096	0.000096
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0017	B	0.00096	0.000063
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.00016	J J	0.00096	0.000069
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.016		0.00096	0.000074
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00013	J J	0.00096	0.000057
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000068	U J	0.00096	0.000068
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0063	U	0.0096	0.0063
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0019	U	0.0096	0.0019
27619-97-2	6:2 FTS	0.00038	U UJ	0.0096	0.00038
39108-34-4	8:2 FTS	0.00065	U UJ	0.0096	0.00065

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Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40641-1

SDG No.:

Client Sample ID: AE-FR-003-B Lab Sample ID: 320-40641-12

Matrix: Tissue Lab File ID: 2018.07.19LLC_040.d

Analysis Method: 537 (modified) Date Collected: 06/13/2018 09:05

Extraction Method: SHAKE Date Extracted: 07/10/2018 15:57

Sample wt/vol: 1.08(g) Date Analyzed: 07/19/2018 21:56

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 235043 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00096		0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U V	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000048	U V	0.00093	0.000048
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.00013	J J	0.00093	0.000056
335-67-1	Perfluorooctanoic acid (PFOA)	0.0012		0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00068	J J	0.00093	0.000040
335-76-2	Perfluorodecanoic acid (PFDA)	0.00029	J J	0.00093	0.000068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.0012	B	0.00093	0.000069
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00043	J J	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00042	J ↓	0.00093	0.000047
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00033	J ↓	0.00093	0.000061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U V	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00043	J B 0.00093U	0.00093	0.000061
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000090	J J	0.00093	0.000067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.059		0.00093	0.000071
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00011	J J	0.00093	0.000055
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000066	U V	0.00093	0.000066
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0060	U ↓	0.0093	0.0060
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0018	U ↓	0.0093	0.0018
27619-97-2	6:2 FTS	0.00036	U UJ	0.0093	0.00036
39108-34-4	8:2 FTS	0.00063	U UJ	0.0093	0.00063

OCT 18 2019

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40641-1

SDG No.:

Client Sample ID: AE-FR-003-C Lab Sample ID: 320-40641-13

Matrix: Tissue Lab File ID: 2018.07.19LLC_060.d

Analysis Method: 537 (modified) Date Collected: 06/13/2018 09:10

Extraction Method: SHAKE Date Extracted: 07/10/2018 15:57

Sample wt/vol: 1.07(g) Date Analyzed: 07/20/2018 00:33

Con. Extract Vol.: 10.00(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 235043 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	0.00049	J J	0.00093	0.000093
2706-90-3	Perfluoropentanoic acid (PFPeA)	0.000064	U U	0.00093	0.000064
307-24-4	Perfluorohexanoic acid (PFHxA)	0.000049	U	0.00093	0.000049
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.000056	U	0.00093	0.000056
335-67-1	Perfluorooctanoic acid (PFOA)	0.00052	J J	0.00093	0.00010
375-95-1	Perfluorononanoic acid (PFNA)	0.00041	J	0.00093	0.000040
335-76-2	Perfluorodecanoic acid (PFDA)	0.00029	J	0.00093	0.000068
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.00073	J B 0.000930	0.00093	0.000069
307-55-1	Perfluorododecanoic acid (PFDoA)	0.00040	J J	0.00093	0.000055
72629-94-8	Perfluorotridecanoic acid (PFTriA)	0.00048	J	0.00093	0.000048
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.00039	J	0.00093	0.000062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.000093	U U	0.00093	0.000093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00037	J B 0.000930	0.00093	0.000062
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.000067	U U	0.00093	0.000067
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.018		0.00093	0.000072
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.00014	J J	0.00093	0.000055
754-91-6	Perfluorooctanesulfonamide (FOSA)	0.000066	U U	0.00093	0.000066
2355-31-9	N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0061	U	0.0093	0.0061
2991-50-6	N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.0018	U	0.0093	0.0018
27619-97-2	6:2 FTS	0.00036	U J	0.0093	0.00036

OCT 18 2019

Initials: CR

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Sacramento Job No.: 320-40641-1

SDG No.:

Client Sample ID: AE-FR-003-C DL Lab Sample ID: 320-40641-13 DL

Matrix: Tissue Lab File ID: 2018.07.19LLC_044.d

Analysis Method: 537 (modified) Date Collected: 06/13/2018 09:10

Extraction Method: SHAKE Date Extracted: 07/10/2018 15:57

Sample wt/vol: 1.07(g) Date Analyzed: 07/19/2018 22:28

Con. Extract Vol.: 10.00(mL) Dilution Factor: 10

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 235043 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
39108-34-4	8:2 FTS	0.0064	U UJ	0.093	0.0064

