
Analytical Report

Air Sampling Fluorochemical Report

DuPont Washington Works – Air Sampling Program Round 1

Exygen Research Report No. L0001277

Testing Laboratory

Exygen Research
3058 Research Drive
State College, PA 16801

Requester

Michael D Aucoin
URS Corporation
Barley Mill Plaza
Building 27 Room 1260
Lancaster Pike and Rt 141
Wilmington, DE 19805

ALL DATA CONTAINED IN THIS REPORT WAS GENERATED BY EXYGEN RESEARCH

Summary

Seven solid media samples were received by Centre Analytical Laboratories, Inc. (dba Exygen Research) (Exygen) from DuPont Corporation. The media represent samples of air collected on OVS tubes. Please see Table 1 for a completed listing of samples received and field air volumes collected.

The samples were analyzed for Perfluorooctanoic Acid (C8 Acid) using liquid chromatography / mass spectrometry (LCMS). The method employed is entitled "Method of Analysis for the Determination of Perfluorooctanoic Acid (PFOA) in OVS Airtubes by LCMS" (James Miller, Exygen Research, February 17, 2003).

The OVS tubes were separated into three fractions for specific fluorochemical analysis. Fraction A consisted of the filter, backing material and plastic ring. Fraction B contained the first bed of XAD resin and the PUF backing. Fraction C contained the second bed of XAD resin and PUF backing. The fractions were extracted with 1 mL of methanol. Perfluorodecanoic Acid (C10 Acid) was added as a surrogate spike to each fraction prior to extraction.

Instrument operating conditions can be found at the beginning of each analytical run. Raw instrument data is given in Appendix A. Chain-of-custody information can be found in Appendix B.

Results Summary

Request #	Air Volume Sampled (L)	C8 Acid (mg/m ³)	$\mu\text{g}/\text{m}^3$
WWK-A-AMS1-E1 A	1407	< 0.00007	
WWK-A-AMS1-E1 B	1407	< 0.00007	
WWK-A-AMS1-E1 C	1407	< 0.00007	
WWK-A-AMS1-E1 (Total)		< 0.00014	< 0.14
WWK-A-AMS2-E1 A	1410	0.00007	
WWK-A-AMS2-E1 B	1410	< 0.00007	
WWK-A-AMS2-E1 C	1410	< 0.00007	
WWK-A-AMS2-E1 (Total)		0.00007	0.07
WWK-A-AMS3-E1 A	1418	0.00008	
WWK-A-AMS3-E1 B	1418	< 0.00007	
WWK-A-AMS3-E1 C	1418	< 0.00007	
WWK-A-AMS3-E1 (Total)		0.00008	0.08
WWK-A-AMS4-E1 A	1397	< 0.00007	
WWK-A-AMS4-E1 B	1397	< 0.00007	
WWK-A-AMS4-E1 C	1397	< 0.00007	
WWK-A-AMS4-E1 (Total)		< 0.00014	< 0.14
WWK-A-AMS5-E1 A	1418	< 0.00007	
WWK-A-AMS5-E1 B	1418	< 0.00007	
WWK-A-AMS5-E1 C	1418	< 0.00007	
WWK-A-AMS5-E1 (Total)		< 0.00014	< 0.14
WWK-A-AMS6-E1 A	1482	< 0.00007	
WWK-A-AMS6-E1 B	1482	< 0.00007	
WWK-A-AMS6-E1 C	1482	< 0.00007	
WWK-A-AMS6-E1 (Total)		< 0.00014	< 0.14

1. "<" is defined as not detected at or above the reported level.
2. Sample results have not been corrected for blank results or control spike recoveries.
3. Please note the following descriptions of the OVS sample tube fractions:

Fraction	Fraction Description
A	Frit Extract
B	1st set beads extract
C	2nd set beads extract

ALL DATA CONTAINED IN THIS REPORT WAS GENERATED BY OXYGEN RESEARCH

QC Data

LCS

Please note: One control sample was spiked with each perfluorooctanoic acid to give a final concentration of 500 ppb. Air was pulled through the tube at a rate of 1-liter per minute for one hour (480 liters of air). The fractions were separated and analyzed. The acceptable range for control recovery is 75-125%.

