

Your P.O. #: 30202.002.008.010101
 Your Project #: S14 INV FLD WK
 Site Location: SWMU 14
 Your C.O.C. #: STR03045

Attention: Reporting Group

TLI Solutions
 112 North Rubey Drive
 Golden, CO
 USA 80401

Report Date: 2018/02/15
 Report #: R4989243
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B823896

Received: 2018/02/01, 13:02

Sample Matrix: Water
 # Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PFOS and PFOA in water by SPE/LCMS (1)	4	2018/02/08	2018/02/09	CAM SOP-00894	EPA 537 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

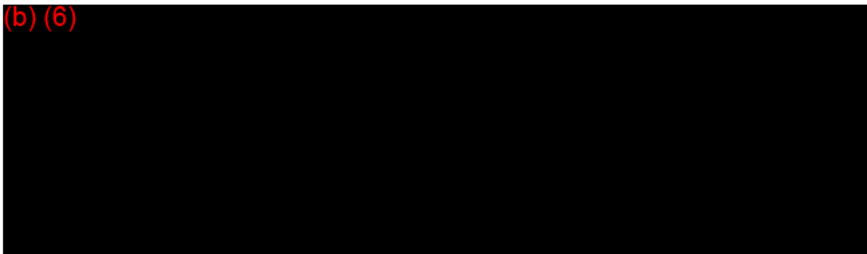
Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding in the apparent difference.

(1) Per- and polyfluoroalkyl substances (PFAS) identified in the certificate of analysis represent the extracted internal standard.



Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10 2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF ANALYSES OF WATER

Maxxam ID		GAC701		GAC702		GAC703				
Sampling Date		2018/01/29 11:30		2018/01/29 13:45		2018/01/29 12:30				
COC Number		STR03045		STR03045		STR03045				
	UNITS	290118AB1	QC Batch	290118EB1	QC Batch	LFPIEZ005A	DL	LOD	LOQ	QC Batch
Miscellaneous Parameters										
6:2 Fluorotelomer sulfonate	ug/L	0.015 U	5391181	0.015 U	5391181	0.015 U	0.0066	0.015	0.020	5391181
8:2 Fluorotelomer sulfonate	ug/L	0.015 U	5391181	0.015 U	5391181	0.015 U	0.0066	0.015	0.020	5391181
Perfluorobutanoic acid	ug/L	0.015 U	5391181	0.015 U	5391181	0.015 U	0.0055	0.015	0.020	5391181
Perfluorobutane Sulfonate (PFBS)	ug/L	0.015 U	5391181	0.015 U	5391181	0.015 U	0.0054	0.015	0.020	5391181
Perfluorodecane Sulfonate	ug/L	0.015 U	5391181	0.015 U	5391181	0.015 U	0.0060	0.015	0.020	5391181
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.015 U	5391181	0.015 U	5391181	0.015 U	0.0074	0.015	0.020	5391181
Perfluorohexanoic Acid (PFHxA)	ug/L	0.010 U	5391181	0.010 U	5391181	0.010 U	0.0035	0.010	0.020	5391181
Perfluorohexane Sulfonate (PFHxS)	ug/L	0.015 U	5391181	0.015 U	5391181	0.015 U	0.0056	0.015	0.020	5391181
Perfluorononanoic Acid (PFNA)	ug/L	0.018 U	5391181	0.018 U	5395679	0.018 U	0.0087	0.018	0.020	5391181
Perfluorooctane Sulfonamide (PFOSA)	ug/L	0.010 U	5391181	0.010 U	5391181	0.010 U	0.0034	0.010	0.020	5391181
Perfluoropentanoic Acid (PFPeA)	ug/L	0.018 U	5391181	0.018 U	5391181	0.018 U	0.0075	0.018	0.020	5391181
Perfluorotetradecanoic Acid	ug/L	0.010 U	5391181	0.010 U	5391181	0.010 U	0.0027	0.010	0.020	5391181
Perfluorotridecanoic Acid	ug/L	0.010 U	5391181	0.010 U	5391181	0.010 U	0.0038	0.010	0.020	5391181
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.010 U	5391181	0.010 U	5391181	0.010 U	0.0025	0.010	0.020	5391181
Perfluorodecanoic Acid (PFDA)	ug/L	0.015 U	5391181	0.015 U	5391181	0.015 U	0.0061	0.015	0.020	5391181
Perfluorododecanoic Acid (PFDoA)	ug/L	0.010 U	5391181	0.010 U	5391181	0.010 U	0.0050	0.010	0.020	5391181
Perfluoro-n-Octanoic Acid (PFOA)	ug/L	0.010 U	5391181	0.010 U	5391181	0.010 U	0.0033	0.010	0.020	5391181
Perfluorooctane Sulfonate (PFOS)	ug/L	0.015 U	5391181	0.015 U	5391181	0.015 U	0.0060	0.015	0.020	5391181
Surrogate Recovery (%)										
13C2-6:2 Fluorotelomer sulfonate	%	98	5391181	69	5391181	87				5391181
13C2-8:2 Fluorotelomer sulfonate	%	104	5391181	100	5391181	87				5391181
13C2-Perfluorodecanoic acid	%	95	5391181	97	5391181	100				5391181
13C2-Perfluorododecanoic acid	%	85	5391181	114	5391181	88				5391181
13C2-Perfluorohexanoic acid	%	95	5391181	101	5391181	102				5391181
13C2-perfluorotetradecanoic acid	%	84	5391181	75	5391181	72				5391181
13C2-Perfluoroundecanoic acid	%	86	5391181	118	5391181	94				5391181
13C4-Perfluorobutanoic acid	%	97	5391181	94	5391181	61				5391181
13C4-Perfluoroheptanoic acid	%	96	5391181	103	5391181	96				5391181
13C4-Perfluorooctanesulfonate	%	98	5391181	84	5391181	99				5391181
13C4-Perfluorooctanoic acid	%	97	5391181	66	5391181	102				5391181
DL = Detection Limit LOD = Limit of Detection LOQ = Limit of Quantitation QC Batch = Quality Control Batch N/A = Not Applicable										