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02280	M2-8:2 FTS	232	*	25-150

OCT 18 2019

Initials: CR

FORM I 537 (modified)

LDC #: 42956H96
SDG #: 320-40641-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 9/6/18
Page: 1 of 1
Reviewer: 9
2nd Reviewer: 9

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537-Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A ~~SW~~ A	RSD ≤ 35%. TME/ICV ≤ 30%
IV.	Continuing calibration	SW	CCV ≤ 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
~~VII.~~	~~Surrogate spikes~~	N	
VIII.	Matrix spike/Matrix spike duplicates	SW	7/8: M YOR out > 4x SA
IX.	Laboratory control samples	A	LCS, SRM
X.	Field duplicates	N	
XI.	Labeled Compounds	SW	
XII.	Compound quantitation RL/LOQ/LODs	SW	results < RL - Idet = A
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	AE-GA002-A	320-40641-1	Tissue	06/13/18
2	AE-GA002-B (1/10x) high epd	320-40641-2	Tissue	06/13/18
3	AE-GA002-E	320-40641-5	Tissue	06/13/18
4	AE-GA002-G	320-40641-7	Tissue	06/08/18
5	AE-FR-003-B	320-40641-12	Tissue	06/13/18
6	AE-FR-003-C (1/10x)	320-40641-13	Tissue	06/13/18
7	AE-GA002-AMS	320-40641-1MS	Tissue	06/13/18
8	AE-GA002-AMSD	320-40641-1MSD	Tissue	06/13/18
9				
10				

Notes:

LDC #: 40956H96 VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: 0

Method: LCMS (EPA Method 537M)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ ~~20~~ 25%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?			✓	
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard	✓	✓		
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration ≤ 30%?		✓		
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 42956H96

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: 2

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?.			✓	
XI. Labeled standards				
Were internal standard area counts within ± 50% of the associated calibration standard?		✓		
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 1H, 1H, 2H, 2H-perfluorooctane sulfonate (6:2FTS)			
S. 1H, 1H, 2H, 2H-perfluorodecane sulfonate (8:2 FTS)			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			
V. 1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)			

LDC #: ~~42956496~~

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 8

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a continuing calibration standard analyzed after every 10 injections for each instrument?

Y (N) N/A Were all continuing calibration percent differences (%D) ≤30 %?

#	Date	Standard ID	Compound	Finding %D (Limit: <30.0%)	Finding RRF (Limit:)	Associated Samples	Qualifications
	~~7/19/18~~	~~2018.07.19.04~~	~~X~~				
	7/19/18	2018.07.19.04	M2-8:2FTS	74.8		6 (NO)	Y/N/P (8:2 FTS)

CONCAL-LCMS.wpd

LDC #: 42956H96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: M
2nd Reviewer: C

METHOD: LC/MS PFCs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 07/10/18 **Blank analysis date:** 07/18/18

Conc. units: mg/Kg **Associated samples:** All

Compound	Blank ID	Sample Identification						
	MB 320-233298/1-A	1	2	3	4	5	6	
F	0.000109	0.00049/0.00094U	0.00050/0.00096U	0.00050/0.00098U	0.00056/0.00096U		0.00073/0.00093U	
K	0.0000890					0.00043/0.00093U	0.00037/0.00093U	
R	0.000827			0.00064/0.0098U				
	<RL							

LDC #~~49564496~~

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer: CV
2nd Reviewer: CA

METHOD: LC/MS PFAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all internal standard area counts within 50-150% limits?

Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (ND)	M2-6:2FTS	200 (25-150)		J/UJ/P (R)
			M2-8:2FTS	235		(S)
		2 (ND)		228		
				291		
		3 (ND)		261		
				231		
		~~4 (ND)~~				
		4 (ND)		205		
				335		
		5 (ND)		191		
				250		
		6 (ND)	M2-6:2FTS	295		(R)
		6 (ND)	M2-8:2FTS	232		No qual (10x)
		MB 320-33298/14	13C4-PFBA	5 (25-150)		J/UJ/P
			13C5-PFPeA	10		
			13C2-PFHxA	15		
			13C4-PFHpA	19		
			13C4-PFOA	22		
		T, 8 (MS/MSD)	IS	out		No qual

LDC #: 42956H96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: [signature]
2nd Reviewer: [signature]

