



November 26, 2008

HAND-DELIVERED

Mr. Tom Cleveland, P.E.
Decatur Utilities
1002 Central Parkway SW
P.O. Box 2232
Decatur, AL 35609

Subject: Potential Perfluorochemical (PFC) Sources

Dear Mr. Cleveland:

3M received your letter dated November 14, 2008 requesting an investigation of potential PFC sources to the Decatur Utilities Dry Creek Wastewater Treatment Plant. This correspondence has been prepared in response to your inquiry. To summarize the information that follows, 3M is not aware that any of the wastewater it discharges to the Decatur Utilities Dry Creek WWTP are from processes that could result in the release of PFCs, including PFOA and PFOS.

Historically, industrial process wastewater from the 3M Decatur facility was not conveyed to the Decatur Utilities Dry Creek WWTP. More specifically, 3M did not connect to the Decatur Utilities sewer system until 2001 and this was only for sanitary wastewater generated at its site. The average flow for this discharge has been estimated to be 0.15 million gallons per day (MGD). Subsequently, in January 2003, 3M acquired Solvay operations and they became part of the 3M Decatur facility. These operations, now referred to as Dyneon Plastics, discharge a relatively low volume (estimated to be 0.13 MGD) to the City sewer. Based on our knowledge of these processes, no PFCs would be expected in this water.

In October 2004, 3M entered into a Memorandum of Understanding (MOU) with the U.S. Environmental Protection Agency (EPA) to conduct a site-related environmental assessment for perfluorooctanoic acid (PFOA). This MOU and the work plan carried out by the company have been previously discussed with Decatur Utilities on January 18, 2007. PFOA was used in manufacturing at the 3M Decatur facility through 2004. As part of this MOU, 3M agreed to sample and analyze wastewater sludge and treated wastewater effluent from the Decatur Utilities Dry Creek WWTP. Samples were collected on May 3, 2005.

Analytical results for Decatur Utilities Dry Creek WWTP samples are reported below and include analyses of three other PFCs: PFOS, PFHS, and PFBS. Based on this data, a second round of samples was collected April 13, 2006. Sample locations were expanded to include the influent to the Decatur Utilities Dry Creek WWTP as well as the sanitary wastewater effluent from the 3M Decatur facility. The sanitary wastewater effluent sample was collected as a single grab sample from the wet well of the lift station located at the 3M facility. Results

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facility. Results from this second round of sampling are also summarized below. As can be noted, the results for the 3M sanitary wastewater for PFC's are very low.

Sample Date	Sample Description	Average PFOA, ppb	Average PFOS, ppb	Average PFHS, ppb	Average PFBS, ppb
3-May-05	Dry Creek WWTP Effluent	17.4	2.85	0.297	0.102
3-May-05	Dry Creek WWTP Sludge	528 (683)	2110 (1930)	14.7 (14.0)	ND (1.59)
13-Apr-06	Dry Creek WWTP Influent	4.27	0.732	0.102	0.0677
13-Apr-06	Dry Creek WWTP Effluent	7.08	0.571	0.104	0.0823
13-Apr-06	Dry Creek WWTP Sludge	1875	1400	5.24	3.30
13-Apr-06	3M Sanitary Wastewater	4.63	4.48	0.812	0.309

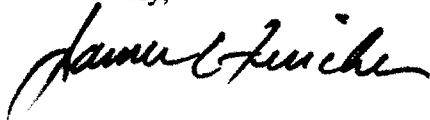
Units are ng/mL for aqueous samples and ng/g (dry weight) for sludge samples.
Concentrations in parentheses are field duplicate results.
ND = not detected at or above 0.2 ng/g (wet weight).

As part of the MOU work with U.S. EPA, 3M also collected leachate samples from the Morgan County Landfill and analyzed for PFOA, PFOS, PFHS, and PFBS. Our understanding is that this leachate is treated at the Decatur Utilities Dry Creek WWTP. Although, we do not have specific information concerning the volumetric flow of leachate to the Decatur Utilities Dry Creek WWTP, we can provide the following data from leachate sampling:

Sample Date	Sample Description	Average PFOA, ppb	Average PFOS, ppb	Average PFHS, ppb	Average PFBS, ppb
9-Jun-05	Morgan County Landfill Leachate	43.1	43.2	17.0	9.17
14-Apr-06	Morgan County Landfill Leachate	48.7	27.4	17.3	5.49

If you have any questions, comments or would like to discuss this matter further, please contact me at the above address or call me at (256) 552-6300.

Sincerely,



Jim Fincher
Site Manager
3M Decatur - Building 1

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c: Phil Wirey – 3M Decatur
Gary Hohenstein – 3M EHS Operations, St. Paul, MN

bc: J.B. Sweeney – 42-2E-27
M.A. Santoro – 236-1B-10
W.M. Nelson – 225-1S-15
M.A. Nash – 220-9E-02

MATERIAL SAFETY DATA SHEET 3M
 3M Center
 St. Paul, Minnesota
 55144-1000
 1-800-364-3577 or (651) 737-6501 (24 hours)

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DIVISION: 3M SPECIALTY MATERIALS
 TRADE NAME:
 FC-143 FLUORAD Brand Fluorochemical Surfactant
 ID NUMBER/U.P.C.:
 ZF-0002-0378-4 - - -
 ISSUED: August 27, 2001
 SUPERSEDES: August 25, 2000
 DOCUMENT: 10-3808-2

1. INGREDIENT	C.A.S. NO.	PERCENT
AMMONIUM PERFLUOROOCTANOATE.....	3825-26-1	96.5 - 100
AMMONIUM PERFLUOROHEXANOATE.....	21615-47-4	0 - 1.5
AMMONIUM PERFLUROHEPTANOATE.....	6130-43-4	0 - 1
HEPTADEC AFLUORONONANOIC ACID, AMMONIUM SALT.....	4149-60-4	0 - 1

The components of this product are in compliance with the chemical
 notification requirements of TSCA. All applicable chemical
 ingredients in this material are listed on the European Inventory of
 Existing Chemical Substances (EINECS), or are exempt polymers whose
 monomers are listed on EINECS.

This product contains the following toxic chemical or chemicals subject to
 the reporting requirements of Section 313 of Title III of the Emergency
 Planning and Community Right-To-Know Act of 1986 and 40 CFR Part 372:

AMMONIUM PERFLUROHEXANOATE
 AMMONIUM PERFLUROHEPTANOATE
 HEPTADEC AFLUORONONANOIC ACID, AMMONIUM
 SALT

2. PHYSICAL DATA

BOILING POINT:..... N/A
 VAPOR PRESSURE:..... N/A
 VAPOR DENSITY:..... N/A
 EVAPORATION RATE:..... N/A
 SOLUBILITY IN WATER:..... apprec.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

2. PHYSICAL DATA (continued)

SPECIFIC GRAVITY:..... 0.4 - 0.5 Water=1
(Bulk)
PERCENT VOLATILE:..... N/A
pH:..... 4 - 7
(2% aqueous solution)
VISCOSITY:..... N/A
MELTING POINT:..... N/A

APPEARANCE AND ODOR:
Solid, Light colored powder; slight odor.

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... Non-flammable
FLAMMABLE LIMITS - LEL:..... N/A
FLAMMABLE LIMITS - UEL:..... N/A
AUTOIGNITION TEMPERATURE:..... N/A

EXTINGUISHING MEDIA:
Water, Carbon dioxide, Dry chemical, Foam

SPECIAL FIRE FIGHTING PROCEDURES:
Wear full protective clothing, including helmet, self-contained,
positive pressure or pressure demand breathing apparatus, bunker coat
and pants, bands around arms, waist and legs, face mask, and
protective covering for exposed areas of the head.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS/CONDITIONS TO AVOID:
Not Applicable

HAZARDOUS POLYMERIZATION: Hazardous polymerization will not occur.