Request #	C8 Acid (amount spiked - ppb)	C8 Acid (amount recovered - ppb)	C8 Acid (percent recovery)
Control 1	500	509	102

Blanks

Request #	Vol. Of Air (L)	C8 Acid (ug/fraction)
WWK-A-AMSFBLK-E1 A	0	< 0.10
WWK-A-AMSFBLK-E1 B	0	< 0.10
WWK-A-AMSFBLK-E1 C	0	< 0.10

ALL DATA CONTAINED IN THIS REPORT WAS GENERATED BY EYGEN RESEARCH

Surrogates

A surrogate spike (C10 Acid) was added to all OVS tubes to give a final concentration of 500 ppb in the extract. Surrogate spike recoveries are given in the following table. There are no set criteria for surrogate spike recoveries. Advisory ranges are 75-125%.

Sample #	Amount Spiked (ppb)	Amount Recovered (ppb)	Percent Recovery (%)
WWK-A-AMSFBLK-E1 A	500	663	133 **
WWK-A-AMSFBLK-E1 B	500	345	69 **
WWK-A-AMSFBLK-E1 C	500	393	79
WWK-A-AMS1-E1 A	500	561	112
WWK-A-AMS1-E1 B	500	384	77
WWK-A-AMS1-E1 C	500	359	72 **
WWK-A-AMS2-E1 A	500	668	134 **
WWK-A-AMS2-E1 B	500	423	85
WWK-A-AMS2-E1 C	500	411	82
WWK-A-AMS3-E1 A	500	691	138 **
WWK-A-AMS3-E1 B	500	417	83
WWK-A-AMS3-E1 C	500	418	84
WWK-A-AMS4-E1 A	500	774	155 **
WWK-A-AMS4-E1 B	500	384	77
WWK-A-AMS4-E1 C	500	382	76
WWK-A-AMS5-E1 A	500	643	129 **
WWK-A-AMS5-E1 B	500	358	72 **
WWK-A-AMS5-E1 C	500	407	81
WWK-A-AMS6-E1 A	500	825	165 **
WWK-A-AMS6-E1 B	500	397	79
WWK-A-AMS6-E1 C	500	442	88
Control Spike A	1000 *	1196	120
Control Spike B	500	349	70 **
Control Spike C	500	385	77

* The control spike A Fraction was inadvertently spiked twice with surrogate. The surrogate concentration for this sample is therefore 1000 ppb.

** Surrogate recovery outside of advisory range.

Calculations

Request #	Vol. Of Air (L)	C8 Acid (raw-ppb)	C8 Acid (ug/fraction)	C8 Acid (mg/m3)
WWK-A-AMSFBLK-E1 A	0	< 10	< 0.10	
WWK-A-AMSFBLK-E1 B	0	< 10	< 0.10	
WWK-A-AMSFBLK-E1 C	0	< 10	< 0.10	
WWK-A-AMS1-E1 A	1407	< 10	< 0.10	< 0.00007
WWK-A-AMS1-E1 B	1407	< 10	< 0.10	< 0.00007
WWK-A-AMS1-E1 C	1407	< 10	< 0.10	< 0.00007
WWK-A-AMS2-E1 A	1410	101	0.10	0.00007
WWK-A-AMS2-E1 B	1410	< 10	< 0.10	< 0.00007
WWK-A-AMS2-E1 C	1410	< 10	< 0.10	< 0.00007
WWK-A-AMS3-E1 A	1418	105	0.11	0.00008
WWK-A-AMS3-E1 B	1418	< 10	< 0.10	< 0.00007
WWK-A-AMS3-E1 C	1418	< 10	< 0.10	< 0.00007
WWK-A-AMS4-E1 A	1397	< 10	< 0.10	< 0.00007
WWK-A-AMS4-E1 B	1397	< 10	< 0.10	< 0.00007
WWK-A-AMS4-E1 C	1397	< 10	< 0.10	< 0.00007
WWK-A-AMS5-E1 A	1418	< 10	< 0.10	< 0.00007
WWK-A-AMS5-E1 B	1418	< 10	< 0.10	< 0.00007
WWK-A-AMS5-E1 C	1418	< 10	< 0.10	< 0.00007
WWK-A-AMS6-E1 A	1482	< 10	< 0.10	< 0.00007
WWK-A-AMS6-E1 B	1482	< 10	< 0.10	< 0.00007
WWK-A-AMS6-E1 C	1482	< 10	< 0.10	< 0.00007
Control Spike A	0	509	0.51	
Control Spike B	0	< 10	< 0.10	
Control Spike C	0	< 10	< 0.10	