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (2.5 std)	Recalculated RRF (2.5 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	7/11/18	PFBA (1st internal standard)	0.9987	0.9987	0.9856	0.9856	1.8	1.8
	(A8_N)		PFOS (2nd internal standard)	1.1467	1.1467	1.1332	1.1332	2.3	2.3
			(3rd internal standard)						
2	ICAL	7/19/18	PFBA (1st internal standard)	0.9973	0.9973	1.0041	1.0041	3.6	3.6
	(A8_N)		PFOS (2nd internal standard)	1.1399	1.1399	1.1836	1.1836	8.1	8.1
			(3rd internal standard)						
3	ICAL	7/20/18	PFBA (1st internal standard)	0.9911	0.9911	0.9892	0.9892	2.5	2.5
	(A8_N)		PFOS (2nd internal standard)	1.1307	1.1307	1.1618	1.1618	4.5	4.5
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42956H96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.07.18.027	7/18/18	PFBA	(1st internal standard)	0.9856	0.9690	0.9690	1.7	1.7
			PFOS	(2nd internal standard)	1.1332	1.130	1.130	0.3	0.3
2	2018.07.19.021	7/19/18	PFBA	(1st internal standard)	1.0041	0.9818	0.9818	2.2	2.2
			PFOS	(2nd internal standard)	1.1836	1.106	1.106	6.6	6.6
3	2018.07.19.032	7/19/18	PFBA	(1st internal standard)	1.0041	0.9938	0.9938	1.0	1.0
			PFOS	(2nd internal standard)	1.1836	1.156	1.156	2.3	2.3
4	2018.07.19.043	7/19/18	PFBA	(1st internal standard)	1.0041	0.9560	0.9560	4.8	4.8
			PFOS	(2nd internal standard)	1.1836	1.141	1.141	3.6	3.6

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42956H96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.07.19.054	7/19/18	PFBA	(1st internal standard)	1.0041	0.9736	0.9736	3.0	3.0
			PFOS	(2nd internal standard)	1.1836	1.197	1.197	1.1	1.1
2	2018.07.20.063	7/21/18	PFBA	(1st internal standard)	0.9892	0.9891	0.9891	0.0	0.0
			PFOS	(2nd internal standard)	1.1618	1.134	1.134	2.4	2.4
3									
4									

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 7/8

Compound	Spike Added (MS5)		Sample Concentration (MS5)	Spiked Sample Concentration (MS7)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
PFBA	0.00909	0.00935	0.00099	0.0109	0.0106	109	109	103	103	3	3
PFOS	0.00844	0.00857	0.036	0.043	0.0409	70	75	51	57	4	4

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-233298

Compound	Spike Added (MS/S)		Spike Concentration MS/S		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFBA	0.0100	NA	0.0108	NA	108	108				
PFOS	0.00998	↓	0.00941	↓	101	101				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: ~~295H96~~

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: Q
2nd reviewer: Q

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, ~~PFBA~~

Conc. = $\frac{(1)(2071)(0.5)(10)(1)}{(27176)(0.986)(1.06)(1000)}$

= 0.000937 MS/KG

#	Sample ID	Compound	Reported Concentration MS/S	Calculated Concentration ( )	Qualification
	1	~~PFBA~~	0.00099		

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

P.W. Grosser Consulting
630 Johnson Ave, Suite 7
Bohemia, NY 11716
ATTN: Ms. Heather Moran-Botta

October 10, 2018

SUBJECT: Suffolk County Firematics, Data Usability Summary Report

Dear Ms. Moran-Botta,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on September 20, 2018. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #43168:

SDG #	Fraction
320-42479-1 320-42512-1	Fluorinated Alkyl Substances

The data validation was performed under Category B guidelines using quality control summaries provided by the laboratory. The analyses were validated using the following documents, as applicable to each method:

- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, EPA 540-R-2017-002; January 2017

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink

Christina Rink
Project Manager/Senior Chemist

1,145 pages-ADV (Validate 20% per SDG) Attachment 1

DUSR Category B

LDC #43168 (P.W. Grosser Consulting - Bohemia, NY / Suffolk County Firematics Site)

LDC	SDG#	DATE REC'D	(3) DATE DUE	PFAs (537M)																															
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	320-42479-1	09/20/18	10/11/18	1	0																														
B	320-42512-1	09/20/18	10/11/18	3	0																														
Total	T/CR			4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4

Shaded cells indicate Category B validation (all other cells are Category A validation). These sample counts do not include MS, MSD, or DUP's.