RESULTS OF ANALYSES OF WATER

Maxxam ID		GAC701		GAC702		GAC703				
Sampling Date		2018/01/29 11:30		2018/01/29 13:45		2018/01/29 12:30				
COC Number		STR03045		STR03045		STR03045				
	UNITS	290118AB1	QC Batch	290118EB1	QC Batch	LFPIEZ005A	DL	LOD	LOQ	QC Batch
13C5-Perfluorononanoic acid	%	98	5391181	44 (1)	5395679	99				5391181
13C5-Perfluoropentanoic acid	%	93	5391181	94	5391181	107				5391181
13C8-Perfluorooctane Sulfonamide	%	86	5391181	108	5391181	85				5391181
18O2-Perfluorohexanesulfonate	%	95	5391181	106	5391181	102				5391181

DL = Detection Limit

LOD = Limit of Detection

LOQ = Limit of Quantitation

QC Batch = Quality Control Batch

N/A = Not Applicable

(1) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Laboratory spiked water resulted in satisfactory recovery of the extracted internal standard analyte. When considered together, these QC data suggest that matrix interferences may be biasing the data low. Because quantitation is performed using isotope dilution techniques, any losses of the native compound that may occur during any of the sample preparation, extraction, cleanup or determinative steps will be mirrored by a similar loss of the labeled standard, and as such can be accounted for and corrected. Therefore, the quantification of these target compounds is not affected by the low extracted internal standard analyte recovery.