ALL DATA CONTAINED IN THIS REPORT WAS GENERATED BY EXYGEN RESEARCH

Example Calculation

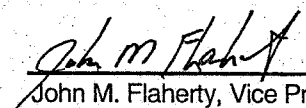
For sample WWK-A-AMS2-E1 A C8 Acid,

$$\begin{aligned} &= [101 \text{ ng/ml of C8 Acid} \times (1 \text{ ml}) \times (1 \text{ ug} / 1000 \text{ ng}) \times (1 \text{ mg} / 1000 \text{ ug})] / [(1410 \text{ L}) \times (1 \text{ m}^3 / 1000 \text{ L})] \\ &= 0.00007 \text{ mg} / \text{m}^3 \end{aligned}$$

Signatures


Paul Connolly, LCMS Team Leader

2/25/04
Date


John M. Flaherty, Vice President

2/25/04
Date

Other Lab Members Contributing to Data

James Miller

ALL DATA CONTAINED IN THIS REPORT WAS GENERATED BY EXYGEN RESEARCH

Table 1. Login Information / Field Data

Sample ID	Exygen Lab ID	Date Received	Description	Air Volume Sampled (L)
WWK-A-AMSFBLK-E1 A	L0001277-1	11/7/03	Frit extract	0
WWK-A-AMSFBLK-E1 B	L0001277-2	11/7/03	1st set beads extract	0
WWK-A-AMSFBLK-E1 C	L0001277-3	11/7/03	2nd set beads extract	0
WWK-A-AMS1-E1 A	L0001277-4	11/7/03	Frit extract	1407
WWK-A-AMS1-E1 B	L0001277-5	11/7/03	1st set beads extract	1407
WWK-A-AMS1-E1 C	L0001277-6	11/7/03	2nd set beads extract	1407
WWK-A-AMS2-E1 A	L0001277-7	11/7/03	Frit extract	1410
WWK-A-AMS2-E1 B	L0001277-8	11/7/03	1st set beads extract	1410
WWK-A-AMS2-E1 C	L0001277-9	11/7/03	2nd set beads extract	1410
WWK-A-AMS3-E1 A	L0001277-10	11/7/03	Frit extract	1418
WWK-A-AMS3-E1 B	L0001277-11	11/7/03	1st set beads extract	1418
WWK-A-AMS3-E1 C	L0001277-12	11/7/03	2nd set beads extract	1418
WWK-A-AMS4-E1 A	L0001277-13	11/7/03	Frit extract	1397
WWK-A-AMS4-E1 B	L0001277-14	11/7/03	1st set beads extract	1397
WWK-A-AMS4-E1 C	L0001277-15	11/7/03	2nd set beads extract	1397
WWK-A-AMS5-E1 A	L0001277-16	11/7/03	Frit extract	1418
WWK-A-AMS5-E1 B	L0001277-17	11/7/03	1st set beads extract	1418
WWK-A-AMS5-E1 C	L0001277-18	11/7/03	2nd set beads extract	1418
WWK-A-AMS6-E1 A	L0001277-19	11/7/03	Frit extract	1482
WWK-A-AMS6-E1 B	L0001277-20	11/7/03	1st set beads extract	1482
WWK-A-AMS6-E1 C	L0001277-21	11/7/03	2nd set beads extract	1482
Control Spike A	L0001277-22	11/7/03	Frit extract	0
Control Spike B	L0001277-23	11/7/03	1st set beads extract	0
Control Spike C	L0001277-24	11/7/03	2nd set beads extract	0