L:\PW Grosser\Suffolk\43168ST.wpd

Site:	Suffolk County Firematics
Laboratory:	TestAmerica, Inc., Edison, NY
Report No.:	320-42479-1
Reviewer:	Pei Geng and Christina Rink/Laboratory Data Consultants for P.W. Grosser Consulting
Date:	October 9, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
FW-YC001-C	320-42479-2	Fluorinated Alkyl Substances

Associated QC Samples(s):
Field/Trip Blanks: EB011, FB011
Field Duplicate pair: None Associated

The above-listed water samples were collected on August 23, 2018 and were analyzed for fluorinated alkyl substances by method 537 modified. The data validation was performed in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,* EPA 540-R-2017-002 (January 2017), modified as necessary to accommodate the non-CLP methodologies used.

The organic data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tunes
- Initial and Continuing Calibrations
- Blanks
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Labeled Compounds
- Field Duplicate Results
- Quantitation Limits and Data Assessment
- Sample Quantitation and Compound Identification

Overall Evaluation of Data and Potential Usability Issues

All results are usable as reported or usable with minor qualification due to laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was complete as defined under the requirements for the NYSDEC ASP category B laboratory deliverables.

Holding Times and Sample Preservation

All technical holding time requirements were met.

LC/MS Tunes

All criteria were met.

Initial and Continuing Calibrations

All criteria were met.

Blanks

Contamination was detected in the associated pesticide method blank samples. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Blank ID	Compound	Level Detected	Action Level	Associated Samples
MB 320-244082/1-A	Perfluorohexanesulfonic acid	0.294 ng/L	RL	FW-YC001-C

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the RL and > the Action Level, qualification of the data was not required.

No samples were qualified since the associated sample results were greater than the action level.

Contamination was detected in the equipment blank EB011 and field blank sample FB011 for fluorinated alkyl substances analysis. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Field Blank ID	Compound	Level Detected	Action Level	Associated Samples
EB011	Perfluorohexanesulfonic acid	0.28 ng/L	RL	FW-YC001-C
FB011	Perfluorohexanesulfonic acid	0.24 ng/L	RL	FW-YC001-C

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.

No samples were qualified since the associated sample results were greater than the action level.

MS/MSD Results

MS/MSD analyses were not associated with this sample set. Validation action was not required on this basis.

LCS Results

All criteria were met.

Labeled Compounds

The following table lists the labeled compounds recovered outside of control limits and the resulting actions.

Sample	Labeled Compound	%R (Limits)	Affected Compounds	Validation actions
FW-YC001-C	M2-6:2FTS	185 (25-150)	6:2FTS	UJ nondetects

The 6:2FTS result was estimated due to labeled compounds percent recovery exceedance. The bias cannot be determined. The result can be used for project objectives as a nondetect with an estimated quantitation limit (UJ) which may have a minor impact on the data usability.

Field Duplicate Results

A field duplicate pair was not associated with this sample set. Validation action was not required on this basis.

Quantitation Limits and Data Assessment

Results were reported which were below the reporting limit (RL) and above the method detection limit (MDL) in the fluorinated alkyl substances analysis. These results were qualified as estimated (J) by the laboratory.

Dilutions were not required for fluorinated alkyl substances analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-42479-1

SDG No.:

Client Sample ID: FW-YC001-C | Lab Sample ID: 320-42479-2

Matrix: Water | Lab File ID: 2018.09.06LLB_040.d

Analysis Method: 537 (modified) | Date Collected: 08/23/2018 13:45

Extraction Method: 3535 | Date Extracted: 09/06/2018 03:43

Sample wt/vol: 266.8(mL) | Date Analyzed: 09/06/2018 23:11

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

Injection Volume: 20(uL) | GC Column: Acquity ID: 2.1(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 244264 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	35.2		1.87	0.33
2706-90-3	Perfluoropentanoic acid (PFPeA)	10.6		1.87	0.46
307-24-4	Perfluorohexanoic acid (PFHxA)	32.8		1.87	0.54
375-85-9	Perfluoroheptanoic acid (PFHpA)	13.4		1.87	0.23
335-67-1	Perfluorooctanoic acid (PFOA)	36.3		1.87	0.80
375-95-1	Perfluorononanoic acid (PFNA)	1.89		1.87	0.25
335-76-2	Perfluorodecanoic acid (PFDA)	0.39	J	1.87	0.29
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.03	U	1.87	1.03
307-55-1	Perfluorododecanoic acid (PFDoA)	0.52	U	1.87	0.52
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.22	U	1.87	1.22
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.27	U	1.87	0.27
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.69		1.87	0.19
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	9.52	B	1.87	0.16
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.48	J	1.87	0.18
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	12.8		1.87	0.51
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.30	U	1.87	0.30
754-91-6	Perfluorooctane Sulfonamide (FOSA)	0.57	J	1.87	0.33
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	2.90	U	18.7	2.90
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	5.46	J	18.7	1.78
27619-97-2	6:2 FTS	1.87	U	18.7	1.87
39108-34-4	8:2 FTS	1.87	U	18.7	1.87

