TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

ANALYTICAL REPORT

Perfluorocarbon (PFC) Analysis

Lot #: D9I020235

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Dalton Utilities
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September 18, 2009

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Case Narrative
D9I020235

TestAmerica Denver utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the methods summary page in accordance with the methods indicated. Dilution factors and footnotes are provided on each datasheet to assist in the interpretation of the results.

The results relate only to the samples in this report and meet all requirements of NELAC. All data have been reviewed for compliance with the laboratory QA/QC plan and have found to be compliant with laboratory protocols with any exceptions noted below.

Please note that Non-Detect (ND) results have been evaluated down to the Method Detection Limit (MDL) and should be considered ND at the MDL. Unless otherwise noted, results for solids have been dry weight corrected.

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Sample Arrival and Receipt
The following report contains the analytical results for two samples received at TestAmerica Denver on September 2, 2009, according to documented sample acceptance procedures. The samples were received in good condition at a temperature of 1.3°C.

The samples were logged per client instruction on September 2, 2009, as the client indicated the information on the Chains of Custody was incomplete and/or erroneous. The client provided a revised chain of custody on September 4, 2009; however the sample ID information was still incomplete. The samples were logged as #65-290 N GA SPEEDWAY and #66-8165 HIGHWAY 225, per the client's original instructions. Both the original and revised chains of custody are included in the report.

No other anomalies were encountered during sample receipt.

Standards
Analytical standards were prepared using commercially available certified solutions containing all compounds of interest.

The mass labeled compounds 13C4 PFBA, 13C2 PFHxA, 18O2 PFHxS, 13C4 PFOA, 13C4 PFOS, 13C5 PFNA, 13C2 PFDA, 13C2 PFUnA, 13C2 PFDoA, and D3 MeFOSA were introduced at the extraction step and were used for internal standards for the quantitation of the target compounds.

Sample Extraction and Analysis
The samples presented in this report were extracted for the target analytes by TestAmerica Denver's Standard Operating Procedure (SOP) DV-OP-0019 and analyzed for the target analytes by TestAmerica Denver's SOP DV-LC-0012.

Method QC Samples
The Method Blank is processed reagent water spiked with surrogate and prepared with each batch of 20 samples of the same matrix. The method blanks were non-detect at the reporting limits for the target analytes.

Each batch is prepared with low and mid level Laboratory Control Samples (LCS). The LCS recoveries for both levels were within established control limits, with the exception of the items noted in section Analytical Comments.

Analytical Comments

The Standard Operating Procedure (SOP) was altered slightly in the sample preparation for FOSA. Sodium hydroxide was added to all seven samples to obtain a pH of 14 instead of the SOP required <2. The basic pH is generating better internal standard recoveries for Me FOSA.

Due to low internal standard recoveries and cartridges clogging during the extraction process, samples and the associated QC in FOSA batch 9247171 were filtered through a PVDF filter after the spike and base were added to the samples. This is a deviation from the SOP.

Please note during the FOSA extraction process samples #65-290 N GA SPEEDWAY and #66-8165 HIGHWAY 225 clogged the cartridge; therefore, the organic preparation chemist had to use two cartridges for each of these samples. The chemist observed no color or sediment in these samples.

The internal standard recoveries for MeFOSA, associated with QC batch 9247171, were recovered below 50% in samples #65-290 N GA SPEEDWAY and #66-8165 HIGHWAY 225. This is an indicator that data may be biased low. Upon re-extraction and reanalysis within hold in QC batch 9251485, surrogate recovery outliers were still present in these samples, demonstrating that this anomaly is most likely due to matrix interference. Both sets of data have been provided.

The low level LCS and mid-level LCS/LCSD analyses associated with QC batch 9247171 exhibited percent recoveries and surrogate recoveries outside the QC control limits. This is an indicator that data may be biased low. Upon re-extraction and reanalysis in QC batch 9251485, all QC recoveries were 100% in control. Both sets of data have been provided.

The method required MS/MSD could not be performed for QC batches 9246452, 9247171 and 9251485, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable low-level LCS and mid-level LCS/LCSD analyses data.

No other anomalies were observed.