HAZARDOUS DECOMPOSITION PRODUCTS:
Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen
Fluoride, Ammonia.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Observe precautions from other sections. Collect spilled material. Use wet sweeping compound or water to avoid dusting. Clean up residue. Place in a closed container.

RECOMMENDED DISPOSAL:

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF. Do not dispose of in a sanitary landfill. Disposal alternative: Dispose of waste product in a facility permitted to accept chemical waste.

ENVIRONMENTAL DATA:

SUPPORTING DATA:

BIODEGRADATION:

Theoretical Oxygen Demand (ThOD): 0.320 g/g
Chemical Oxygen Demand (COD): 0.0007 g/g
20-Day Biochemical Oxygen Demand (BOD20): Nil

AQUATIC TOXICITY:

Fathead minnow (*Pimephales promelas*) 96-hr LC50: 766 mg/L
Water flea (*Daphnia magna*) 48-hr EC50: 632 mg/L
Bluegill sunfish (*Lepomis macrochirus*) 96-hr EC50: 569 mg/L
Green Algae (*Selenastrum capricornutum*) 14-Day EC50:
>1000 mg/L
Microtox (*Photobacterium phosphoreum*) 30-min EC50: 730 mg/L

BIONCONCENTRATION:

BCF = 1.8

REGULATORY INFORMATION:

Volatile Organic Compounds: N/A.
VOC Less H2O & Exempt Solvents: N/A.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

The components of this product are in compliance with the chemical registration requirements of TSCA, EINECS, CDSL, AICS, MITI, KECI and PICCS.

OTHER ENVIRONMENTAL INFORMATION:

This substance has minimal toxicity to aquatic organisms (100 mg/L < Lowest LC50, EC50, or IC50 < or = 1000 mg/L).

No data are available on the toxicity effects of this substance on wastewater treatment system organisms.

This product can potentially generate Perfluorooctanoate anion,

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

5. ENVIRONMENTAL INFORMATION (continued)

either through dissociation or metabolism, which has the potential to resist degradation and persist in the environment.

EPCRA HAZARD CLASS:

FIRE HAZARD: No PRESSURE: No REACTIVITY: No ACUTE: Yes CHRONIC: Yes

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Flush skin with large amounts of water. If irritation persists, get medical attention.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: nitrile rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials:
polyethylene/polyvinylidene chloride (Saranex)

Use disposable shoe/boot covering or rubber boots. Disposable fabric is preferable for all protective garments.

RECOMMENDED VENTILATION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

7. PRECAUTIONARY INFORMATION (continued)

RESPIRATORY PROTECTION:

Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water. Wash hands after handling and before eating.

RECOMMENDED STORAGE:

Store away from areas where product may come into contact with food or pharmaceuticals. Store at room temperature. Keep container closed when not in use.

PREVENT MOISTURE CONTAMINATION TO KEEP POWDER FREE FLOWING.

FIRE AND EXPLOSION AVOIDANCE:

Nonflammable.

OTHER PRECAUTIONARY INFORMATION:

No smoking: Smoking while using this product can result in contamination of the tobacco and/or smoke and lead to the formation of the hazardous decomposition products mentioned in the Reactivity Data section of this MSDS. Store work clothes separately from other clothing, food and tobacco products. Wash contaminated clothing thoroughly before re-use. Discard contaminated leather clothing. Decontaminate work surfaces frequently to avoid exposure by contact.

HMS HAZARD RATINGS: HEALTH: 3 FLAMMABILITY: 0 REACTIVITY: 0
PERSONAL PROTECTION: X (See precautions, section 7.)

EXPOSURE LIMITS

INGREDIENT	VALUE	UNIT	TYPE	AUTH	SKIN*
AMMONIUM PERFLUOROOCANOATE.....	0.01	MG/M3	TWA	ACGIH	Y
AMMONIUM PERFLUROHEXANOATE.....	0.1	MG/M3	TWA	3M	Y
AMMONIUM PERFLUROHEPTANOATE.....	0.1	MG/M3	TWA	3M	Y
HEPTADECALFLURONONANOIC ACID, AMMONIUM SALT.....	NONE	NONE	NONE	NONE	

* SKIN NOTATION: Listed substances indicated with 'Y' under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- 3M: 3M Recommended Exposure Guidelines

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

EXPOSURE LIMITS (continued)

INGREDIENT	VALUE	UNIT	TYPE	AUTH	SKIN*

- ACGIH: American Conference of Governmental Industrial Hygienists					
- NONE: None Established					

8. HEALTH HAZARD DATA

EYE CONTACT:

Moderate Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, and hazy vision.

SKIN CONTACT:

Mild Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and produce effects similiar to those caused by inhalation and/or ingestion.

INHALATION:

Illness requiring medical attention may result from a single exposure by inhalation to moderate quantities of this material.

May be absorbed by inhalation and persist in the body for an extended time.

Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

This product can potentially generate Perfluorooctanoate anion, either through dissociation or metabolism. Animal studies conducted on Perfluorooctanoate anion indicate effects including liver disturbances, weight loss, loss of appetite, adrenal and hematologic effects, and benign tumors of the liver, pancreas and testes of male rats. There are no known human health effects from anticipated exposure to this Perfluorooctanoate anion when used as intended and instructed.

Illness may result from a single swallowing of a moderate quantity of this material.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

8. HEALTH HAZARD DATA (continued)

CANCER:

A mixture of ammonium perfluorooctanoate, ammonium perfluoroheptanoate, ammonium perfluoropentanoate and ammonium perfluorohexanoate, that was 93 to 97% AMMONIUM PERFLUOROOCCTANOATE (3825-26-1) was fed to albino rats for 2 years, no compound induced carcinogenicity was found in the study. There were statistically significant compound related benign testicular tumors. In a second two-year study there were statistically significant compound related benign tumors in the liver, pancreas, and testis when compared to ad libitum and pair-fed controls. Based on the current knowledge, these findings have no human health implications. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

MUTAGENICITY:

Not mutagenic in invitro mutagenicity assays. Did not cause cell transformation in a mammalian cell transformation assay.

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

Not teratogenic in rabbits by oral administration. Not teratogenic to rats by gavage or inhalation exposures.

OTHER HEALTH HAZARD INFORMATION:

A Product Toxicity Summary Sheet is available.

The presence of organic fluorochemicals in the blood of the general population and subpopulations, such as workers, has been published dating back to the 1970's. 3M's epidemiological study of its own workers indicates no adverse effects.

This product can potentially generate Perfluorooctanoate anion, either through dissociation or metabolism. Perfluorooctanoate anion has the potential to be absorbed and remain in the body for long periods of time and may accumulate with repeated exposures. There are no known human health effects from anticipated exposure to this Perfluorooctanoate anion when used as intended and instructed.

