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3M General Offices

3M Center
St. Paul, MN 55144-1000
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July 7, 2000

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Charles Auer (E403C)
Director, Chemical Control Division
Office of Pollution Prevention and Toxics
Office of Prevention, Pesticides and Toxic Substances
US Environmental Protection Agency
401 M. Street, SW
Washington, DC

Re: Phase-out Plan for POSF-Based Products

Dear Mr. Auer:

As you know, on May 16, 2000 3M announced that it will be phasing out manufacture of products based on perfluorooctanyl chemistry. In that announcement, 3M indicated that production of these materials would be substantially discontinued by the end of 2000 and that the company would work with its customers to implement an orderly phase-out.

EPA has asked 3M to submit a detailed plan explaining how it intends to fulfill these commitments. This letter and attachments are provided in response to EPA's request. As discussed with the Agency, 3M's initial plan focuses on products derived from perfluorooctanesulfonyl fluoride (POSF); these products constitute over 95 percent of 3M's total production of perfluorooctanyl chemistries. Other products covered by 3M's May 16 announcement, including perfluorooctanoic acid (PFOA), will be separately discussed with EPA.

We appreciated the opportunity to discuss our phase-out plan with EPA staff on June 20. The Agency's comments at the meeting and in subsequent conversations were very helpful and are reflected in this letter and attachments. We have also continued to refine our plan on the basis of updated information. Because of these modifications, our latest submission reflects 3M's current phase-out plan and therefore supersedes our letters of June 16 and 23.

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INTRODUCTION AND OVERVIEW

During the past two years, 3M has communicated extensively with EPA about fluorochemical (FC) issues. We informed EPA management of our phase-out decision before it was announced publicly and EPA is familiar with the considerations on which that decision was based. In summary, 3M is discontinuing manufacture of perfluorooctanyl materials because of its commitment to responsible environmental management and sound business principles. 3M concluded that, in light of the persistence of certain FCs and their detection at extremely low levels in the blood of the general population and wildlife, other business opportunities were more deserving of the company's energies and attention than perfluorooctanyl-based chemistries. As

3M has repeatedly emphasized, all existing knowledge indicates that the presence of these chemistries in people and wildlife at the low levels detected does not pose a health or environmental risk.

In deciding how to implement its phase-out decision, 3M has been guided by two objectives. First, we wish to fulfill our commitment to accomplish a substantial phase-out of production as expeditiously as practicable. Second, we want to minimize marketplace disruption and provide for an orderly transition away from POSF-based products by the business sectors that depend on perfluorooctanyl chemistries. Balancing these considerations is extremely challenging because our POSF-based products are used in a wide range of applications with impacts on numerous segments of the economy.

We are still receiving and evaluating the information necessary to balance these complex considerations. However, this letter and attachments provide our best current understanding of how we will implement our phase-out plan for POSF-based products. As illustrated in *Attachment 1*, 3M's plan will result in a substantial reduction in production and import volumes after December 31, 2000. Limited further production, at significantly lower levels, will continue through the end of 2002. As shown in *Attachment 2*, production of POSF-derived materials will be reduced in 2001 to 12.3 percent of the projected 2000 baseline and would decline to 4.5 percent of the baseline in 2002. 3M anticipates that manufacture and import of affected products will cease entirely at the end of 2002. Thereafter, 3M will continue to distribute small volumes of certain previously manufactured products to specific customers.

After the end of the year, 3M manufacturing capacity will be committed entirely to certain proposed "extended phase-out" applications for POSF-based products by our customers or other 3M businesses. These applications are identified in *Attachments 3, 4 and 5*. **[These attachments are CBI.]** They were selected on the basis of a careful evaluation process within 3M. We understand from our discussions with the Agency that EPA believes that 3M's initial judgments are reasonable. However, we urge EPA to solicit public comment on extended phase-out applications for POSF-based chemistries when it proposes regulations applicable to these chemistries later this summer so that 3M customers and other interested parties can provide input to EPA.

As you know, 3M is developing substitutes for certain products that will require Premanufacture Notice (PMN) submissions before commercialization. We are pleased that EPA and 3M have begun a dialogue on these substitute chemistries. This ongoing dialogue, which we hope will continue during the PMN review process, will help 3M provide informed guidance to our customers on substitution options at the earliest possible date so that they can switch to acceptable alternates with minimum delay.