EXECUTIVE SUMMARY - Detection Highlights

D9I020235

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
#66-8165 HIGHWAY 225 09/01/09 15:00 002				
Perfluorooctanoic Acid	0.22	0.020	ug/L	DEN -LC-0012
Perfluorooctanesulfonate	0.20	0.020	ug/L	DEN -LC-0012
Perfluorobutanoic acid (PFBA)	0.064	0.020	ug/L	DEN -LC-0012
Perfluoropentanoic acid (PFPA)	0.13	0.030	ug/L	DEN -LC-0012
Perfluorohexanoic acid (PFHxA)	0.14	0.020	ug/L	DEN -LC-0012
Perfluoroheptanoic acid (PFHpA	0.11	0.020	ug/L	DEN -LC-0012
Perfluorononanoic acid (PFNA)	0.040	0.020	ug/L	DEN -LC-0012
Perfluorodecanoic acid (PFDA)	0.0099 J	0.020	ug/L	DEN -LC-0012
Perfluorobutane sulfonate (PFB	0.36	0.020	ug/L	DEN -LC-0012
Perfluorohexane sulfonate (PFH	0.066	0.030	ug/L	DEN -LC-0012

METHODS SUMMARY

D9I020235

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
LC/MS/MS PFCs	DEN -LC-0012	SW846 FOSA spec

References:

DEN Severn Trent Laboratores, Denver, Facility Standard Operating Procedure.

METHOD / ANALYST SUMMARY

D9I020235

ANALYTICAL METHOD	ANALYST	ANALYST ID
DEN -LC-0012	Jacqueline Bonnett	003601

References:

DEN Severn Trent Laboratores, Denver, Facility Standard Operating Procedure.

SAMPLE SUMMARY

D9I020235

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
LJ7VT	001	#65-290 N GA SPEEDWAY	09/01/09	14:30
LJ7V0	002	#66-8165 HIGHWAY 225	09/01/09	15:00

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Dalton Utilities

Client Sample ID: #65-290 N GA SPEEDWAY

HPLC

Lot-Sample #...: D9I020235-001 **Work Order #...:** LJ7VT1AA **Matrix.....:** WATER
Date Sampled...: 09/01/09 14:30 **Date Received..:** 09/02/09
Prep Date.....: 09/03/09 **Analysis Date..:** 09/06/09
Prep Batch #...: 9246452 **Analysis Time..:** 06:19
Dilution Factor: 1

Method.....: DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctanoic Acid	ND	0.020	ug/L	0.0055
Perfluorooctanesulfonate	ND	0.020	ug/L	0.0068
Perfluorobutanoic acid (PFBA)	ND	0.020	ug/L	0.0062
Perfluoropentanoic acid (PFPA)	ND	0.030	ug/L	0.0082
Perfluorohexanoic acid (PFHxA)	ND	0.020	ug/L	0.0030
Perfluoroheptanoic acid (PFHpA)	ND	0.020	ug/L	0.0054
Perfluorononanoic acid (PFNA)	ND	0.020	ug/L	0.0065
Perfluorodecanoic acid (PFDA)	ND	0.020	ug/L	0.0026
Perfluoroundecanoic acid (PFUnA)	ND	0.020	ug/L	0.0025
Perfluorododecanoic acid (PFDoA)	ND	0.020	ug/L	0.0040
Perfluorotridecanoic acid (PFTriA)	ND	0.020	ug/L	0.0072
Perfluorotetradecanoic acid (PFTeA)	ND	0.020	ug/L	0.0087
Perfluorobutane sulfonate (PFBS)	ND	0.020	ug/L	0.0045
Perfluorohexane sulfonate (PFHxS)	ND	0.030	ug/L	0.0084

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	110	(50 - 200)
13C4 PFOS	65	(50 - 200)
13C4 PFBA	96	(50 - 200)
13C2 PFHxA	105	(50 - 200)
18O2 PFHxS	84	(50 - 200)
13C5 PFNA	86	(50 - 200)
13C2 PFDA	69	(50 - 200)
13C2 PFUnA	65	(50 - 200)
13C2 PFDoA	72	(50 - 200)

Dalton Utilities

Client Sample ID: #65-290 N GA SPEEDWAY

HPLC

Lot-Sample #...: D9I020235-001 **Work Order #...:** LJ7VT1AC **Matrix.....:** WATER
Date Sampled...: 09/01/09 14:30 **Date Received..:** 09/02/09
Prep Date.....: 09/04/09 **Analysis Date..:** 09/05/09
Prep Batch #...: 9247171 **Analysis Time..:** 08:43
Dilution Factor: 1

Method.....: DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctane sulfonamide (FOSA)	ND	0.050	ug/L	0.0057

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
MeFOSA	1.0 *	(50 - 200)

NOTE(S):