SECTION CHANGE DATES

HEADING	SECTION CHANGED SINCE August 25, 2000	ISSUE
PRECAUTIONARY INFO.	SECTION CHANGED SINCE August 25, 2000	ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

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DIVISION: 3M SPECIALTY MATERIALS

TRADE NAME:

FC-95 FLUORAD Brand Fluorochemical Surfactant

ID NUMBER/U.P.C.:

98-0207-0103-7 00-51135-09054-1 98-0207-0104-5 00-51135-09055-8
 98-0211-0888-5 00-51135-09362-7 98-0211-3916-1 00-51135-02311-2
 ZF-0002-1044-1 - - -

ISSUED: May 09, 2001

SUPERSEDES: May 18, 2000

DOCUMENT: 10-3796-9

1. INGREDIENT	C.A.S. NO.	PERCENT
POTASSIUM PERFLUOROALKYL SULFONATE.....	2795-39-3	82 - 86
POTASSIUM PERFLUOROALKYL SULFONATE.....	3871-99-6	3 - 8
POTASSIUM PERFLUOROALKYL SULFONATE.....	29420-49-3	3 - 7
POTASSIUM PERFLUOROALKYL SULFONATE.....	60270-55-5	2 - 6
POTASSIUM PERFLUOROALKYL SULFONATE.....	3872-25-1	1 - 3

The components of this product are in compliance with the chemical
 notification requirements of TSCA. All applicable chemical
 ingredients in this material are listed on the European Inventory of
 Existing Chemical Substances (EINECS), or are exempt polymers whose
 monomers are listed on EINECS.

2. PHYSICAL DATA

BOILING POINT:..... N/A
 VAPOR PRESSURE:..... N/A
 VAPOR DENSITY:..... N/A
 EVAPORATION RATE:..... N/A
 SOLUBILITY IN WATER:..... 570 mg/l
 SPECIFIC GRAVITY:..... ca. 0.6 Water=1
 (Bulk)
 PERCENT VOLATILE:..... 0 %
 pH:..... 7 - 8
 (0.1% Aqueous)
 VISCOSITY:..... N/A

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

2. PHYSICAL DATA (continued)

MELTING POINT:..... > 400 C

APPEARANCE AND ODOR:

Solid, Light colored, free flowing powder.

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... None

FLAMMABLE LIMITS - LEL:..... N/A

FLAMMABLE LIMITS - UEL:..... N/A

AUTOIGNITION TEMPERATURE:..... N/A

EXTINGUISHING MEDIA:

Water, Carbon dioxide, Dry chemical, Foam

SPECIAL FIRE FIGHTING PROCEDURES:

Wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

NFPA HAZARD CODES: HEALTH: 1 FIRE: 0 REACTIVITY: 0

UNUSUAL REACTION HAZARD: none

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS/CONDITIONS TO AVOID:

Not applicable.

HAZARDOUS POLYMERIZATION: Hazardous polymerization will not occur.

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Sulfur, Hydrogen Fluoride, Toxic Vapors, Gases or Particulates.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Observe precautions from other sections. Vacuum, use wet sweeping compound or water to avoid dusting. CAUTION! A vacuum cleaner could be an ignition source. Clean up residue with water. Place in a closed container.

RECOMMENDED DISPOSAL:

Do not release to waterways or sewer. Do not use in products or processes that could result in aquatic concentrations greater than 1/10 of the lowest EC50 or LC50 concentration. Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF.

ENVIRONMENTAL DATA:

96-Hr. Aquatic Fish LC50, Fathead Minnow (*Pimephales promelas*)=38 mg/l, Bluegill Sunfish (*Lepomis macrochirus*)=68 mg/l, Rainbow Trout (*Salmo gairdneri*)=11 mg/l; 48-Hr. EC50, *Daphnia Magna* = 50 mg/l; COD=.004 g/g; BOD20 = Nil.

REGULATORY INFORMATION:

Volatile Organic Compounds: N/A.
VOC Less H2O & Exempt Solvents: N/A.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

This product complies with the chemical registration requirements of TSCA, EINECS, CDSL, AICS, MITI and Korea.

OTHER ENVIRONMENTAL INFORMATION:

EPCRA 311/312 Reportable Quantity = Not Reportable.

This product contains one or more organic fluorochemicals that have the potential to resist degradation and persist in the environment.

EPCRA HAZARD CLASS:

FIRE HAZARD: No PRESSURE: No REACTIVITY: No ACUTE: Yes CHRONIC: Yes

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

6. SUGGESTED FIRST AID (continued)

SKIN CONTACT:

Immediately flush skin with large amounts of water. Remove contaminated clothing. If irritation persists, call a physician. Wash contaminated clothing before reuse.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex).

RECOMMENDED VENTILATION:

If exhaust ventilation is not adequate, use appropriate respiratory protection. Provide ventilation adequate to control vapor concentrations below recommended exposure limits and/or control spray or mist.

RESPIRATORY PROTECTION:

Avoid breathing of vapors created during the cure cycle. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: half-mask dust and mist respirator, half-mask supplied air respirator, full-face dust and mist respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water. Wash hands after handling and before eating.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

7. PRECAUTIONARY INFORMATION (continued)

RECOMMENDED STORAGE:

Store away from areas where product may come into contact with food or pharmaceuticals. Store at room temperature. Keep container dry. Keep container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:

Nonflammable.

OTHER PRECAUTIONARY INFORMATION:

No smoking: Smoking while using this product can result in contamination of the tobacco and/or smoke and lead to the formation of the hazardous decomposition products mentioned in the Reactivity Data section of this MSDS.

HMS HAZARD RATINGS: HEALTH: 2 FLAMMABILITY: 0 REACTIVITY: 0
PERSONAL PROTECTION: X (See precautions, section 7.)

EXPOSURE LIMITS

INGREDIENT	VALUE	UNIT	TYPE	AUTH	SKIN*
POTASSIUM PERFLUOROALKYL SULFONATE...	0.1	MG/M3	TWA	3M	Y
POTASSIUM PERFLUOROALKYL SULFONATE...	0.1	MG/M3	TWA	3M	Y
POTASSIUM PERFLUOROALKYL SULFONATE...	0.1	MG/M3	TWA	3M	Y
POTASSIUM PERFLUOROALKYL SULFONATE...	0.1	MG/M3	TWA	3M	Y
POTASSIUM PERFLUOROALKYL SULFONATE...	0.1	MG/M3	TWA	3M	Y

* SKIN NOTATION: Listed substances indicated with 'Y' under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- 3M: 3M Recommended Exposure Guidelines

8. HEALTH HAZARD DATA

EYE CONTACT:

Mild Eye Irritation: signs/symptoms can include redness, swelling, pain, and tearing.

SKIN CONTACT:

Mild Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and produce effects similar to those caused by inhalation and/or ingestion.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

8. HEALTH HAZARD DATA (continued)

INHALATION:

May be harmful if inhaled.

Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include
soreness of the nose and throat, coughing and sneezing.

IF SWALLOWED:

Animal studies conducted on organic fluorochemicals which are present
in this product indicate effects including liver disturbances, weight
loss, loss of appetite, lethargy, and neurological, pancreatic,
adrenal and hematologic effects. There are no known human health
effects from anticipated exposure to these organic fluorochemicals
when used as intended and instructed.

Illness may result from a single swallowing of a moderate quantity of
this material.

Ingestion may cause:

Aspiration Pneumonitis: signs/symptoms can include coughing,
difficulty breathing, wheezing, coughing up blood and pneumonia,
which can be fatal.

MUTAGENICITY:

Mutagenicity assays indicate the product is not mutagenic.

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

Not teratogenic in the rat at oral doses below maternally toxic
levels.

OTHER HEALTH HAZARD INFORMATION:

A Product Toxicity Summary Sheet is available.

This product contains one or more organic fluorochemicals that have
the potential to be absorbed and remain in the body for long periods
of time, either as the parent molecule or as metabolites, and may
accumulate with repeated exposures. There are no known human health
effects from anticipated exposure to these organic fluorochemicals
when used as intended and instructed.