RESULTS OF ANALYSES OF WATER

Maxxam ID		GAC704				
Sampling Date		2018/01/29 14:45				
COC Number		STR03045				
	UNITS	LFPIEZ001	DL	LOD	LOQ	QC Batch
Miscellaneous Parameters						
6:2 Fluorotelomer sulfonate	ug/L	0.015 U	0.0066	0.015	0.020	5391181
8:2 Fluorotelomer sulfonate	ug/L	0.015 U	0.0066	0.015	0.020	5391181
Perfluorobutanoic acid	ug/L	0.015 U	0.0055	0.015	0.020	5395679
Perfluorobutane Sulfonate (PFBS)	ug/L	0.015 U	0.0054	0.015	0.020	5391181
Perfluorodecane Sulfonate	ug/L	0.015 U	0.0060	0.015	0.020	5391181
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.015 U	0.0074	0.015	0.020	5391181
Perfluorohexanoic Acid (PFHxA)	ug/L	0.010 U	0.0035	0.010	0.020	5391181
Perfluorohexane Sulfonate (PFHxS)	ug/L	0.015 U	0.0056	0.015	0.020	5391181
Perfluorononanoic Acid (PFNA)	ug/L	0.018 U	0.0087	0.018	0.020	5391181
Perfluorooctane Sulfonamide (PFOSA)	ug/L	0.020 J	0.0034	0.010	0.020	5391181
Perfluoropentanoic Acid (PFPeA)	ug/L	0.022	0.0075	0.018	0.020	5391181
Perfluorotetradecanoic Acid	ug/L	0.010 U	0.0027	0.010	0.020	5391181
Perfluorotridecanoic Acid	ug/L	0.010 U	0.0038	0.010	0.020	5391181
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.010 U	0.0025	0.010	0.020	5391181
Perfluorodecanoic Acid (PFDA)	ug/L	0.015 U	0.0061	0.015	0.020	5391181
Perfluorododecanoic Acid (PFDoA)	ug/L	0.010 U	0.0050	0.010	0.020	5391181
Perfluoro-n-Octanoic Acid (PFOA)	ug/L	0.010 U	0.0033	0.010	0.020	5391181
Perfluorooctane Sulfonate (PFOS)	ug/L	0.015 U	0.0060	0.015	0.020	5391181
Surrogate Recovery (%)						
13C2-6:2 Fluorotelomer sulfonate	%	85				5391181
13C2-8:2 Fluorotelomer sulfonate	%	94				5391181
13C2-Perfluorodecanoic acid	%	99				5391181
13C2-Perfluorododecanoic acid	%	81				5391181
13C2-Perfluorohexanoic acid	%	83				5391181
13C2-perfluorotetradecanoic acid	%	55				5391181
13C2-Perfluoroundecanoic acid	%	96				5391181
13C4-Perfluorobutanoic acid	%	73				5395679
13C4-Perfluoroheptanoic acid	%	95				5391181
13C4-Perfluorooctanesulfonate	%	89				5391181
13C4-Perfluorooctanoic acid	%	88				5391181
DL = Detection Limit LOD = Limit of Detection LOQ = Limit of Quantitation QC Batch = Quality Control Batch N/A = Not Applicable						

RESULTS OF ANALYSES OF WATER

Maxxam ID		GAC704				
Sampling Date		2018/01/29 14:45				
COC Number		STR03045				
	UNITS	LFPIEZ001	DL	LOD	LOQ	QC Batch
13C5-Perfluorononanoic acid	%	84				5391181
13C5-Perfluoropentanoic acid	%	89				5391181
13C8-Perfluorooctane Sulfonamide	%	88				5391181
18O2-Perfluorohexanesulfonate	%	89				5391181
DL = Detection Limit LOD = Limit of Detection LOQ = Limit of Quantitation QC Batch = Quality Control Batch N/A = Not Applicable						

TEST SUMMARY

Maxxam ID: GAC701
Sample ID: 290118AB1
Matrix: Water

Collected: 2018/01/29
Shipped:
Received: 2018/02/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5391181	2018/02/08	2018/02/09	(b) (6)

Maxxam ID: GAC702
Sample ID: 290118EB1
Matrix: Water

Collected: 2018/01/29
Shipped:
Received: 2018/02/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5391181	2018/02/08	2018/02/09	(b) (6)

Maxxam ID: GAC703
Sample ID: LFPIEZ005A
Matrix: Water

Collected: 2018/01/29
Shipped:
Received: 2018/02/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5391181	2018/02/08	2018/02/09	(b) (6)

Maxxam ID: GAC704
Sample ID: LFPIEZ001
Matrix: Water

Collected: 2018/01/29
Shipped:
Received: 2018/02/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5391181	2018/02/08	2018/02/09	(b) (6)

