Voluntary Use and Exposure Information Profile
Perfluorodecane sulfonate

I. CHEMICAL IDENTIFICATION

Chemical Name: Perfluorodecane sulfonate (PDSF)
CAS Number: 335-77-3 (acid)
67906-42-7 (ammonium salt)

II. COMPANY IDENTIFICATION

Company Name: 3M

Site Location: 10746 Innovation Road
Cottage Grove, MN 55016

Technical Contact: W.A. Weppner
Phone: 651/733-6374
Address: 3M Center, Building 236-1B-10
St. Paul, MN 55144

III. ON-SITE ACTIVITIES

CAS # *	Mfg. (1997)	Imported
335-77-3	0	0
67906-42-7	0	0

Estimate the amount of subject chemical distributed off-site:

% of manufacture/import

*These materials are not produced during POSF (CAS #307-35-7) manufacture. Manufacturing did not occur in 1997 but did occur in1998 and 1999 at < 100,000 lbs.

If you have already provided the above information to EPA and it is still representative please reference that submission here:

Narrative Description and Process Flow Schematic:

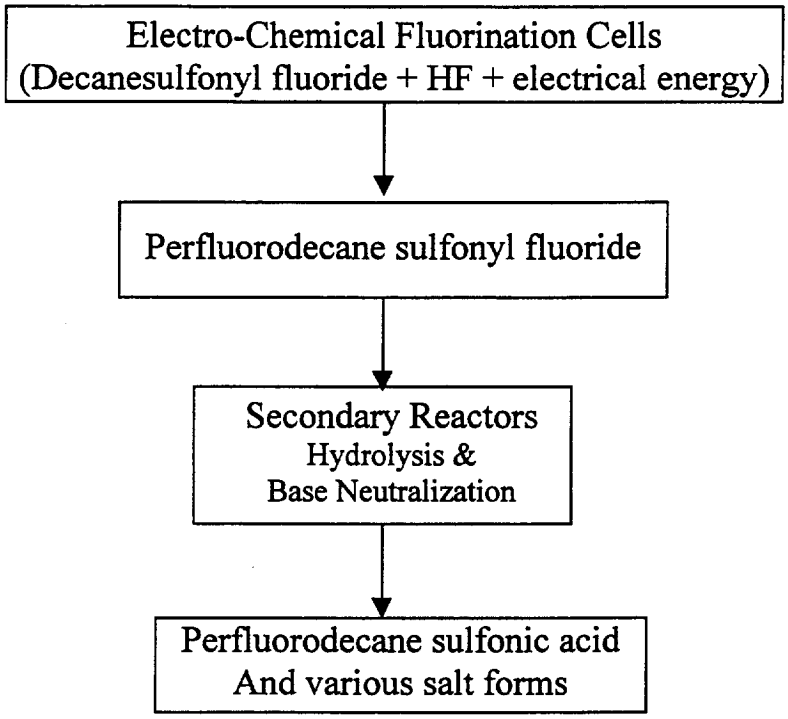
Perfluorodecane sulfonates are synthesized via the Simons Electro-Chemical Fluorination (ECF) process. The starting feedstock for this reaction is Decane Sufonyl Fluoride

$$C_{10}H_{21}SO_2F + 21\ HF \xrightarrow[ECF]{\text{Energy}} C_8F_{17}SO_2F + 21\ H_2$$

PDSF is not itself a commercially viable product, but is used as an intermediate in the manufacture for Perfluorodecane sulfonates. The perfluorodecane sulfonic acid is manufactured by hydrolyzing perfluorodecane sulfonyl fluoride to the corresponding sulfonic acid in batch reactors. The salts are manufactured by base neutralization of the acid to the salt in a separate reactor. The low sales volume and reactor availability dictate an infrequent production schedule for these chemicals.

The following block flow diagram describes the process discussed above.