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: #65-290 N GA SPEEDWAY

HPLC

Lot-Sample #...: D9I020235-001 **Work Order #...:** LJ7VT2AC **Matrix.....:** WATER
Date Sampled...: 09/01/09 14:30 **Date Received..:** 09/02/09
Prep Date.....: 09/08/09 **Analysis Date..:** 09/11/09
Prep Batch #...: 9251485 **Analysis Time..:** 14:07
Dilution Factor: 1

Method.....: DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctane sulfonamide (FOSA)	ND	0.050	ug/L	0.0057

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
MeFOSA	46 *	(50 - 200)

NOTE(S):

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: #66-8165 HIGHWAY 225

HPLC

Lot-Sample #...: D9I020235-002 Work Order #...: LJ7V01AA Matrix.....: WATER
Date Sampled...: 09/01/09 15:00 Date Received..: 09/02/09
Prep Date.....: 09/03/09 Analysis Date..: 09/06/09
Prep Batch #...: 9246452 Analysis Time..: 06:36
Dilution Factor: 1
Method.....: DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctanoic Acid	**0.22**	**0.020**	**ug/L**	**0.0055**
Perfluorooctanesulfonate	**0.20**	**0.020**	**ug/L**	**0.0068**
Perfluorobutanoic acid (PFBA)	**0.064**	**0.020**	**ug/L**	**0.0062**
Perfluoropentanoic acid (PFPA)	**0.13**	**0.030**	**ug/L**	**0.0082**
Perfluorohexanoic acid (PFHxA)	**0.14**	**0.020**	**ug/L**	**0.0030**
Perfluoroheptanoic acid (PFHpA)	**0.11**	**0.020**	**ug/L**	**0.0054**
Perfluorononanoic acid (PFNA)	**0.040**	**0.020**	**ug/L**	**0.0065**
Perfluorodecanoic acid (PFDA)	**0.0099 J**	**0.020**	**ug/L**	**0.0026**
Perfluoroundecanoic acid (PFUnA)	ND	0.020	ug/L	0.0025
Perfluorododecanoic acid (PFDoA)	ND	0.020	ug/L	0.0040
Perfluorotridecanoic acid (PFTriA)	ND	0.020	ug/L	0.0072
Perfluorotetradecanoic acid (PFTeA)	ND	0.020	ug/L	0.0087
Perfluorobutane sulfonate (PFBS)	**0.36**	**0.020**	**ug/L**	**0.0045**
Perfluorohexane sulfonate (PFHxS)	**0.066**	**0.030**	**ug/L**	**0.0084**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	105	(50 - 200)
13C4 PFOS	66	(50 - 200)
13C4 PFBA	95	(50 - 200)
13C2 PFHxA	100	(50 - 200)
18O2 PFHxS	86	(50 - 200)
13C5 PFNA	84	(50 - 200)
13C2 PFDA	69	(50 - 200)
13C2 PFUnA	65	(50 - 200)
13C2 PFDoA	78	(50 - 200)

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: #66-8165 HIGHWAY 225

HPLC

Lot-Sample #...: D9I020235-002 **Work Order #...:** LJ7V01AC **Matrix.....:** WATER
Date Sampled...: 09/01/09 15:00 **Date Received..:** 09/02/09
Prep Date.....: 09/04/09 **Analysis Date..:** 09/05/09
Prep Batch #...: 9247171 **Analysis Time..:** 08:50
Dilution Factor: 1
Method.....: DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctane sulfonamide (FOSA)	ND	0.050	ug/L	0.0057

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
MeFOSA	1.3 *	(50 - 200)

NOTE(S):

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: #66-8165 HIGHWAY 225

HPLC

Lot-Sample #...: D9I020235-002 **Work Order #...:** LJ7V02AC **Matrix.....:** WATER
Date Sampled...: 09/01/09 15:00 **Date Received..:** 09/02/09
Prep Date.....: 09/08/09 **Analysis Date..:** 09/11/09
Prep Batch #...: 9251485 **Analysis Time..:** 14:14
Dilution Factor: 1

Method.....: DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluorooctane sulfonamide (FOSA)	ND	0.050	ug/L	0.0057

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
MeFOSA	46 *	(50 - 200)

NOTE(S):

* Surrogate recovery is outside stated control limits.

QC DATA ASSOCIATION SUMMARY

D9I020235

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WATER	DEN -LC-0012		9246452	
	WATER	DEN -LC-0012		9247171	
	WATER	DEN -LC-0012		9251485	
002	WATER	DEN -LC-0012		9246452	
	WATER	DEN -LC-0012		9247171	
	WATER	DEN -LC-0012		9251485	