3058 Research Drive
State College, PA 16801

Phone: 814-272-1039
Fax: 814-231-1580

Login

Login Group: L0001277

Login #: L0001277 > 1,387
Project: P0000419
Project Title/Type: Analysis of PFOA in OVS Tubes / ROUTINE
Project Storage:
Submitted By: Michael D. Aucoin
Status: Unreceived
Login Type: Immediate Receipt of Samples
Started: T
Date Start: 11/7/2003 2:41:35PM
Due Date: 11/21/2003
Received Date: 11/07/2003
Received By: ROBB, SHAWN
Spread Sample:
Label:
Login Notes:
Conform Notes: "

Conform COC Sample: True
Conform COC: True
Conform Sample: True
Conform Request: True

Packages / Containers

Package	Carton	Mail Date / Condition		Shipper / ID	Temp. Control / Temperat	Direction / Handled By
PK0001842		11/7/2003 10:40:51PM		FEDEX	NONE	RECEIVED
		Package & Contents Uncompromised		8363913020300200		ROBB, SHAWN
Container #	Gross Weight	pH	Container Type	Preservative	Mfg. Lot	Mfg. ID
018656	7.2 g		Other	NONE		
C0018657	7.1 g		Other	NONE		
C0018658	7.2 g		Other	NONE		
C0018659	7.2 g		Other	NONE		
C0018660	7.2 g		Other	NONE		
C0018661	7.2 g		Other	NONE		
C0018662	7.2 g		Other	NONE		
C0018663	7.2 g		Other	NONE		
C0018664	7.2 g		Other	NONE		
C0018665	7.2 g		Other	NONE		
C0018666	7.2 g		Other	NONE		
C0018667	7.2 g		Other	NONE		
C0018668	7.2 g		Other	NONE		
C0018669	7.2 g		Other	NONE		
C0018670	7.2 g		Other	NONE		
C0018671	7.2 g		Other	NONE		
C0018672	7.2 g		Other	NONE		
C0018673	7.2 g		Other	NONE		
C0018674	7.2 g		Other	NONE		
C0018675	7.2 g		Other	NONE		
C0018676	7.2 g		Other	NONE		
C0018677	7.2 g		Other	NONE		
C0018678	7.2 g		Other	NONE		
C0018679	7.2 g		Other	NONE		

ICOC

Miscellaneous

Item Key

None

Description

0066



Samples

Sample ID	Matrix	Fraction	Sample	Date Sampled	Date Received	Date Due
L0001277-0001	GAS	OVS Tubes	WWK-A-AMSFBLK-E1 A		11/07/2003	11/21/2003
L0001277-0002	GAS	OVS Tubes	WWK-A-AMSFBLK-E1 B		11/07/2003	11/21/2003
001277-0003	GAS	OVS Tubes	WWK-A-AMSFBLK-E1 C		11/07/2003	11/21/2003
L0001277-0004	GAS	OVS Tubes	WWK-A-AMS1-E1 A		11/07/2003	11/21/2003
L0001277-0005	GAS	OVS Tubes	WWK-A-AMS1-E1 B		11/07/2003	11/21/2003
L0001277-0006	GAS	OVS Tubes	WWK-A-AMS1-E1 C		11/07/2003	11/21/2003
L0001277-0007	GAS	OVS Tubes	WWK-A-AMS2-E1 A		11/07/2003	11/21/2003
L0001277-0008	GAS	OVS Tubes	WWK-A-AMS2-E1 B		11/07/2003	11/21/2003
L0001277-0009	GAS	OVS Tubes	WWK-A-AMS2-E1 C		11/07/2003	11/21/2003
L0001277-0010	GAS	OVS Tubes	WWK-A-AMS3-E1 A		11/07/2003	11/21/2003
L0001277-0011	GAS	OVS Tubes	WWK-A-AMS3-E1 B		11/07/2003	11/21/2003
L0001277-0012	GAS	OVS Tubes	WWK-A-AMS3-E1 C		11/07/2003	11/21/2003
L0001277-0013	GAS	OVS Tubes	WWK-A-AMS4-E1 A		11/07/2003	11/21/2003
L0001277-0014	GAS	OVS Tubes	WWK-A-AMS4-E1 B		11/07/2003	11/21/2003
L0001277-0015	GAS	OVS Tubes	WWK-A-AMS4-E1 C		11/07/2003	11/21/2003
L0001277-0016	GAS	OVS Tubes	WWK-A-AMS5-E1 A		11/07/2003	11/21/2003
L0001277-0017	GAS	OVS Tubes	WWK-A-AMS5-E1 B		11/07/2003	11/21/2003
L0001277-0018	GAS	OVS Tubes	WWK-A-AMS5-E1 C		11/07/2003	11/21/2003
L0001277-0019	GAS	OVS Tubes	WWK-A-AMS6-E1 A		11/07/2003	11/21/2003
L0001277-0020	GAS	OVS Tubes	WWK-A-AMS6-E1 B		11/07/2003	11/21/2003
L0001277-0021	GAS	OVS Tubes	WWK-A-AMS6-E1 C		11/07/2003	11/21/2003
L0001277-0022	GAS	OVS Tubes	CONTROL A		11/07/2003	11/21/2003
L0001277-0023	GAS	OVS Tubes	CONTROL B		11/07/2003	11/21/2003
L0001277-0024	GAS	OVS Tubes	CONTROL C		11/07/2003	11/21/2003