The presence of organic fluorochemicals in the blood of the general
population and subpopulations, such as workers, has been published
dating back to the 1970's. 3M's epidemiological study of its own
workers indicates no adverse effects.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

SECTION CHANGE DATES

ENVIRONMENTAL INFO. SECTION CHANGED SINCE May 18, 2000 ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

The information in this Material Safety Data Sheet (MSDS) is believed to be correct as of the date issued. 3M MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR COURSE OF PERFORMANCE OR USAGE OF TRADE. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's method of use or application. Given the variety of factors that can affect the use and application of a 3M product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for user's method of use or application.

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Final Report

Fluorochemical Characterization of Aqueous Samples, Decatur Sanitary Sewage Samples – December 2008

Laboratory Request Number: E08-0726

Method Requirement: 3M Method ETS-8-154.3

ETS-8-154.3: "Determination of Perfluorinated Acids, Alcohols, Amides, and Sulfonates in
Water by Solid Phase Extraction and High Performance Liquid Chromatography/Mass
Spectrometry"

Report Date – January 15, 2009

Testing Laboratory

3M EHS Operations
3M Environmental Laboratory
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Requester

Phil Wirey
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Decatur, AL
Phone: (256) 552-6631



The testing reported herein meet the requirements of ISO/IEC 17025-2005 "General Requirements for the Competence of Testing and Calibration Laboratories", in accordance with the A2LA Certificate #2052-01. Testing that complies with this International Standard also operate in accordance with ISO 9001:2000.

Certificate #2052-01

3M Environmental Laboratory

3M Environmental Laboratory Technical Manager: William K. Reagen, Ph.D.

3M Principal Analytical Investigator and Report Author: Susan Wolf

Analytical Report E08-0726

Fluorochemical Characterization of Aqueous Samples, Decatur Sanitary Sewage Samples
December 2008

Report Date: January 15, 2009

1 Introduction/Summary

The 3M Environmental Laboratory prepared and analyzed sanitary sewage samples collected by Alabama Department of Environmental Management (ADEM) personnel from the 3M Decatur facility. Samples were collected on December 29, 2008 and returned to the 3M Environmental Laboratory for the analysis for fourteen fluorochemical compounds under laboratory project number E08-0726.

As this was an unscheduled sampling event, sample bottles for field spikes were not prepared and sent to the facility prior to sampling. In lieu of field matrix spikes, laboratory matrix spike samples were prepared on the samples prior to sample preparation.

Samples were prepared and analyzed using method ETS-8-154.3 "Determination of Perfluorinated Acids, Alcohols, Amides, and Sulfonates in Water by Solid Phase Extraction and High Performance Liquid Chromatography/Mass Spectrometry".

Table 1 summarizes the sample results using the analytical methods identified above. All results for quality control samples prepared and analyzed with the samples will be reported and discussed elsewhere in this report.



The testing reported herein meet the requirements of ISO/IEC 17025-2005 "General Requirements for the Competence of Testing and Calibration Laboratories", in accordance with the A2LA Certificate #2052-01. Testing that complies with this International Standard also operate in accordance with ISO 9001:2000.

Certificate #2052-01

Table 1. Sample Results Summary⁽¹⁾

3M LIMS ID	Sample Description	PFBA Concentration (ng/mL)	PFPeA Concentration (ng/mL)	PFHxA Concentration (ng/mL)	PFHpA Concentration (ng/mL)	PFOA Concentration (ng/mL)	PFNA Concentration (ng/mL)	PFDA Concentration (ng/mL)
E08-0726-001	3M Decatur Sanitary Sewage Sample	6.05	3.11	6.31	6.41	20.3	0.187	0.0733
E08-0726-001 Dup	3M Decatur Sanitary Sewage Sample	6.14	3.23	6.67	6.49	21.0	0.197	0.0743
	Average	6.10	3.17	6.49	6.45	20.7	0.192	0.0738
	%RPD Sample/Sample Dup	1.5	3.8	5.5	1.2	3.4	5.2	1.4
E08-0726-002	3M Decatur Sanitary Sewage Sample	5.99	3.26	6.51	6.82	20.4	0.190	0.0743
E08-0726-002 Dup	3M Decatur Sanitary Sewage Sample	6.10	3.29	6.68	7.06	20.5	0.198	0.0705
	Average	6.05	3.28	6.60	6.94	20.5	0.194	0.0724
	%RPD Sample/Sample Dup	1.8	0.92	2.6	3.5	0.49	4.1	5.2
E08-0726-003	3M Decatur Sanitary Sewage Sample	6.17	3.37	7.01	7.13	21.3	0.195	0.0735
E08-0726-003 Dup	3M Decatur Sanitary Sewage Sample	6.40	3.43	6.94	7.22	21.4	0.200	0.0707
	Average	6.29	3.40	6.98	7.18	21.4	0.198	0.0721
	%RPD Sample/Sample Dup	3.7	1.8	1.0	1.3	0.47	2.5	3.9
E08-0726-004	3M Decatur Sanitary Sewage Sample	6.29	3.43	7.22	7.30	22.0	0.208	0.0800
E08-0726-004 Dup	3M Decatur Sanitary Sewage Sample	6.27	3.33	7.07	6.75	21.3	0.195	0.0778
	Average	6.28	3.38	7.15	7.03	21.7	0.202	0.0789
	%RPD Sample/Sample Dup	0.32	3.0	2.1	7.8	3.2	6.5	2.8

NA = Not Applicable

- (1) Samples were extracted by solid-phase extraction using method ETS-8-154.3 and analyzed on January 8, 2009. The analytical method uncertainties associated with the reported results are as follows: PFBA 100% ± 20%, PFPeA 100% ± 20%, PFHxA 100% ± 18%, PFHpA 100% ± 18%, PFOA 100% ± 25%, PFNA 100% ± 21%, PFDA 100% ± 18%, PFUnA 100% ± 17%, PFDoA, 100% ± 25%, PFBS 100% ± 20%, PFHS 100% ± 22%, and PFOS 100% ± 21%.
- (2) Analytical uncertainty adjusted for lab matrix spike recovery of 100% ± 40%.

Table 1 continued. Sample Results Summary⁽¹⁾

3M LIMS ID	Sample Description	PFUnA Concentration (ng/mL)	PFDaA Concentration (ng/mL)	PFBS Concentration (ng/mL)	PFHS Concentration (ng/mL)	PFOS Concentration (ng/mL)
E08-0726-001	3M Decatur Sanitary Sewage Sample	<0.0249	<0.0246	31.8	10.9	45.8
E08-0726-001 Dup	3M Decatur Sanitary Sewage Sample	<0.0249	<0.0246	32.3	11.2	46.7
Average		<0.0249	<0.0246	32.1	11.1	46.3 ⁽²⁾
%RPD Sample/Sample Dup		NA	NA	1.6	2.7	1.9
E08-0726-002	3M Decatur Sanitary Sewage Sample	<0.0249	<0.0246	35.7	11.1	43.8
E08-0726-002 Dup	3M Decatur Sanitary Sewage Sample	<0.0249	<0.0246	36.2	11.3	44.5
Average		<0.0249	<0.0246	36.0	11.2	44.2
%RPD Sample/Sample Dup		NA	NA	1.4	1.8	1.6
E08-0726-003	3M Decatur Sanitary Sewage Sample	<0.0249	<0.0246	34.5	11.8	43.3
E08-0726-003 Dup	3M Decatur Sanitary Sewage Sample	<0.0249	<0.0246	34.6	12.0	43.6
Average		<0.0249	<0.0246	34.6	11.9	43.5
%RPD Sample/Sample Dup		NA	NA	0.29	1.7	0.69
E08-0726-004	3M Decatur Sanitary Sewage Sample	<0.0249	<0.0246	31.4	12.0	45.1
E08-0726-004 Dup	3M Decatur Sanitary Sewage Sample	<0.0249	<0.0246	31.5	11.5	44.0
Average		<0.0249	<0.0246	31.5	11.8	44.6
%RPD Sample/Sample Dup		NA	NA	0.32	4.3	2.5

NA = Not Applicable

- (1) Samples were extracted by solid-phase extraction using method ETS-8-154.3 and analyzed on January 8, 2009. The analytical method uncertainties associated with the reported results are as follows: PFBA 100% ± 20%, PFPeA 100% ± 20%, PFHxA 100% ± 18%, PFHpA 100% ± 18%, PFOA 100% ± 25%, PFNA 100% ± 21%, PFDA 100% ± 18%, PFUnA 100% ± 17%, PFDaA, 100% ± 25%, PFBS 100% ± 20%, PFHS 100% ± 22%, and PFOS 100% ± 21%.
- (2) Analytical uncertainty adjusted for lab matrix spike recovery of 100% ± 40%.