OCT 10 2018

Initials: CR

LDC #: 43168A96
SDG #: 320-42479-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 10/8/18
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤35%. r²: True/QD≤3%. ICV≤30%
IV.	Continuing calibration	A	CCV≤30%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	FB011, EB011
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	N	
XI.	Labeled Compounds	SW	
XII.	Compound quantitation RL/LOQ/LODs	A	Results<RL - J/UJ/A
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	FW-YC001-C	320-42479-2	Water	08/23/18
2				
3				
4				
5				
6				
7				
8				

Notes:

LDC #: 43168A96 **VALIDATION FINDINGS CHECKLIST** Page: 1 of 2
Reviewer: O
2nd Reviewer: O

Method: LCMS (EPA Method 537M)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 25%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration ≤ 30%?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?	✓			
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 43163A96

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: 0

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?.			✓	
XI. Labeled standards				
Were internal standard area counts within ± 50% of the associated calibration standard?		✓		
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #: 43168A96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 9
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 8/27/18 **Blank analysis date:** 9/6/18
Conc. units: ng/L **Associated samples:** All (>RL)

Compound	Blank ID	Sample Identification								
MB 320-24408/1-A										
K	0.294									

Blank extraction date: _____ **Blank analysis date:** _____ **Associated samples:** _____
Conc. units: _____

Compound	Blank ID	Sample Identification								

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 13168A96

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: A
2nd Reviewer: A

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were field blanks identified in this SDG?

Y N N/A Were target compounds detected in the field blanks?

Blank units: ng/L **Associated sample units:** ng/L

Sampling date: 8/23/18

Field blank type: (circle one) Trip Blank/Field Blank / Rinsate / Other:_____ Associated Samples: All

Compound	Blank ID	Blk 1b	Sample Identification							
	FB011	EB011								
K	0.24	0.28								

Blank units:_____ **Associated sample units:**_____

Sampling date:_____

Field blank type: (circle one) Field Blank / Rinsate / Other:_____ Associated Samples:_____

Compound	Blank ID	Sample Identification								

LDC #: 43168A96

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer: q
2nd Reviewer: Q

METHOD: LC/MS PFAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (ND)	M2-6:2FTS	185 (25-150)		J/UJ/P (R)

LDC #: 43168A96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: C

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (2.5 std)	Recalculated RRF (2.5 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	8/28/18	PFOA (1st internal standard)	0.9894	0.9894	1.0762	1.0762	13.6	13.6
	(A9_N)		PFOS (2nd internal standard)	1.0737	1.0737	1.0551	1.0551	4.6	4.6
			(3rd internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43168A96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 9
2nd Reviewer: 2

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.09.06.027	9/6/18	PFOA	(1st internal standard)	1.0762	1.057	1.057	1.8	1.8
			PFOS	(2nd internal standard)	1.0551	1.074	1.074	1.8	1.8
2	2018.09.06.038	9/6/18	PFOA	(1st internal standard)	1.0762	1.099	1.099	2.1	2.1
			PFOS	(2nd internal standard)	1.0551	1.063	1.063	0.7	0.7
3			PFOA	(1st internal standard)					
			PFOS	(2nd internal standard)					
4			PFOA	(1st internal standard)					
			PFOS	(2nd internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 72693A96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: 9
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = | LCSC - LCSDC | * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-244082

Compound	Spike Added (ng/L)		Spike Concentration (ng/g)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	40.0	NA	39.83	NA	99	99				
PFOS	37.1	✓	34.85	✓	94	94				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43168A96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: 0

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, PFOS

Conc. = $\frac{(921865)(2.39)(10)(1)}{(6111630)(1.055)(0.7665)}$

= 12.8 ng/L

#	Sample ID	Compound	Reported Concentration (ng/L)	Calculated Concentration ( )	Qualification
	1	PFOS	12.8		

Site: Suffolk County Firematics
Laboratory: TestAmerica, Inc., Edison, NY
Report No.: 320-42512-1
Reviewer: Pei Geng and Christina Rink/Laboratory Data Consultants for P.W. Grosser Consulting
Date: October 9, 2018

Samples Reviewed and Evaluation Summary

FIELD ID	LAB ID	FRACTIONS VALIDATED
MW-CR001-C	320-42512-1	Fluorinated Alkyl Substances
FW-CR006-C	320-42512-4	Fluorinated Alkyl Substances
MW-GA002-C	320-42512-8	Fluorinated Alkyl Substances

Associated QC Samples(s):
Field/Trip Blanks: EB012, FB012
Field Duplicate pair: None Associated

The above-listed water samples were collected on August 24, 2018 and were analyzed for fluorinated alkyl substances by method 537 modified. The data validation was performed in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,* EPA 540-R-2017-002 (January 2017), modified as necessary to accommodate the non-CLP methodologies used.