The remainder of this letter addresses five aspects of 3M's phase-out plan:

- Scope of the plan
- Details of production scale-down
- Proposed extended phase-out applications
- Proposed substitutes for POSF-based products

- 3M stewardship actions during the phase-out period

SCOPE OF 3M'S PLAN

Global Impacts. 3M's phase-out plan is global in scope. In developing the plan, we have applied a consistent framework to production and use activities within and outside the US. 3M recognizes that EPA does not have jurisdiction over manufacture and use of POSF-based products outside the US, but we want the Agency to be informed about our phase-out actions on a worldwide basis.

Attachment 2 provides projected Year 2000 production volumes for POSF-based products for the US and entire world. 3M management is in the process of determining which manufacturing locations in the US and Europe will be used for production during 2001 and 2002. It is possible that all production will be consolidated at a single facility in order to reduce costs and re-deploy manufacturing resources efficiently. We will keep EPA informed of our manufacturing plans as they evolve.

Status of FDA Regulated Products. The 3M phase-out plan includes products used in food packaging, medical devices and other applications regulated by the Food and Drug Administration (FDA). For purposes of comparison, we have provided a breakout of FDA-regulated applications and associated production volumes. 3M will be informing FDA of our phase-out plans for products within that agency's jurisdiction.

Inclusion of Additional Chemistries. Following our initial announcement, 3M has decided to discontinue manufacture of products based on C-6 and C-10 homologs of POSF. We made this decision because, in management's judgment, the rationale for our phase-out decision applied to these products as well as to our C-8 sulfonated materials. The C-6 and C-10 products represent relatively small volumes and are highlighted in the attachments to this letter.

DETAILS OF PRODUCTION SCALE-DOWN

Baseline Inventory of Affected Products. To establish a baseline for phase-out decisions, 3M inventoried all POSF-based products currently manufactured by the company. This inventory is presented in *Attachment 6.* **[Attachment 6 is CBI]** The *Attachment* groups these products by use category and then lists individual products in each category by 3M product code, CAS Number, chemical name and the percentage of fluorochemicals (FCs) present in the product. In addition, the *Attachment* provides projected Year 2000 production totals for each individual product and use category.

Since six months remain in Year 2000, 3M used updated business forecasts prepared at the end of 1999 to estimate production volumes for the remainder of the year. These estimated volumes are presented for both the FC portion of the product and the entire product formulation (FC plus other components). The FC poundages represent total solids (including reactants combined with the FC starting material) and do not represent the POSF molecule itself.

Year 2000 Ordering Process. 3M has asked customers to place final orders by October 1, 2000. We are informing customers that final order amounts cannot exceed 50 percent of their purchase volumes during 1999. Our intention is to meet customer requirements with product manufactured during this calendar year. Depending on the size of the orders we receive, total production volumes for 2000 could exceed the forecasted levels reflected in *Attachment 6*.

Production of Starting Materials and Intermediates. 3M has previously identified to EPA the different raw materials and intermediates (including POSF itself) used in the manufacture of POSF-based products. 3M was required to provide 1997 production volumes for several of these chemicals under the 1998 TSCA Inventory Update Rule (IUR). *Attachment 7* provides these IUR production figures, corrected to reflect a recent reanalysis of 1997 production data. The *Attachment* shows 1997 U.S. production volumes for POSF of 4,083,000 lbs. For year 2000, a 1.5% decrease is anticipated from that number, which would be 4,022,000 lbs. Because the IUR submissions only include U.S. production and importation, a further adjustment is needed to reflect POSF production at 3M's Antwerp facility. After accounting for Antwerp operations, we estimate that total worldwide POSF production in 2000 will be 8,100,000 lbs.

Production of starting materials and intermediates for POSF-based products will necessarily decline very significantly in 2001 and 2002 because of the substantial scale-down in production of the end-products themselves. However, the precise volumes of POSF and its derivatives produced during these years will depend on the chemical compositions and quantities of the extended phase-out products which 3M continues to manufacture. Once the mix of these products is finalized, 3M will be in a position to determine anticipated production levels for the corresponding raw materials. 3M will assemble this information if EPA believes it is needed to to develop regulations applicable to POSF-based chemistries.

PROPOSED EXTENDED PHASE-OUT APPLICATIONS

Process for Selection. To identify product uses for which production would continue after the end of 2000, 3M screened its entire product line using three criteria:

1. Does the end-use product provide environmental, health or safety benefits to which the fluorochemical component makes a substantial contribution?
2. Does the end-use product perform a unique or important function which is lost without the fluorochemical component and is there either no technically acceptable substitute available for the fluorochemical or is additional time needed to qualify or prove out such a substitute?
3. Is use of the product specified by a federal or state agency or would governmental activities (such as national defense) be affected if the product were no longer available?