BLOCK FLOW DIAGRAM



IV. SITE RELEASE AND TRANSFER INFORMATION FOR TRI CHEMICALS

Not applicable.

V. SITE RELEASE AND TRANSFER INFORMATION FOR NON-TRI CHEMICALS

While analytical methods have improved over time, large variability still exists for certain matrices and compounds, so data available for this report is mostly of a qualitative nature. Although limited monitoring data exists, most emission and waste estimates are based upon process models and engineering calculations. Engineering calculations, however, have limitations with respect to fluorochemicals because fluorochemical losses were not always included in the analysis of each intermediate step.

The accuracy of the emissions data submitted varies due to several factors. Batch process systems are difficult to measure due to quickly changing process conditions, venting pressures and difficulty in isolating processes to take measurements. Additionally, the unique characteristics of these compounds cause them to behave differently from conventional compounds, and physical chemical data properties are not available for all intermediate reaction steps in the past.

A. ON-SITE AIR RELEASES

Cottage Grove, MN

Engineering calculations and models of process vent emissions are used for estimates. Existing process emission information shows only minor losses through point source vents.

Fugitive emissions may have occurred during some handling steps but have not been quantified.

	Estimated Total Annual Releases (lbs.)	**Estimated % Accuracy of Estimate (optional)**	**# days/years release occurs**
Fugitive (non-point)	No data available.		
Stack (point)	< 1		

Comments:

B. WATER RELEASES FROM SITE

Cottage Grove, MN

1000 pounds of PDSF were estimated discharged to the wastewater treatment system in 1998. No data is available for 1997. The level of this compound discharged, based upon behavior of POSF in Decatur, is believed to be close to zero (<1% of total discharge).

Continued improvements in reducing material to the river are being undertaken by a wastewater emission reduction team and engineers at the facility.

	Estimated Total	**Estimated %**

	Annual Releases (lbs.)	Accuracy of Estimate (optional)
Water releases:	< 10	

Number of days/year release occurs: 6/year

Receiving Water Name: Mississippi

NPDES Number: MN00001449

Comments:

C. ON-SITE LAND RELEASES

Cottage Grove, MN

	Estimated Total Annual Releases (lbs.)	Estimated % Accuracy of Estimate (optional)
Landfill	0	
Land Treatment/Land Amendment	0	
Surface Impoundments	0	
Underground Injection	0	
Other (specify):		

Comments:

D. OFF-SITE TRANSFERS

Cottage Grove, MN

Process wastewaters are managed in an on-site wastewater treatment facility and are not sent to the POTW.

D1. Transfer to Publicly Owned Treatment Works (POTW)

Number of days/year the release occurs:

Annual Transfer (lb): 0

Estimated % Accuracy of Transfer Estimate (optional) (%):

POTW Name:
Street Address:
City: **Country:**
State: **Zip Code:**
NPDES Number:

Comments:

D2. TRANSFERS TO OTHER OFF-SITE LOCATIONS

General Waste Information: There is limited information by CAS number for compound specific reporting and off-site transfers cannot be readily verified. Rather, wastes are classified by halogen content, regulatory waste codes, physical properties and non-specific fluorochemical categories. Where wastes are tracked by CAS number, the amounts have been included. Incineration is now the primary disposal method for these wastes.

Cottage Grove, MN

Cottage Grove facility utilizes incineration for all their drummed wastes.

Sludge from the Cottage Grove facility is sent to an industrial landfill.

	Estimated Total Annual Releases (lbs.)	**Estimated % Accuracy of Estimate (optional)**
Incineration:	2,100	
Wastewater Treatment (Excluding POTW)	0	
Underground Injection	0	
Hazardous Waste (RCRA Subtitle C) landfill	0	
Other Landfill	0	
Recycle or Recovery	0	
Unknown or Other		

Comments:

VI. ON-SITE WORKPLACE EXPOSURE (335-77-3)

This information will assist EPA in characterizing the number of workers potentially exposed and the magnitude, frequency, and duration of potential exposure. When providing monitoring data, ensure that data is linked with worker activities described in question 2.