The organic data were evaluated based on the following parameters:

- Data Completeness
- Holding Times and Sample Preservation
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tunes
- Initial and Continuing Calibrations
- Blanks
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results
- Laboratory Control Sample (LCS) Results
- Labeled Compounds
- Field Duplicate Results
- Quantitation Limits and Data Assessment
- Sample Quantitation and Compound Identification

Overall Evaluation of Data and Potential Usability Issues

All results are usable as reported or usable with minor qualification due to laboratory quality control outliers.

The validation findings were based on the following information.

Data Completeness

The data package was complete as defined under the requirements for the NYSDEC ASP category B laboratory deliverables.

Holding Times and Sample Preservation

All technical holding time requirements were met.

LC/MS Tunes

All criteria were met.

Initial and Continuing Calibrations

Initial calibration:

All criteria were met.

Continuing calibration:

Date	Instrument ID	Compound	CC %D	Associated Samples	Affected Compound		Validation Action
09/07/18	2018.09.07.006	M2-8:2FTS	30.6	MW-CR001-C FW-CR006-C MW-GA002-C	8:2FTS	XX	UJ nondetects

X = Initial calibration (IC) relative standard deviation (%RSD) > 35; estimate (J/UJ) positive and nondetect results.
XX = Continuing calibration (CC) percent difference (%D) > 30; estimate (J/UJ) positive and nondetect results.
SS = Second source verification percent difference (%D) > 30; estimate (J/UJ) positive and nondetect results.
+ = Response factor (RRF) < validation criteria; estimate (J/UJ) positive and nondetect results.

The 8:2FTS results were estimated due to continuing calibration exceedance. The bias cannot be determined. The results can be used for project objectives as nondetects with estimated quantitation limits (UJ) which may have a minor impact on the data usability.

Blanks

Contamination was detected in the associated pesticide method blank samples. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Blank ID	Compound	Level Detected	Action Level	Associated Samples
MB 320-244321/1-A	Perfluorohexanesulfonic acid	0.247 ng/L	RL	MW-CR001-C FW-CR006-C MW-GA002-C

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.
- If the sample concentration was > the RL and > the Action Level, qualification of the data was not required.

No samples were qualified since the associated sample results were greater than the action level.

Contamination was detected in the equipment blank EB012 and field blank sample FB012 for fluorinated alkyl substances analysis. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action Levels (ALs) were established at the reporting limit (RL) for contaminants. The following table summarizes the contamination detected.

Field Blank ID	Compound	Level Detected	Action Level	Associated Samples
EB012	Perfluorohexanesulfonic acid	0.20 ng/L	RL	MW-CR001-C FW-CR006-C MW-GA002-C
FB012	Perfluorohexanesulfonic acid	0.27 ng/L	RL	MW-CR001-C FW-CR006-C MW-GA002-C

Sample results were qualified as follows:

- If sample concentration was < the reporting limit (RL) and ≤ the Action Level, qualify the result as a nondetect (U) at the RL.
- If sample concentration was > the RL and ≤ the Action Level, qualify the result as not detected (U) at the reported concentration.

No samples were qualified since the associated sample results were greater than the action level.

MS/MSD Results

MS/MSD analyses were not associated with this sample set. Validation action was not required on this basis.

LCS Results

All criteria were met.

Labeled Compounds

All criteria were met.

Field Duplicate Results

A field duplicate pair was not associated with this sample set. Validation action was not required on this basis.

Quantitation Limits and Data Assessment

Results were reported which were below the reporting limit (RL) and above the method detection limit (MDL) in the fluorinated alkyl substances analysis. These results were qualified as estimated (J) by the laboratory.

Dilutions were not required for fluorinated alkyl substances analysis.

Sample Quantitation and Compound Identification

Calculations were spot-checked; no discrepancies were noted.