Products meeting one or more of these criteria were assigned to the extended phase-out category and deemed suitable for production following December 31, 2000.

Attachment 3 provides background on extended phase-out products identified during 3M's screening process. The *Attachment* sorts these products into three categories based on 3M's

criteria for extending production beyond 2000. Where more than one criterion applies, the product has been classified on the basis of the predominant rationale for extended phase-out. For each affected product, the *Attachment* also provides a detailed description of the technological complexities or other factors that preclude immediate availability of an acceptable substitute. *Attachment 4* complements this information by providing CAS numbers, chemical compositions and projected volumes for the extended phase-out products. Finally, *Attachment 5* indicates the intended distribution of the extended phase-out products to different global markets.

The three Attachments should be reviewed in conjunction with the more detailed use profiles for POSF-based products provided in 3M's May 26, 1999 white paper entitled *Fluorochemical Use, Distribution and Release Overview*. EPA should also note that the CAS names that appear in *Attachment 4* are those that are specifically tied to 3M's proposed extended phase-out products. Additional extended phase-out products that are identified subsequent to the date of this submission may require limited production of chemicals not shown in the CAS names column.

Attachments 1 and *2* indicate the small volumes that 3M will produce for extended phase-out applications during 2001 and 2002 in the aggregate and by product category. Anticipated production volumes in 2001 should be *12.3 percent* of the projected 2000 baseline on a global basis. In 2002, global production should decline to *4.5 percent* of the 2000 baseline, with no production currently anticipated in 2003.

Need for Further Input on Selection of Extended Phase-out Products. It is important to keep in mind that the judgments reflected in *Attachment 3, 4 and 5* are preliminary and were based on information currently available to 3M regarding the applications in which POSF-based products are used. 3M necessarily has incomplete knowledge of the end-use products and processes of its customers and, therefore, cannot make definitive judgments about the availability of substitute materials or the precise impacts of phasing out specific products. We also made the decision not to consult extensively with our customer base until we had reviewed our phase-out plan with EPA. For this reason, our screening process has not fully captured customer views on extended phase-out applications. To permit users of POSF-based products or other interested parties to address this subject, we would encourage EPA to solicit public comment at the earliest possible date.

Surfactant Properties of POSF-Based Materials. As *Attachment 3* illustrates, the great majority of the proposed extended phase-out products identified by 3M are in the industrial surfactant category, which represents roughly 10 percent of projected Y2000 production of POSF-based materials. Surfactants are crucial additives in many formulator applications used widely in transportation, construction, electronic, oil and other market segments. They provide value through two basic modes of operation. First is their ability to lower surface tension of liquids and/or solids. Second is their ability to emulsify and disperse a host of materials. These surfactant characteristics are typically achieved at very low concentrations within a formulation due to the surfactant's ability to migrate to interfaces and surfaces.

The scientific literature documents that the lowest surface tensions attainable are derived from the use of fluorosurfactants (perfluoro-containing surfactants). This is because the unique physicochemical characteristics of perfluorinated compounds give them greater surface tension

reduction capability than other surfactants, such as silicone or hydrocarbon oils. Accordingly, while fluorosurfactants may not be essential in some applications, they are irreplaceable in many others. For these applications, 3M is proposing to continue production through 2002 while 3M works **[CBI].**

While *Attachments 3* and *4* list extended phase-out applications known to 3M at this time, we expect that more will be identified as 3M's customer base focuses on the implications of our phase-out announcement. To address this possibility, we urge that any regulation developed by EPA allow additional extended phase-out uses during 2001-2002 if such uses are identified by 3M or its customers. To place limits on such uses, this regulation might include an annual cap on total production of POSF-based products during 2001 and 2002. Assuming that production does not exceed this cap, 3M could market these products for additional uses first identified after December 31, 2000 if 3M or its customer files a notice with EPA confirming that the use meets the criteria for extended phase-out.