GENERAL COMMENTS

Sample GAC702, PFOS and PFOA in water by SPE/LCMS: Test repeated.
Sample GAC704, PFOS and PFOA in water by SPE/LCMS: Test repeated.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
	5391181	M_G	Matrix Spike	13C2-6:2 Fluorotelomer sulfonate	2018/02/09		85	%	50 - 150
				13C2-8:2 Fluorotelomer sulfonate	2018/02/09		93	%	50 - 150
				13C2-Perfluorodecanoic acid	2018/02/09		88	%	50 - 150
				13C2-Perfluorododecanoic acid	2018/02/09		72	%	50 - 150
				13C2-Perfluorohexanoic acid	2018/02/09		96	%	50 - 150
				13C2-perfluorotetradecanoic acid	2018/02/09		46 (1)	%	50 - 150
				13C2-Perfluoroundecanoic acid	2018/02/09		82	%	50 - 150
				13C4-Perfluorobutanoic acid	2018/02/09		95	%	50 - 150
				13C4-Perfluoroheptanoic acid	2018/02/09		95	%	50 - 150
				13C4-Perfluorooctanesulfonate	2018/02/09		81	%	50 - 150
				13C4-Perfluorooctanoic acid	2018/02/09		92	%	50 - 150
				13C5-Perfluorononanoic acid	2018/02/09		94	%	50 - 150
				13C5-Perfluoropentanoic acid	2018/02/09		97	%	50 - 150
				13C8-Perfluorooctane Sulfonamide	2018/02/09		86	%	50 - 150
				18O2-Perfluorohexanesulfonate	2018/02/09		96	%	50 - 150
				6:2 Fluorotelomer sulfonate	2018/02/09		97	%	68 - 133
				8:2 Fluorotelomer sulfonate	2018/02/09		92	%	70 - 130
				Perfluorobutanoic acid	2018/02/09		92	%	72 - 129
				Perfluorobutane Sulfonate (PFBS)	2018/02/09		95	%	65 - 135
				Perfluorodecane Sulfonate	2018/02/09		82	%	62 - 127
				Perfluoroheptanoic Acid (PFHpA)	2018/02/09		99	%	73 - 129
				Perfluorohexanoic Acid (PFHxA)	2018/02/09		92	%	74 - 129
				Perfluorohexane Sulfonate (PFHxS)	2018/02/09		NC	%	67 - 132
				Perfluorononanoic Acid (PFNA)	2018/02/09		99	%	72 - 131
				Perfluorooctane Sulfonamide (PFOSA)	2018/02/09		97	%	71 - 132
				Perfluoropentanoic Acid (PFPeA)	2018/02/09		102	%	73 - 129
				Perfluorotetradecanoic Acid	2018/02/09		93	%	70 - 134
				Perfluorotridecanoic Acid	2018/02/09		131	%	67 - 143
				Perfluoroundecanoic Acid (PFUnA)	2018/02/09		93	%	71 - 133
				Perfluorodecanoic Acid (PFDA)	2018/02/09		91	%	71 - 133
				Perfluorododecanoic Acid (PFDoA)	2018/02/09		92	%	71 - 131
				Perfluoro-n-Octanoic Acid (PFOA)	2018/02/09		103	%	71 - 130
				Perfluorooctane Sulfonate (PFOS)	2018/02/09		NC	%	72 - 131
	5391181	M_G	Matrix Spike DUP	13C2-6:2 Fluorotelomer sulfonate	2018/02/09		88	%	50 - 150
				13C2-8:2 Fluorotelomer sulfonate	2018/02/09		82	%	50 - 150
				13C2-Perfluorodecanoic acid	2018/02/09		81	%	50 - 150
				13C2-Perfluorododecanoic acid	2018/02/09		65	%	50 - 150
				13C2-Perfluorohexanoic acid	2018/02/09		96	%	50 - 150
				13C2-perfluorotetradecanoic acid	2018/02/09		38 (1)	%	50 - 150
				13C2-Perfluoroundecanoic acid	2018/02/09		71	%	50 - 150
				13C4-Perfluorobutanoic acid	2018/02/09		94	%	50 - 150
				13C4-Perfluoroheptanoic acid	2018/02/09		91	%	50 - 150
				13C4-Perfluorooctanesulfonate	2018/02/09		89	%	50 - 150
				13C4-Perfluorooctanoic acid	2018/02/09		95	%	50 - 150
				13C5-Perfluorononanoic acid	2018/02/09		90	%	50 - 150
				13C5-Perfluoropentanoic acid	2018/02/09		93	%	50 - 150
				13C8-Perfluorooctane Sulfonamide	2018/02/09		81	%	50 - 150
				18O2-Perfluorohexanesulfonate	2018/02/09		101	%	50 - 150
				6:2 Fluorotelomer sulfonate	2018/02/09		92	%	68 - 133
				8:2 Fluorotelomer sulfonate	2018/02/09		106	%	70 - 130
				Perfluorobutanoic acid	2018/02/09		97	%	72 - 129