0067



Login

Bottles

0001277-0001

Container

C0018656 / Other / NONE

Method

L0001277-0002

Container

C0018657 / Other / NONE

Method

L0001277-0003

Container

C0018658 / Other / NONE

Method

L0001277-0004

Container

C0018659 / Other / NONE

Method

L0001277-0005

Container

C0018660 / Other / NONE

Method

L0001277-0006

Container

C0018661 / Other / NONE

Method

L0001277-0007

Container

C0018662 / Other / NONE

Method

L0001277-0008

Container

C0018663 / Other / NONE

Method

L0001277-0009

Container

C0018664 / Other / NONE

Method

L0001277-0010

Container

C0018665 / Other / NONE

Method

L0001277-0011

Container

C0018666 / Other / NONE

Method

L0001277-0012

Container

Method

0068



Login

C0018667 / Other / NONE

L0001277-0013

Container

C0018668 / Other / NONE

Method

L0001277-0014

Container

C0018669 / Other / NONE

Method

L0001277-0015

Container

C0018670 / Other / NONE

Method

L0001277-0016

Container

C0018671 / Other / NONE

Method

L0001277-0017

Container

C0018672 / Other / NONE

Method

L0001277-0018

Container

C0018673 / Other / NONE

Method

L0001277-0019

Container

C0018674 / Other / NONE

Method

L0001277-0020

Container

C0018675 / Other / NONE

Method

L0001277-0021

Container

C0018676 / Other / NONE

Method

L0001277-0022

Container

C0018677 / Other / NONE

Method

L0001277-0023

Container

C0018678 / Other / NONE

Method

L0001277-0024

Container

Method

0069



Login

C0018679 / Other / NONE

0070



PROJECT INFORMATION

Client (name & address):

Project Manager (Name & E-mail Address):

ADQW

Mike Aucoin

Depot Washington Works

Phone: (302) 892-1698

Fax:

P.O. #:

Sampler: 550/REK LMK AAC

Quotation #:

Please fill out this form *completely* to ensure correct analysis and proper handling of your samples.

STAY AHEAD

ExyLIMS#	Client Sample Identification	Collection Date	Collection Time
	WwK-A-AMSFBLLK-E1	11/06/03	0633
	WwK-A-AMS1-E1		0545
	WwK-A-AMS2-E1		0551
	WwK-A-AMS3-E1		0553
	WwK-A-AMS4-E1		0602
	WwK-A-AMS5-E1		0531
	WwK-A-AMSG-E1	▽	0615

LAB USE ONLY

[illegible][illegible]

CHAIN OF CUSTODY

Relinquished by	Date	Time
<i>[Signature]</i>	11/6/03	0800

LAB USE ONLY

OTHER INFORMATION

Event 1

PROJECT REQUIREMENTS

Results Deadline:

Cooler ID # M Cooler Temp. (°C) 14

Cooler Temp. (°C) 14

Received by	Date	Time
<i>[Signature]</i>	10/30/03	0830
<i>[Signature]</i>	11/01/02	1040