INTRODUCTION OF SUBSTITUTES FOR POSF-BASED PRODUCTS

At the current time, 3M is planning **[CBI.]**

3M STEWARDSHIP ACTIONS DURING THE PHASE-OUT PERIOD

Environmental Controls. Since 1997, manufacturing releases of perfluorooctanyl chemistries at 3M's Decatur facility have been reduced by 50 percent for wastewater discharges and 40 percent for air emissions. During the phase out of POSF-based products, 3M will continue to implement these emission reduction programs. These include source reduction and recycle, off-site disposal of designated waste streams, and end-of-pipe treatment. Drying systems have been installed and are operating at all 3M manufacturing facilities to recover and reuse POSF. Designated wastewater streams are being collected and transported off-site for disposal at permitted hazardous waste thermal treatment facilities. These practices will continue during production phase-out and additional waste streams continue to be included in this program. 3M will also be utilizing carbon adsorption systems to recover POSF from more dilute wastewater streams. Systems have been installed and are operating in both Antwerp, Belgium and Decatur, Alabama. Carbon adsorption has been shown to be effective in the removal of POSF and POSF based compounds.

Continuation of Research Program. As previously discussed with EPA, 3M is committed to continuing its ongoing research program on the environmental fate and distribution, ecotoxicity and human health effects. We plan to share new data when it becomes available and to continue our scientific dialogue with EPA on the interpretation of key studies.

* * * * * *

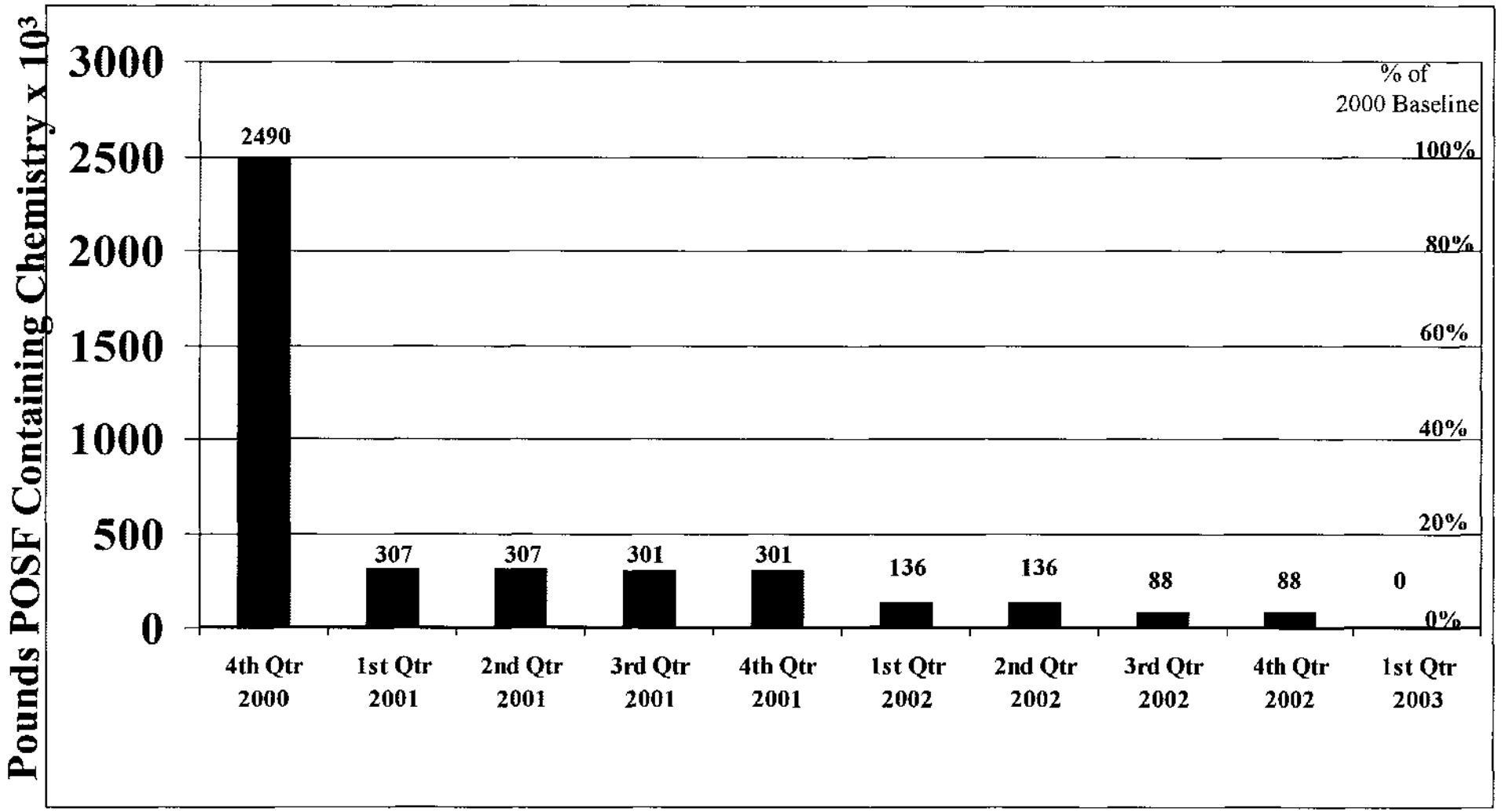
We look forward to continuing dialogue with EPA on our phase-out plan. We expect to be refining the information in the attachments based on further feedback from our own organization and customers and will submit updated attachments to EPA as appropriate.