1. **Estimate the number of workers potentially exposed routinely to the subject chemical for each of the exposure duration times. If a worker is involved in more than one activity, enter only his/her most typical activity in the table. Don't count a worker more than once. The total number in the table should equal the total number of workers potentially exposed.**

	Days/Year			
Hours/Day	<10	10-100	100-250	>250
<.25	4	8		
.25-1	4	8		
1-8	4	4		
>8				

2. **Describe the routine worker activities to which the workers in question 1 are exposed: sampling, removal of filter cake, and drumming of liquids, manufacture an article, etc. For these activities, describe the physical state of the subject chemical (liquid, gas, particulate, or aerosol, etc.) and, if in a mixture, the chemical's concentration:**

The chemical (335-77-3) is a produced in an aqueous slurry, drained into drums. The material is vacuum charged as an aqueous slurry to produce other materials. Employees take quality samples during the process. The liquid product contains 33-43% 335-77-3.

3. **Provide industrial hygiene monitoring data, if available, with a brief description of the sampling method and exposure scenario monitored, e.g., describe the specific worker activities performed by the individuals monitored. For privacy considerations, please do not include any personal identifiers such as a worker's name or social security number with any data submitted to EPA.**

   There is no chemical-specific personal industrial hygiene monitoring data or area/source monitoring data for this specific material at this facility. For most areas of the facility, recent qualitative assessment of potential exposure to this material under 3M's ongoing industrial hygiene program indicates a low exposure potential to this material.

   Each 3M plant that produces sulfonated fluorochemicals has an industrial hygienist on staff and is supported by a corporate industrial hygiene group. 3M's industrial hygiene program focuses on task-based exposure assessment and control. Exposures are identified and assessed qualitatively and/or quantitatively. Qualitative assessments are performed by an industrial hygienist. Quantitative assessments include task-based personal sampling for certain, specific fluorochemicals and/or source or area sampling. The results of the assessments support decisions on exposure control. Engineering controls are preferred, but personal protective equipment may be used on an interim basis or when effective engineering control is not feasible.

4. **Briefly describe the engineering controls used to minimize exposure to this chemical:**

   Local exhaust ventilation is used at the drum tops during charging and drumming.

5. **Briefly list the personal protective equipment your workers regularly wear to prevent exposure of this chemical:**

   During sampling, employees wear full faceshields, rubber suits and boots, and PVC gloves. During charging and draining employees wear either full face supplied air respirators or full facepiece OVAG air-purifying respirators, butyl gloves, and rubber jackets.

   Comments: (This section is available to clarify the responses given. Attach additional pages if desired.)

VI. ON-SITE WORKPLACE EXPOSURE (67906-42-7)

This information will assist EPA in characterizing the number of workers potentially exposed and the magnitude, frequency, and duration of potential exposure. When providing monitoring data, ensure that data is linked with worker activities described in question 2.

1. **Estimate the number of workers potentially exposed routinely to the subject chemical for each of the exposure duration times. If a worker is involved in more than one activity, enter only his/her most typical activity in the table. Don't count a worker more than once. The total number in the table should equal the total number of workers potentially exposed.**

	Days/Year			
Hours/Day	<10	10-100	100-250	>250
<.25	4	8		
.25-1	4	8		
1-8	4	4		
>8				

2. **Describe the routine worker activities to which the workers in question 1 are exposed: sampling, removal of filter cake, and drumming of liquids, manufacture an article, etc. For these activities, describe the physical state of the subject chemical (liquid, gas, particulate, or aerosol, etc.) and, if in a mixture, the chemical's concentration:**

   The chemical (67906-42-7) is a produced in an alcohol-aqueous solution, drained into drums. Employees take quality samples during the process. The liquid product contains 25% 67906-42-7.