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorobutane Sulfonate (PFBS)	2018/02/09		94	%	65 - 135
			Perfluorodecane Sulfonate	2018/02/09		85	%	62 - 127
			Perfluoroheptanoic Acid (PFHpA)	2018/02/09		102	%	73 - 129
			Perfluorohexanoic Acid (PFHxA)	2018/02/09		94	%	74 - 129
			Perfluorohexane Sulfonate (PFHxS)	2018/02/09		NC	%	67 - 132
			Perfluorononanoic Acid (PFNA)	2018/02/09		102	%	72 - 131
			Perfluorooctane Sulfonamide (PFOSA)	2018/02/09		95	%	71 - 132
			Perfluoropentanoic Acid (PFPeA)	2018/02/09		104	%	73 - 129
			Perfluorotetradecanoic Acid	2018/02/09		104	%	70 - 134
			Perfluorotridecanoic Acid	2018/02/09		146 (2)	%	67 - 143
			Perfluoroundecanoic Acid (PFUnA)	2018/02/09		103	%	71 - 133
			Perfluorodecanoic Acid (PFDA)	2018/02/09		94	%	71 - 133
			Perfluorododecanoic Acid (PFDoA)	2018/02/09		100	%	71 - 131
			Perfluoro-n-Octanoic Acid (PFOA)	2018/02/09		100	%	71 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/02/09		NC	%	72 - 131
5391181	M_G	MS/MSD RPD	6:2 Fluorotelomer sulfonate	2018/02/09	4.6		%	30
			8:2 Fluorotelomer sulfonate	2018/02/09	15		%	30
			Perfluorobutanoic acid	2018/02/09	4.8		%	30
			Perfluorobutane Sulfonate (PFBS)	2018/02/09	1.3		%	30
			Perfluorodecane Sulfonate	2018/02/09	3.8		%	30
			Perfluoroheptanoic Acid (PFHpA)	2018/02/09	3.0		%	30
			Perfluorohexanoic Acid (PFHxA)	2018/02/09	1.9		%	30
			Perfluorohexane Sulfonate (PFHxS)	2018/02/09	0		%	30
			Perfluorononanoic Acid (PFNA)	2018/02/09	2.6		%	30
			Perfluorooctane Sulfonamide (PFOSA)	2018/02/09	3.1		%	30
			Perfluoropentanoic Acid (PFPeA)	2018/02/09	2.2		%	30
			Perfluorotetradecanoic Acid	2018/02/09	11		%	30
			Perfluorotridecanoic Acid	2018/02/09	11 (2)		%	30
			Perfluoroundecanoic Acid (PFUnA)	2018/02/09	10		%	30
			Perfluorodecanoic Acid (PFDA)	2018/02/09	3.9		%	30
			Perfluorododecanoic Acid (PFDoA)	2018/02/09	7.8		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2018/02/09	2.8		%	30
			Perfluorooctane Sulfonate (PFOS)	2018/02/09	0		%	30
5391181	M_G	Spiked Blank	13C2-6:2 Fluorotelomer sulfonate	2018/02/09		86	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/02/09		83	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/02/09		94	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/02/09		84	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/02/09		96	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/02/09		80	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/02/09		93	%	50 - 150
			13C4-Perfluorobutanoic acid	2018/02/09		92	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/02/09		90	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/02/09		105	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/02/09		92	%	50 - 150
			13C5-Perfluorononanoic acid	2018/02/09		93	%	50 - 150
			13C5-Perfluoropentanoic acid	2018/02/09		96	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2018/02/09		85	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/02/09		88	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/02/09		100	%	68 - 133
			8:2 Fluorotelomer sulfonate	2018/02/09		109	%	70 - 130
			Perfluorobutanoic acid	2018/02/09		102	%	72 - 129