DATA VALIDATION QUALIFIERS

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-42512-1

SDG No.:

Client Sample ID: MW-CR001-C | Lab Sample ID: 320-42512-1

Matrix: Water | Lab File ID: 2018.09.07LLAAAA_010.d

Analysis Method: 537 (modified) | Date Collected: 08/24/2018 10:00

Extraction Method: 3535 | Date Extracted: 09/07/2018 05:19

Sample wt/vol: 292.4(mL) | Date Analyzed: 09/07/2018 17:36

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 244451 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	1.66	J J	1.71	0.30
2706-90-3	Perfluoropentanoic acid (PFPeA)	4.00		1.71	0.42
307-24-4	Perfluorohexanoic acid (PFHxA)	3.93		1.71	0.50
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.51	J J	1.71	0.21
335-67-1	Perfluorooctanoic acid (PFOA)	3.03		1.71	0.73
375-95-1	Perfluorononanoic acid (PFNA)	1.82		1.71	0.23
335-76-2	Perfluorodecanoic acid (PFDA)	0.27	U U	1.71	0.27
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.94	U	1.71	0.94
307-55-1	Perfluorododecanoic acid (PFDoA)	0.47	U	1.71	0.47
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.11	U	1.71	1.11
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.25	U	1.71	0.25
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.44	J J	1.71	0.17
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	4.68	B	1.71	0.15
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.16	U U	1.71	0.16
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	8.51		1.71	0.46
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.27	U U	1.71	0.27
754-91-6	Perfluorooctane Sulfonamide (FOSA)	0.30	U	1.71	0.30
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	2.65	U	17.1	2.65
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	1.62	U	17.1	1.62
27619-97-2	6:2 FTS	1.71	U	17.1	1.71
39108-34-4	8:2 FTS	1.71	U UJ	17.1	1.71

OCT 10 2018

Initials: CR

FORM I 537 (modified)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-42512-1

SDG No.:

Client Sample ID: FW-CR006-C | Lab Sample ID: 320-42512-4

Matrix: Water | Lab File ID: 2018.09.07LLAAAA_013.d

Analysis Method: 537 (modified) | Date Collected: 08/24/2018 11:00

Extraction Method: 3535 | Date Extracted: 09/07/2018 05:19

Sample wt/vol: 279.6(mL) | Date Analyzed: 09/07/2018 17:56

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 244451 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	1.44	J J	1.79	0.31
2706-90-3	Perfluoropentanoic acid (PFPeA)	3.05		1.79	0.44
307-24-4	Perfluorohexanoic acid (PFHxA)	3.34		1.79	0.52
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.12	J J	1.79	0.22
335-67-1	Perfluorooctanoic acid (PFOA)	2.36		1.79	0.76
375-95-1	Perfluorononanoic acid (PFNA)	1.51	J J	1.79	0.24
335-76-2	Perfluorodecanoic acid (PFDA)	0.28	U U	1.79	0.28
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.98	U	1.79	0.98
307-55-1	Perfluorododecanoic acid (PFDoA)	0.49	U	1.79	0.49
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.16	U	1.79	1.16
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.26	U	1.79	0.26
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.24	J J	1.79	0.18
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	3.02	B	1.79	0.15
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.17	U U	1.79	0.17
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.19		1.79	0.48
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.29	U U	1.79	0.29
754-91-6	Perfluorooctane Sulfonamide (FOSA)	0.31	U	1.79	0.31
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	2.77	U	17.9	2.77
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	1.70	U	17.9	1.70
27619-97-2	6:2 FTS	1.79	U	17.9	1.79
39108-34-4	8:2 FTS	1.79	U U	17.9	1.79

OCT 10 2018

Initials: CR

FORM I 537 (modified)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-42512-1

SDG No.:

Client Sample ID: MW-GA002-C | Lab Sample ID: 320-42512-8

Matrix: Water | Lab File ID: 2018.09.07LLAAAA_016.d

Analysis Method: 537 (modified) | Date Collected: 08/24/2018 11:45

Extraction Method: 3535 | Date Extracted: 09/07/2018 05:19

Sample wt/vol: 294.7(mL) | Date Analyzed: 09/07/2018 18:15

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 244451 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-22-4	Perfluorobutanoic acid (PFBA)	1.58	J	1.70	0.30
2706-90-3	Perfluoropentanoic acid (PFPeA)	3.80		1.70	0.42
307-24-4	Perfluorohexanoic acid (PFHxA)	4.98		1.70	0.49
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.34		1.70	0.21
335-67-1	Perfluorooctanoic acid (PFOA)	4.01		1.70	0.72
375-95-1	Perfluorononanoic acid (PFNA)	0.65	J	1.70	0.23
335-76-2	Perfluorodecanoic acid (PFDA)	0.29	J	1.70	0.26
2058-94-8	Perfluoroundecanoic acid (PFUnA)	0.93	U	1.70	0.93
307-55-1	Perfluorododecanoic acid (PFDoA)	0.47	U	1.70	0.47
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.10	U	1.70	1.10
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.25	U	1.70	0.25
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.17		1.70	0.17
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	10.8	B	1.70	0.14
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	0.62	J	1.70	0.16
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	25.7		1.70	0.46
335-77-3	Perfluorodecanesulfonic acid (PFDS)	0.27	U	1.70	0.27
754-91-6	Perfluorooctane Sulfonamide (FOSA)	0.30	U	1.70	0.30
2355-31-9	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	2.63	U	17.0	2.63
2991-50-6	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	1.61	U	17.0	1.61
27619-97-2	6:2 FTS	1.78	J	17.0	1.70
39108-34-4	8:2 FTS	1.70	U	17.0	1.70