Laboratory Report Options:

- ☐ Sample results only
☐ Add case narrative
☐ Add quality control summary
☐ Add calibration summary
☐ Add raw data
☐ Other

**DuPont Washington Works
Air Sampling Program**

Sampler(s): SO, AC
RK, LK

FedEx Airbill #: 83639130030

Event Number

Event 1

Pump #	Station #	Oxygen ID	Calibration (pre)	Date	Start Time	Date	Stop Time	Calibration (post)	Total Minutes	Total Volume
669842	AMS-1	WWK-A-AMS1-E1	1.007	11-5-03	0559	11/6/03	0545	0.9671	1424	
669908	AMS-2	WWK-A-AMS2-E1	1.011	11-5-03	0607	11/6/03	0551	0.9694	1425	
669878	AMS-3	WWK-A-AMS3-E1	1.012	11-5-03	0609	11/6/03	0553	0.9570	1425	
669831	AMS-4	WWK-A-AMS4-E1	1.011	11-5-03	0619	11/6/03	0602	0.9530	1424	
669769	AMS-5	WWK-A-AMS5-E1	1.016	11-5-03	0543	11/6/03	0531	0.9706	1430	
669865	AMS-6	WWK-A-AMS6-E1	1.010	11-5-03	0643	11/6/03	0615	1.0000	1382+273	
Hours	Minutes	Hours	Minutes	Hours	Minutes	Hours	Minutes	Hours	Minutes	
0	0	5	300	10	600	15	900	20	1200	
1	60	6	360	11	660	16	960	21	1260	
2	120	7	420	12	720	17	1020	22	1320	
3	180	8	480	13	780	18	1080	23	1380	
4	240	9	540	14	840	19	1140	24	1440	

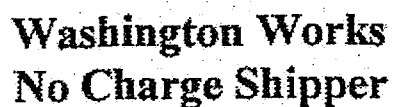
Field Blank: yes WWK-K-AMSFBLK-E1
yes or no

Weather: Partly Cloudy, expected thunderstorms, ~ 62°

SAFER operational: yes
yes or no

Comments:

0072



Routing: FED EX (SEE ABOVE ACCT)
F. O. B.: COLLECT
Date Shipped:
B / L :

[illegible]

Dimensions:
Ship From: Stores

0073

Special Instructions: This N-C-S will cover 6 shipments beginning 10/30/03.

>>> Will deliver package to Stores with completed FEDEX Bill. CRG Account Number 2230-5551-6.
Weekend samples will be delivered directly to FEDEX. <<<<

Comments:

FedEx USA Airbill

Express

Tracking Number **836391302030**

1 From **11/6/03**

Sender's Name **Struc Opp** Phone **304 563-4476**

Company **D.B. + ARB**

Address **Rock 892 S.W., Durbin Road**

City **Wail, Ln** State **WV** ZIP **26181**

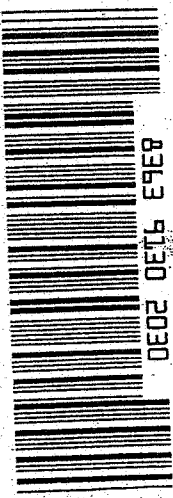
2 Your Internal Billing Reference **18983937.00003**

3 To Recipient's Name **Senile Receiving** Phone **814 231-8032**

Company **Elyssa Research**

Address **3117 Research Drive**

City **State PA** ZIP **16801**



8363 9130 2030

0200

Recipient's Copy

4a Express Package Service

☒ FedEx Priority Overnight ☐ FedEx Standard Overnight ☐ FedEx First Overnight

☐ FedEx 2Day ☐ FedEx Express Saver

4b Express Freight Service

☐ FedEx 1Day Freight ☐ FedEx 2Day Freight ☐ FedEx 3Day Freight

5 Packaging

☐ FedEx Envelope ☐ FedEx Pak ☒ Other

6 Special Handling

☐ Saturday Delivery ☐ Hold Weekday ☐ Hold Saturday

7 Payment Bill to:

☒ Sender ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Check

8 Release Signature

☐ Signature Required ☐ Signature Not Required

By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims.

446