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorobutane Sulfonate (PFBS)	2018/02/09		105	%	65 - 135
			Perfluorodecane Sulfonate	2018/02/09		89	%	62 - 127
			Perfluoroheptanoic Acid (PFHpA)	2018/02/09		103	%	73 - 129
			Perfluorohexanoic Acid (PFHxA)	2018/02/09		89	%	74 - 129
			Perfluorohexane Sulfonate (PFHxS)	2018/02/09		105	%	67 - 132
			Perfluorononanoic Acid (PFNA)	2018/02/09		101	%	72 - 131
			Perfluorooctane Sulfonamide (PFOSA)	2018/02/09		98	%	71 - 132
			Perfluoropentanoic Acid (PFPeA)	2018/02/09		99	%	73 - 129
			Perfluorotetradecanoic Acid	2018/02/09		103	%	70 - 134
			Perfluorotridecanoic Acid	2018/02/09		107	%	67 - 143
			Perfluoroundecanoic Acid (PFUnA)	2018/02/09		97	%	71 - 133
			Perfluorodecanoic Acid (PFDA)	2018/02/09		96	%	71 - 133
			Perfluorododecanoic Acid (PFDoA)	2018/02/09		97	%	71 - 131
			Perfluoro-n-Octanoic Acid (PFOA)	2018/02/09		104	%	71 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/02/09		80	%	72 - 131
5391181	M_G	Method Blank	13C2-6:2 Fluorotelomer sulfonate	2018/02/09		103	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/02/09		102	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/02/09		101	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/02/09		86	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/02/09		100	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/02/09		86	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/02/09		93	%	50 - 150
			13C4-Perfluorobutanoic acid	2018/02/09		102	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/02/09		100	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/02/09		99	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/02/09		107	%	50 - 150
			13C5-Perfluorononanoic acid	2018/02/09		91	%	50 - 150
			13C5-Perfluoropentanoic acid	2018/02/09		102	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2018/02/09		95	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/02/09		95	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/02/09	0.015 U, LOD=0.015		ug/L	
			8:2 Fluorotelomer sulfonate	2018/02/09	0.015 U, LOD=0.015		ug/L	
			Perfluorobutanoic acid	2018/02/09	0.015 U, LOD=0.015		ug/L	
			Perfluorobutane Sulfonate (PFBS)	2018/02/09	0.015 U, LOD=0.015		ug/L	
			Perfluorodecane Sulfonate	2018/02/09	0.015 U, LOD=0.015		ug/L	
			Perfluoroheptanoic Acid (PFHpA)	2018/02/09	0.015 U, LOD=0.015		ug/L	
			Perfluorohexanoic Acid (PFHxA)	2018/02/09	0.010 U, LOD=0.010		ug/L	
			Perfluorohexane Sulfonate (PFHxS)	2018/02/09	0.015 U, LOD=0.015		ug/L	
			Perfluorononanoic Acid (PFNA)	2018/02/09	0.018 U, LOD=0.018		ug/L	
			Perfluorooctane Sulfonamide (PFOSA)	2018/02/09	0.010 U, LOD=0.010		ug/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluoropentanoic Acid (PFPeA)	2018/02/09	0.018 U, LOD=0.018		ug/L	
			Perfluorotetradecanoic Acid	2018/02/09	0.010 U, LOD=0.010		ug/L	
			Perfluorotridecanoic Acid	2018/02/09	0.010 U, LOD=0.010		ug/L	
			Perfluoroundecanoic Acid (PFUnA)	2018/02/09	0.010 U, LOD=0.010		ug/L	
			Perfluorodecanoic Acid (PFDA)	2018/02/09	0.015 U, LOD=0.015		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2018/02/09	0.010 U, LOD=0.010		ug/L	
			Perfluoro-n-Octanoic Acid (PFOA)	2018/02/09	0.010 U, LOD=0.010		ug/L	
			Perfluorooctane Sulfonate (PFOS)	2018/02/09	0.015 U, LOD=0.015		ug/L	
5395679	DZU	Spiked Blank	13C4-Perfluorobutanoic acid	2018/02/13		80	%	50 - 150
			13C5-Perfluorononanoic acid	2018/02/13		80	%	50 - 150
			Perfluorobutanoic acid	2018/02/13		113	%	72 - 129
			Perfluorononanoic Acid (PFNA)	2018/02/13		106	%	72 - 131
5395679	DZU	Method Blank	13C4-Perfluorobutanoic acid	2018/02/13		99	%	50 - 150
			13C5-Perfluorononanoic acid	2018/02/13		99	%	50 - 150
			Perfluorobutanoic acid	2018/02/13	0.015 U, LOD=0.015		ug/L	
			Perfluorononanoic Acid (PFNA)	2018/02/13	0.018 U, LOD=0.018		ug/L	
5395679	DZU	RPD - Sample/Sample Dup	Perfluorononanoic Acid (PFNA)	2018/02/13	NC (3)		%	30

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Laboratory spiked water resulted in satisfactory recovery of the extracted internal standard analyte. When considered together, these QC data suggest that matrix interferences may be biasing the data low. Because quantitation is performed using isotope dilution techniques, any losses of the native compound that may occur during any of the sample preparation, extraction, cleanup or determinative steps will be mirrored by a similar loss of the labeled standard, and as such can be accounted for and corrected. Therefore, the quantification of these target compounds is not affected by the low extracted internal standard analyte recovery.

(2) Recovery of the matrix spike was above the upper control limit. Laboratory spiked water resulted in satisfactory recovery of the compound of interest. When considered together, these QC data suggest that matrix interferences may be biasing the data high. For results that were not detected (ND), this potential bias has no impact.

(3) Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limit was adjusted accordingly (100x).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

(b) (6)

A large black rectangular redaction box covers the signature area. The text "(b) (6)" is printed in red at the top left corner of the redacted area.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.