OCT 10 2018

Initials: CR

FORM I 537 (modified)

LDC #: 43168B96
SDG #: 320-42512-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Category B

Date: 10/3/18
Page: 1 of 1
Reviewer: I
2nd Reviewer: C

METHOD: LC/MS Fluorinated Alkyl Substances (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤35%. r^2. Time TOD≤30%. ICV≤30%
IV.	Continuing calibration	SW	CCV≤30%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	EB012. FB012
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	AN	~~MS/MSD samples~~
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	N	
XI.	Labeled Compounds	A	
XII.	Compound quantitation RL/LOQ/LODs	A	results < RL ~~J flags~~
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-CR001-C	320-42512-1	Water	08/24/18
2	FW-CR006-C	320-42512-4	Water	08/24/18
3	MW-GA002-C	320-42512-8	Water	08/24/18
4				
5				
6				
7				
8				

Notes:

	MB 320-244321/1-A						

LDC #: 43168B96 VALIDATION FINDINGS CHECKLIST

Reviewer: Q
2nd Reviewer:

Method: LCMS (EPA Method 537M)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration ≤ 30%?		✓		
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?	✓			
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 43168B96

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?.			✓	
XI. Labeled standards				
Were internal standard area counts within ± 50% of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #: 43168B96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a continuing calibration standard analyzed after every 10 injections for each instrument?

Y (N) N/A Were all continuing calibration percent differences (%D) ≤30 %?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Finding RRF (Limit:)	Associated Samples	Qualifications
	9/7/18	2018.09.07.006	M2-S	30.6		All (ND)	J/UJ/P (S)

LDC #: 43168B96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 9
2nd Reviewer: a

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 9/7/18 **Blank analysis date:** 9/7/18
Conc. units: ng/L **Associated samples:** All

Compound	Blank ID	Sample Identification								
	MB 320-24432/1-A									
K	0.24 T									

Blank extraction date: _____ **Blank analysis date:** _____ **Associated samples:** _____
Conc. units: _____

Compound	Blank ID	Sample Identification								

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 43168B96

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 9

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: ng/L **Associated sample units:** ng/L
Sampling date: 8/24/18
Field blank type: (circle one) Trip Blank/Field Blank / Rinsate / Other:_____ Associated Samples: All

Compound	Blank ID	Bck ID	Sample Identification							
	ZB012	FB012								
K	0.20	0.27								

Blank units:_____ **Associated sample units:**_____
Sampling date:_____
Field blank type: (circle one) Field Blank / Rinsate / Other:_____ Associated Samples:_____

Compound	Blank ID	Sample Identification								

LDC #: 43168B96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (2.5 std)	Recalculated RRF (2.5 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	8/29/18	PFOA (1st internal standard)	1.0473	1.0473	1.1303	1.1303	9.9	9.9
	(A8_N)		PFOS (2nd internal standard)	1.1107	1.1107	1.0998	1.0998	2.0	2.0
			(3rd internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43168B96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)		Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	2018.09.17.006	9/7/18	PFOA	(1st internal standard)	1.1303	1.083	1.083	4.1	4.1
			PFOS	(2nd internal standard)	1.0998	1.087	1.087	1.2	1.2
2			PFOA	(1st internal standard)					
			PFOS	(2nd internal standard)					
3			PFOA	(1st internal standard)					
			PFOS	(2nd internal standard)					
4			PFOA	(1st internal standard)					
			PFOS	(2nd internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 72160B76

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: 9
2nd Reviewer: 9

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = | LCSC - LCSDC | * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 320-24431

Compound	Spike Added (ng/L)		Spike Concentration (ng/g)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	40.0	NA	39.25	NA	98	98				
PFOS	37.1	V	36.58	V	99	99				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43168B96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer:
2nd reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1 , PFOA

Conc. = $\frac{(150253)(2.5)(10)(1)}{(3508)(1.1303)(0.794)(\quad)}$

= 3.03 ng/L

#	Sample ID	Compound	Reported Concentration (ng/L)	Calculated Concentration ( )	Qualification
	1	PFOA	3.03		