3. **Provide industrial hygiene monitoring data, if available, with a brief description of the sampling method and exposure scenario monitored, e.g., describe the specific worker activities performed by the individuals monitored. For privacy considerations, please do not include any personal identifiers such as a worker's name or social security number with any data submitted to EPA.**

   There is no chemical-specific personal industrial hygiene monitoring data or area/source monitoring data for this specific material at this facility. For most areas of the facility, recent qualitative assessment of potential exposure to this material under 3M's ongoing industrial hygiene program indicates a low exposure potential to this material.

Each 3M plant that produces sulfonated fluorochemicals has an industrial hygienist on staff and is supported by a corporate industrial hygiene group. 3M's industrial hygiene program focuses on task-based exposure assessment and control. Exposures are identified and assessed qualitatively and/or quantitatively. Qualitative assessments are performed by an industrial hygienist. Quantitative assessments include task-based personal sampling for certain, specific fluorochemicals and/or source or area sampling. The results of the assessments support decisions on exposure control. Engineering controls are preferred, but personal protective equipment may be used on an interim basis or when effective engineering control is not feasible.

4. **Briefly describe the engineering controls used to minimize exposure to this chemical:**

   Local exhaust ventilation is used at the drum tops during charging and drumming.

5. **Briefly list the personal protective equipment your workers regularly wear to prevent exposure of this chemical:**

   During sampling, employees wear full faceshields, rubber jackets and boots, and PVC gloves. During draining employees wear full facepiece OVAG air-purifying respirators, butyl gloves, and rubber jackets.

   Comments: (This section is available to clarify the responses given. Attach additional pages if desired.)

VII. CHEMICAL END USES

A. END USE AS AN INTERMEDIATE CONSUMED TO MAKE OTHER CHEMICALS

A1. On-Site Use as a Intermediate:

Perfluorodecane sulfonic acid (CAS #335-77-3) is used as an intermediate to make perfluorodecane sulfonate, ammonium salt (CAS #67906-42-7).

	Product chemical class or product chemical (Include CAS number if appropriate)	**% of total volume of subject chemical manufactured or imported**
1.	Perfluorodecane sulfonate, ammonium salt	50

As reported in Part III, p.2

A2. Off-Site Use as an Intermediate

	Product chemical class or product chemical (Include CAS number if appropriate)	**% of total volume of subject chemical manufactured or imported**
1.	Not Applicable	

B. END USES OTHER THAN AS A CONSUMED INTERMEDIATE

Use Number 1 of 2

Description of Chemical End Use: Chemical formulators use this chemical as a surfactant to improve wetting and leveling of products sold as floor polishes. Janitorial service firms are the end users.

Percent of total manufactured or imported volume going to this use: 10 ± 2

If used in a mixture check appropriate box to indicate weight fraction. Average values are acceptable:

- X <1% (0.01-0.02%)
- ___ 1-30%
- ___ 30-60%
- ___ 60-90%
- ___ >90%

Check all physical forms of the chemical during this use:

- ___ Aerosol
- ___ Dry Powder
- ___ Pellets or large crystals
- ___ Water or solvent – wet solid
- ___ Gas or vapor
- X Liquid solution
- ___ Other (Explain)

Use Number 2 of 2

Description of Chemical End Use: Chemical formulators use this chemical as a surfactant to improve wetting and leveling of products sold as floor polishes. Janitorial service firms are the end users.

Percent of total manufactured or imported volume going to this use: 40 ± 5

If used in a mixture check appropriate box to indicate weight fraction. Average values are acceptable:

- X <1% (0.01-0.02%)
- ___ 1-30%
- ___ 30-60%
- ___ 60-90%
- ___ >90%

Check all physical forms of the chemical during this use:

- ___ Aerosol
- ___ Dry Powder
- ___ Pellets or large crystals
- ___ Water or solvent – wet solid
- ___ Gas or vapor
- X Liquid solution
- ___ Other (Explain)