2 Methods - Analytical and Preparatory

2.1 Methods

Analysis was completed following 3M Environmental Laboratory method ETS-8-154.3 "Determination of Perfluorinated Acids, Alcohols, Amides, and Sulfonates in Water by Solid Phase Extraction and High Performance Liquid Chromatography/Mass Spectrometry".

<i>Target Analytes</i>	<i>Acronym</i>	<i>Reference Material Structure</i>
Perfluorobutanesulfonate (C4 Sulfonate)	PFBS	Linear
Perfluorohexanesulfonate (C6 Sulfonate)	PFHS	Branched
Perfluorooctanesulfonate (C8 Sulfonate)	PFOS	Branched
Perfluorobutanoic Acid (C4 Acid)	PFBA	Linear
Perfluoropentanoic Acid (C5 Acid)	PFPeA	Linear
Perfluorohexanoic Acid (C6 Acid)	PFHxA	Linear
Perfluoroheptanoic Acid (C7 Acid)	PFHpA	Linear
Perfluorooctanoic Acid (C8 Acid)	PFOA	Branched
Perfluorononanoic Acid (C9 Acid)	PFNA	Linear
Perfluorodecanoic Acid (C10 Acid)	PFDA	Linear
Perfluoroundecanoic Acid (C11 Acid)	PFUnA	Linear
Perfluorododecanoic Acid (C12 Acid)	PFDoA	Linear

2.2 Sample Collection

Samples were collected on December 29, 2008 in Nalgene™ (high-density polyethylene) bottles. Collected sample bottles were returned to the laboratory at ambient conditions on December 30, 2008.

2.3 Sample Preparation

All samples, calibration standards, and associated quality control samples were extracted following ETS-8-154.3. Briefly, 40 mL of sample were loaded onto a pre-conditioned Waters tC18 solid-phase extraction (SPE) cartridge (1.0 g, 6 cc) using a vacuum manifold. The loaded SPE cartridges were then eluted with 5 mL of methanol. This extraction procedure concentrates the samples by a factor of eight. (Initial volume = 40 mL, final volume = 5 mL).

2.4 Analysis

All samples and quality control samples were analyzed for fourteen target analytes using high performance liquid chromatography/tandem mass spectrometry (HPLC/MS/MS). Pertinent instrument parameters, the liquid chromatography gradient program, and the specific mass transitions analyzed are described in the tables below.

Table 2. Instrument Parameters.

Instrument Name	ETS Ginger
Analytical Method Followed	ETS-8-154.3
Liquid Chromatograph	Agilent 1100
Guard column	Betasil C18 (2.1 mm X 100 mm), 5 μ
Analytical column	Betasil C18 (2.1 mm X 100 mm), 5μ
Injection Volume	5 or 2 μL
Mass Spectrometer	Applied Biosystems API 5000
Ion Source	Turbo Spray
Electrode	Turbo ion electrode
Polarity	Negative
Software	Analyst 1.4.2

Table 3. Liquid Chromatography Gradient Program.

Step Number	Total Time (min)	Flow Rate (μL/min)	Percent A (2 mM ammonium acetate)	Percent B (Methanol)
0	0	300	90.0	10.0
1	2.0	300	90.0	10.0
2	14.5	300	10.0	90.0
3	15.5	300	10.0	90.0
4	16.5	300	90.0	10.0
5	20.0	300	90.0	10.0

Table 4. Mass Transitions

Analyte	Mass Transition Q1/Q3	Analyte	Mass Transition Q1/Q3
PFBA	213/169	PFDoA	613/569
PFPeA	263/219		613/319
PFHxA	313/119		613/169
	313/269	PFBS	299/80
PFHpA	363/119		299/99
	363/219	PFHS	399/80
	363/169		399/99
PFOA	413/369	PFOS	499/99
	413/219		499/80
	413/169		499/130
PFNA	463/419	Dwell time was 50 msec for each transition. The acquisition method was broken into two time periods to accommodate the number of transitions being monitored.	
	463/169		
	463/219		
PFDA	513/469		
	513/269		
	513/219		
PFUnA	563/519		
	563/269		
	563/219		

3 Data Analysis

3.1 Calibration

Calibration standards were prepared by spiking known amounts of stock solutions containing the analytes of interest into 40 mL of reverse-osmosis purified water. Each spiked water standard was then extracted in the same manner as the collected samples. A total of twelve spiked standards ranging from 0.025 ng/mL to 25 ng/mL (nominal) were prepared. A quadratic, 1/x weighted, calibration curve was used to fit the data for each analyte. The data were not forced through zero during the fitting process. Calculating the standard concentration using the peak area counts and the resultant calibration curve confirmed accuracy of each curve point.

Each curve point was quantitated using the overall calibration curve and reviewed for accuracy. Method calibration accuracy requirements of $100 \pm 25\%$ ($100 \pm 30\%$ for the lowest curve point) were met for all analytes. The correlation coefficient (r) was greater than 0.995 for all analytes.

The stock standard used to prepare the calibration standards contained neat materials that have expired. The expired neat materials have been sent out for recertification and are not expected to have any impact on the results contained in this report. A method deviation is included in the data package.

3.2 System Suitability

A calibration standard was analyzed four times at the beginning of the analytical sequence to demonstrate overall system suitability. All analytes met the acceptance criteria of less than or equal to 5% relative standard deviation (RSD) for peak area and retention time criteria of less than or equal to 2% RSD.

3.3 Limit of Quantitation (LOQ)

The LOQ as defined in method ETS-8-154.3 is the lowest non-zero calibration standard in the curve that meets linearity and accuracy requirements and for which the area counts are at least twice those of the appropriate blanks. The LOQs associated with the sample analysis are listed in the table below.

Table 5. LOQs

Analyte	LOQ, ng/mL
PFBA	0.0402
PFPeA	0.0244
PFHxA	0.0249
PFHpA	0.0249
PFOA	0.0245
PFNA	0.0250
PFDA	0.0248
PFOxA	0.0249
PFDoA	0.0246
PFBS	0.0247
PFHS	0.0247
PFOS	0.0244

3.4 Continuing Calibration

During the course of the analytical sequence, several continuing calibration verification samples (CCVs) were analyzed to confirm that the instrument response and the initial calibration curve were still in control. The method acceptance criteria of $100\% \pm 25\%$ was met for all analytes.

3.5 Blanks

Two types of blanks were prepared and analyzed with the samples: method blanks and solvent blanks. Each blank result was reviewed and used to evaluate method performance to determine the LOQ for each analyte.

3.6 Lab Control Spikes (LCSs)

Low and high lab control spikes were prepared and analyzed in triplicate. LCSs were prepared by spiking known amounts of the analytes into 40 mL of reverse-osmosis matrix matched blank water to produce the desired concentration. The spiked water samples were then extracted and analyzed in the same manner as the samples. Analysis of triplicate LCSs at the two specified levels cross-validates the analytical method as used here for any modifications/deviations from ETS 8-154.3. The method acceptance criteria states that the average recovery of all LCS be between 80%-120% with a RSD \leq 20%. All LCS samples met method acceptance criteria and were used in the determination of analytical uncertainty where applicable.

The following calculations were used to generate data in Table 6.

$$\text{LCS Percent Recovery} = \frac{\text{Calculated Concentration}}{\text{Spike Concentration}} * 100\%$$

$$\text{LCS\% RSD} = \frac{\text{standard deviation LCS replicates}}{\text{average LCS recovery}} * 100\%$$

Table 6. Lab Control Spike Results.

ETS-8-154.3									
Lab ID	PFBA			PFPeA			PFHxA		
	Spiked Concentration (ng/mL)	Calculated Concentration (ng/mL)	%Recovery	Spiked Concentration (ng/mL)	Calculated Concentration (ng/mL)	%Recovery	Spiked Concentration (ng/mL)	Calculated Concentration (ng/mL)	%Recovery
LCS-090107-1	0.201	0.207	103	0.195	0.213	109	0.199	0.207	104
LCS-090107-2	0.201	0.236	118	0.195	0.227	116	0.199	0.229	115
LCS-090107-3	0.201	0.226	112	0.195	0.231	119	0.199	0.241	121
LCS-090107-4	5.02	5.26	105	4.88	4.95	101	4.99	4.98	99.7
LCS-090107-5	5.02	5.63	112	4.88	5.59	115	4.99	5.80	116
LCS-090107-6	5.02	6.45	129	4.88	5.81	119	4.99	6.05	121
Average ± %RSD	113% ± 8.4%			113% ± 6.2%			113% ± 7.9%		

ETS-8-154.3									
Lab ID	PFHpA			PFOA			PFNA		
	Spiked Concentration (ng/mL)	Calculated Concentration (ng/mL)	%Recovery	Spiked Concentration (ng/mL)	Calculated Concentration (ng/mL)	%Recovery	Spiked Concentration (ng/mL)	Calculated Concentration (ng/mL)	%Recovery
LCS-090107-1	0.199	0.208	104	0.196	0.205	105	0.200	0.208	104
LCS-090107-2	0.199	0.234	117	0.196	0.225	115	0.200	0.222	111
LCS-090107-3	0.199	0.225	113	0.196	0.235	120	0.200	0.228	114
LCS-090107-4	4.97	5.01	101	4.90	4.94	101	5.00	4.95	98.9
LCS-090107-5	4.97	5.51	111	4.90	5.70	116	5.00	5.63	113
LCS-090107-6	4.97	6.04	121	4.90	5.86	120	5.00	5.94	119
Average ± %RSD	111% ± 6.8%			113% ± 7.1%			110% ± 6.6%		

Table 6. Lab Control Spike Results continued.

ETS-8-154.3 Lab ID	PFDA			PFUnA			PFDoA		
	Spiked Concentration (ng/mL)	Calculated Concentration (ng/mL)	%Recovery	Spiked Concentration (ng/mL)	Calculated Concentration (ng/mL)	%Recovery	Spiked Concentration (ng/mL)	Calculated Concentration (ng/mL)	%Recovery
LCS-090107-1	0.199	0.188	94.3	0.199	0.185	92.8	0.197	0.197	100
LCS-090107-2	0.199	0.211	106	0.199	0.208	105	0.197	0.213	108
LCS-090107-3	0.199	0.208	104	0.199	0.198	99.5	0.197	0.210	107
LCS-090107-4	4.97	4.91	98.7	4.97	4.91	98.8	4.91	5.09	104
LCS-090107-5	4.97	5.59	113	4.97	5.78	116	4.91	6.21	126
LCS-090107-6	4.97	5.81	117	4.97	5.7	115	4.91	5.73	117
Average ± %RSD	106% ± 8.1%			105% ± 8.9%			110% ± 8.6%		

ETS-8-154.3 Lab ID	PFBS			PFHS			PFOS		
	Spiked Concentration (ng/mL)	Calculated Concentration (ng/mL)	%Recovery	Spiked Concentration (ng/mL)	Calculated Concentration (ng/mL)	%Recovery	Spiked Concentration (ng/mL)	Calculated Concentration (ng/mL)	%Recovery
LCS-090107-1	0.198	0.200	101	0.198	0.201	102	0.195	0.189	96.9
LCS-090107-2	0.198	0.218	110	0.198	0.220	111	0.195	0.210	108
LCS-090107-3	0.198	0.230	116	0.198	0.232	117	0.195	0.210	108
LCS-090107-4	4.94	5.04	102	4.94	5.06	102	4.88	4.80	98.5
LCS-090107-5	4.94	5.76	117	4.94	5.74	116	4.88	5.57	114
LCS-090107-6	4.94	5.95	120	4.94	5.96	121	4.88	5.77	118
Average ± %RSD	111% ± 7.3%			112% ± 7.2%			107% ± 7.8%		

3.7 Analytical Method Uncertainty

Analytical uncertainty is based on historical QC data that is control charted and used to evaluate method accuracy and precision. The method uncertainty is calculated following ETS-12-012.2. The standard deviation is calculated for the set of accuracy results (in %) obtained for the QC samples. The expanded uncertainty is calculated by multiplying the standard deviation by a factor of 2, which corresponds to a confidence level of 95%. Fifty data points were used to determine method uncertainty by this method.

Table 7. Analytical Method Uncertainty

Analyte	Standard Deviation	Method Uncertainty
PFBA	10.1	100%±20%
PFPeA	9.77	100%±20%
PFHxA	8.86	100%±18%
PFHpA	8.94	100%±18%
PFOA	12.4	100%±25%
PFNA	10.5	100%±21%
PFDA	8.80	100%±18%
PFUnA	8.46	100%±17%
PFDoA	12.4	100%±25%
PFBS	10.1	100%±20%
PFHS	11.1	100%±22%
PFOS	10.3	100%±21%

3.8 Lab Matrix Spikes (LMS)

Due to the lack of field matrix spike samples, laboratory matrix spikes were prepared on the samples prior to extraction. Low and high lab matrix spikes were prepared at nominal concentrations of 0.25 ppb and 10 ppb. Lab matrix spike recoveries within method acceptance criteria of 100±30% confirm that "unknown" components in the sample matrix do not significantly interfere with the extraction and analysis of the analytes of interest. Lab matrix spikes are presented in the section 4 of this report.

$$\text{LMS Recovery} = \frac{(\text{Sample Concentration of LMS} - \text{Average Concentration : Field Sample \& Field Sample Dup.})}{\text{Spike Concentration}} * 100\%$$

4 Data Summary and Discussion

The tables below summarize the sample results and lab matrix spike recoveries for the four samples submitted. Each table provides the average concentration and the relative percent difference (RPD) of the sample and sample duplicate. Results and average values are rounded to three significant figures according to EPA rounding rules. Percent relative difference (%RPD) values are rounded to two significant figures. Because of rounding, values may vary slightly from those listed in the raw data. Field matrix spikes meeting the method acceptance criteria of ± 30%, demonstrate that the method is appropriate for the given matrix.

E08-0726-001 – The most appropriate field matrix spike for PFOS did not meet method acceptance criteria with a recovery of 59.9%. The analytical uncertainty has been adjusted accordingly for PFOS to 100% ± 40%.

Table 8. 3M Decatur Sanitary Sewage.

3M LIMS ID	Description	PFBA		PFPeA		PFHxA	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-001	3M Decatur Sanitary Sewage Sample	6.05	NA	3.11	NA	6.31	NA
E08-0726-001 Dup	3M Decatur Sanitary Sewage Sample Dup	6.14	NA	3.23	NA	6.67	NA
E08-0726-001 LMS Low	0.25 ppb extracted LMS	6.70	NC	3.36	NC	6.82	NC
E08-0726-001 LMS High	10 ppb extracted LMS	14.8	87.1	12.6	96.5	15.9	94.4
Average Concentration (ng/mL) ± %RPD		6.10 ng/mL ± 1.5%		3.17 ng/mL ± 3.8%		6.49 ng/mL ± 5.5%	

3M LIMS ID	Description	PFHpA		PFOA		PFNA	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-001	3M Decatur Sanitary Sewage Sample	6.41	NA	20.3	NA	0.187	NA
E08-0726-001 Dup	3M Decatur Sanitary Sewage Sample Dup	6.49	NA	21.0	NA	0.197	NA
E08-0726-001 LMS Low	0.25 ppb extracted LMS	6.91	NC	20.8	NC	0.387	78.0
E08-0726-001 LMS High	10 ppb extracted LMS	15.1	86.9	31.1	107	7.71	75.3
Average Concentration (ng/mL) ± %RPD		6.45 ng/mL ± 1.2%		20.7 ng/mL ± 3.4%		0.192 ng/mL ± 5.2%	

NA = Not Applicable

NC = Not Calculated; Endogenous sample concentration greater than 5x spike level.

Table 8 continued. 3M Decatur Sanitary Sewage.

3M LIMS ID	Description	PFDA		PFUnA		PFDoA	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-001	3M Decatur Sanitary Sewage Sample	0.0733	NA	<0.0249	NA	<0.0246	NA
E08-0726-001 Dup	3M Decatur Sanitary Sewage Sample Dup	0.0743	NA	<0.0249	NA	<0.0246	NA
E08-0726-001 LMS Low	0.25 ppb extracted LMS	0.294	88.8	0.228	91.6	0.252	102
E08-0726-001 LMS High	10 ppb extracted LMS	8.41	83.9	7.65	77.0	9.18	93.4
Average Concentration (ng/mL) ± %RPD		0.0738 ng/mL ± 1.4%		<0.0249 ng/mL		<0.0246 ng/mL	

3M LIMS ID	Description	PFBS		PFHS		PFOS	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-001	3M Decatur Sanitary Sewage Sample	31.8	NA	10.9	NA	45.8	NA
E08-0726-001 Dup	3M Decatur Sanitary Sewage Sample Dup	32.3	NA	11.2	NA	46.7	NA
E08-0726-001 LMS Low	0.25 ppb extracted LMS	31.5	NC	11.2	NC	45.1	NC
E08-0726-001 LMS High	10 ppb extracted LMS	40.3	83.5	19.6	86.6	52.1	59.9 ⁽¹⁾
Average Concentration (ng/mL) ± %RPD		32.1 ng/mL ± 1.6%		11.1 ng/mL ± 2.7%		46.3 ng/mL ± 1.9%⁽²⁾	

NA = Not Applicable

NC = Not Calculated; Endogenous sample concentration greater than 5x spike level.

(1) Lab matrix spike did not meet method acceptance criteria of 100% ± 30%.

(2) Analytical uncertainty adjusted for lab matrix spike recovery of 100% ± 40%.

Table 9. 3M Decatur Sanitary Sewage.

3M LIMS ID	Description	PFBA		PFPeA		PFHxA	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-002	3M Decatur Sanitary Sewage Sample	5.99	NA	3.26	NA	6.51	NA
E08-0726-002 Dup	3M Decatur Sanitary Sewage Sample Dup	6.10	NA	3.29	NA	6.68	NA
E08-0726-002 LMS Low	0.25 ppb extracted LMS	5.75	NC	3.58	NC	6.98	NC
E08-0726-002 LMS High	10 ppb extracted LMS	16.2	102	14.0	110	17.5	109
Average Concentration (ng/mL) ± %RPD		6.05 ng/mL ± 1.8%		3.28 ng/mL ± 0.92%		6.60 ng/mL ± 2.6%	

3M LIMS ID	Description	PFHpA		PFOA		PFNA	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-002	3M Decatur Sanitary Sewage Sample	6.82	NA	20.4	NA	0.190	NA
E08-0726-002 Dup	3M Decatur Sanitary Sewage Sample Dup	7.06	NA	20.5	NA	0.198	NA
E08-0726-002 LMS Low	0.25 ppb extracted LMS	7.20	NC	20.9	NC	0.404	84.0
E08-0726-002 LMS High	10 ppb extracted LMS	17.1	102	32.9	127	9.10	89.1
Average Concentration (ng/mL) ± %RPD		6.94 ng/mL ± 3.5%		20.5 ng/mL ± 0.49%		0.194 ng/mL ± 4.1%	

NA = Not Applicable
NC = Not Calculated; Endogenous sample concentration greater than 5x spike level.

Table 9 continued. 3M Decatur Sanitary Sewage.

3M LIMS ID	Description	PFDA		PFUnA		PFDoA	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-002	3M Decatur Sanitary Sewage Sample	0.0743	NA	<0.0249	NA	<0.0246	NA
E08-0726-002 Dup	3M Decatur Sanitary Sewage Sample Dup	0.0705	NA	<0.0249	NA	<0.0246	NA
E08-0726-002 LMS Low	0.25 ppb extracted LMS	0.302	92.6	0.234	94.0	0.274	111
E08-0726-002 LMS High	10 ppb extracted LMS	9.47	94.5	8.31	83.6	9.55	97.2
Average Concentration (ng/mL) ± %RPD		0.0724 ng/mL ± 5.2%		<0.0249 ng/mL		<0.0246 ng/mL	

3M LIMS ID	Description	PFBS		PFHS		PFOS	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-002	3M Decatur Sanitary Sewage Sample	35.7	NA	11.1	NA	43.8	NA
E08-0726-002 Dup	3M Decatur Sanitary Sewage Sample Dup	36.2	NA	11.3	NA	44.5	NA
E08-0726-002 LMS Low	0.25 ppb extracted LMS	36.1	NC	11.5	NC	42.4	NC
E08-0726-002 LMS High	10 ppb extracted LMS	46.9	111	21.6	105	52.2	82.5
Average Concentration (ng/mL) ± %RPD		36.0 ng/mL ± 1.4%		11.2 ng/mL ± 1.8%		44.2 ng/mL ± 1.6%	

NA = Not Applicable
 NC = Not Calculated; Endogenous sample concentration greater than 5x spike level.

Table 10. 3M Decatur Sanitary Sewage.

3M LIMS ID	Description	PFBA		PFPeA		PFHxA	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-003	3M Decatur Sanitary Sewage Sample	6.17	NC	3.37	NC	7.01	NC
E08-0726-003 Dup	3M Decatur Sanitary Sewage Sample Dup	6.40	NC	3.43	NC	6.94	NC
E08-0726-003 LMS Low	0.25 ppb extracted LMS	6.55	NC	3.58	NC	7.16	NC
E08-0726-003 LMS High	10 ppb extracted LMS	17.1	108	14.5	114	18.3	114
Average Concentration (ng/mL) ± %RPD		6.29 ng/mL ± 3.7%		3.40 ng/mL ± 1.8%		6.98 ng/mL ± 1.0%	

3M LIMS ID	Description	PFHpA		PFOA		PFNA	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-003	3M Decatur Sanitary Sewage Sample	7.13	NC	21.3	NC	0.195	NC
E08-0726-003 Dup	3M Decatur Sanitary Sewage Sample Dup	7.22	NC	21.4	NC	0.200	NC
E08-0726-003 LMS Low	0.25 ppb extracted LMS	7.11	NC	20.4	NC	0.413	NC
E08-0726-003 LMS High	10 ppb extracted LMS	18.3	112	31.8	107	9.22	90.3
Average Concentration (ng/mL) ± %RPD		7.18 ng/mL ± 1.3%		21.4 ng/mL ± 0.47%		0.198 ng/mL ± 2.5%	

NA = Not Applicable
 NC = Not Calculated; Endogenous sample concentration greater than 5x spike level.

Table 10 continued. 3M Decatur Sanitary Sewage.

3M LIMS ID	Description	PFDA		PFUnA		PFDoA	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-003	3M Decatur Sanitary Sewage Sample	0.0735	NA	<0.0249	NA	<0.0246	NA
E08-0726-003 Dup	3M Decatur Sanitary Sewage Sample Dup	0.0707	NA	<0.0249	NA	<0.0246	NA
E08-0726-003 LMS Low	0.25 ppb extracted LMS	0.322	100.8	0.250	100	0.285	116
E08-0726-003 LMS High	10 ppb extracted LMS	9.88	98.7	9.30	93.6	11.1	113
Average Concentration (ng/mL) ± %RPD		0.0721 ng/mL ± 3.9%		<0.0249 ng/mL		<0.0246 ng/mL	

3M LIMS ID	Description	PFBS		PFHS		PFOS	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-003	3M Decatur Sanitary Sewage Sample	34.5	NA	11.8	NA	43.3	NA
E08-0726-003 Dup	3M Decatur Sanitary Sewage Sample Dup	34.6	NA	12.0	NA	43.6	NA
E08-0726-003 LMS Low	0.25 ppb extracted LMS	34.2	NC	11.4	NC	41.1	NC
E08-0726-003 LMS High	10 ppb extracted LMS	45.6	112	22.3	105	53.3	101
Average Concentration (ng/mL) ± %RPD		34.6 ng/mL ± 0.29%		11.9 ng/mL ± 1.7%		43.5 ng/mL ± 0.69%	

NA = Not Applicable
 NC = Not Calculated; Endogenous sample concentration greater than 5x spike level.

Table 11. 3M Decatur Sanitary Sewage.

3M LIMS ID	Description	PFBA		PFPeA		PFHxA	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-004	3M Decatur Sanitary Sewage Sample	6.29	NC	3.43	NC	7.22	NC
E08-0726-004 Dup	3M Decatur Sanitary Sewage Sample Dup	6.27	NC	3.33	NC	7.07	NC
E08-0726-004 LMS Low	0.25 ppb extracted LMS	6.48	NC	3.51	NC	7.04	NC
E08-0726-004 LMS High	10 ppb extracted LMS	16.4	101	14.6	115	18.2	111
Average Concentration (ng/mL) ± %RPD		6.28 ng/mL ± 0.32%		3.38 ng/mL ± 3.0%		7.15 ng/mL ± 2.1%	

3M LIMS ID	Description	PFHpA		PFOA		PFNA	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-004	3M Decatur Sanitary Sewage Sample	7.30	NC	22.0	NC	0.208	NC
E08-0726-004 Dup	3M Decatur Sanitary Sewage Sample Dup	6.75	NC	21.3	NC	0.195	NC
E08-0726-004 LMS Low	0.25 ppb extracted LMS	7.22	NC	21.0	NC	0.428	NC
E08-0726-004 LMS High	10 ppb extracted LMS	17.7	107	32.4	110	9.03	88.4
Average Concentration (ng/mL) ± %RPD		7.03 ng/mL ± 7.8%		21.7 ng/mL ± 3.2%		0.202 ng/mL ± 6.5%	

NA = Not Applicable
 NC = Not Calculated; Endogenous sample concentration greater than 5x spike level.

Table 11 continued. 3M Decatur Sanitary Sewage.

3M LIMS ID	Description	PFDA		PFUnA		PFDoA	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-004	3M Decatur Sanitary Sewage Sample	0.0800	NA	<0.0249	NA	<0.0246	NA
E08-0726-004 Dup	3M Decatur Sanitary Sewage Sample Dup	0.0778	NA	<0.0249	NA	<0.0246	NA
E08-0726-004 LMS Low	0.25 ppb extracted LMS	0.334	103	0.263	106	0.298	121
E08-0726-004 LMS High	10 ppb extracted LMS	10.2	102	9.35	94.1	10.9	111
Average Concentration (ng/mL) ± %RPD		0.0789 ng/mL ± 2.8%		<0.0249 ng/mL		<0.0246 ng/mL	

3M LIMS ID	Description	PFBS		PFHS		PFOS	
		Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery	Concentration (ng/mL)	%Recovery
E08-0726-004	3M Decatur Sanitary Sewage Sample	31.4	NA	12.0	NA	45.1	NA
E08-0726-004 Dup	3M Decatur Sanitary Sewage Sample Dup	31.5	NA	11.5	NA	44.0	NA
E08-0726-004 LMS Low	0.25 ppb extracted LMS	31.3	NC	12.0	NC	44.6	NC
E08-0726-004 LMS High	10 ppb extracted LMS	41.8	105	21.8	102	54.3	100
Average Concentration (ng/mL) ± %RPD		31.5 ng/mL ± 0.32%		11.8 ng/mL ± 4.3%		44.6 ng/mL ± 2.5%	

NA = Not Applicable
 NC = Not Calculated; Endogenous sample concentration greater than 5x spike level.

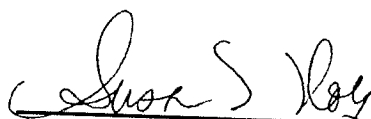
5 Conclusion

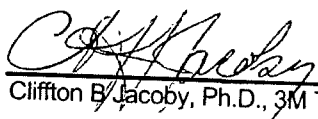
Laboratory control spikes were used to determine the analytical method accuracy and precision for all analytes. The accuracy and precision were then used to estimate the method uncertainty for the results. Lab matrix spike recoveries demonstrated that the analytical method was appropriate for the given sample matrix. Analysis was completed following 3M Environmental Laboratory method ETS-8-154.3 "Determination of Perfluorinated Acids, Alcohols, Amides, and Sulfonates in Water by Solid Phase Extraction and High Performance Liquid Chromatography/Mass Spectrometry". Analytical results are reported in Table 1 of this report.

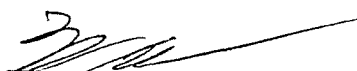
6 Data / Sample Retention

All remaining sample and associated project data (hardcopy and electronic) will be archived according to 3M Environmental Laboratory standard operating procedures.

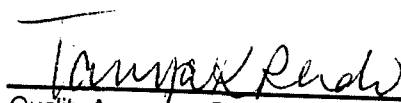
7 Signatures


Susan T. Wolf, 3M Principal Analytical Investigator
1-15-09
Date


Clifton B. Jacoby, Ph.D., 3M Technical Reviewer
15 Jan. 2009
Date


William K. Reagen, Ph.D., 3M Environmental Laboratory Manager
15 JAN 2009
Date

The 3M Environmental Laboratory's Quality Assurance Unit has audited the data and report for this project.


Quality Assurance Representative
1/15/09
Date