We appreciate EPA's cooperation on this matter.

Best regards,

William A. Weppner, Ph.D.
Director
Environmental, Health, Safety and Regulatory Affairs
Specialty Materials Markets Group
3M Center, Bldg. 236-1B-10
St. Paul, MN 55144

POSF-Containing Chemistry Production Phase-Out



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Summary of the Phase-Out Plan for the production of POSF-Containing Chemistry

Attachment 2

This summary presents total estimated production for 2000, which is useful as a baseline for comparing production levels in subsequent plan years. The summary also presents projected production levels for 2001 and 2002. Extended transition period uses requiring production in 2001 and 2002 are included on Attachment 3.

Total 3M POSF Containing Chemistry manufactured

Y2000 Baseline	
Y2000[1] POSF containing chemistry-pounds produced[2] globally:	**9,895,500**
Y2000 POSF containing chemistry-pounds produced in US:	**6,490,000**

Other Information for Baseline comparison	
1999 POSF containing chemistry-pounds imported into the US[3]:	**239,900**
Y2000 POSF containing chemistry-pounds used for FDA applications are	**3,532,000**

Y2001

Y2001 POSF containing chemistry-pounds to be produced globally: **1,215,300 or 12.3%** of 2000 base-line.
See categories below for US production numbers.
Y2001 POSF containing chemistry-pounds used for FDA applications will be **300,000.**

Y2002

Y2002 POSF containing chemistry-pounds to be produced globally: **447,900 or 4.5%** of 2000 base-line.
See categories below for US production numbers.
Y2002 POSF containing chemistry-pounds used for FDA applications will be **zero.**

SORTED BY CATEGORY

Paper & Packaging Category

Global	
Y2000 POSF containing chemistry-pounds produced:	**3,297,200**
Y2001 POSF containing chemistry-pounds to be produced:	**zero**
US Only	
Y2000 POSF containing chemistry-pounds produced:	**2,670,700**
Y2001 POSF containing chemistry-pounds to be produced:	**zero**

[1] Estimation based on Y2000 forecasts from customers before phase-out plan announcement.
[2] This estimate includes total solid pounds of fluorochemical containing compound and has not been broken down to the POSF molecule.
[3] Imports are not included in 2000 production totals. 3M is presenting 1999 import figures because projections for 2000 are not available.

Textile, Leather, and Carpet Treatment Category

This category includes Apparel & Leather, Aftermarket (sold as part of commercial warranty packages), Carpet, Fabric & Upholstery, and Commercial Care (consumer and professional) Fabric Protectors.

Global	
Y2000 POSF containing chemistry-pounds produced:	**4,762,900**
Y2001 POSF containing chemistry-pounds to be produced:	**zero**
US Only	
Y2000 POSF containing chemistry-pounds produced:	**2,356,700**
Y2001 POSF containing chemistry-pounds to be produced:	**zero**

Industrial Surfactants, Additives and Coatings Category

This category includes the External sales of Coatings, Electroplating & Etching Surfactants, Household Additives, Insecticides, Intermediates, and Mining & Oil and Internal 3M Applications

Global	
Y2000 POSF containing chemistry-pounds produced:	**1,501,800**
Y2001 POSF containing chemistry-pounds to be produced:	**881,700**
Y2002 POSF containing chemistry-pounds to be produced:	**432,600**
US Only	
Y2000 POSF containing chemistry-pounds produced:	**1,259,000**
Y2001 POSF containing chemistry-pounds to be produced:	**808,400**
Y2002 POSF containing chemistry-pounds to be produced:	**428,400**

Fire Fighting Foams Category

Global	
Y2000 POSF containing chemistry-pounds produced:	**333,600**
Y2001 POSF containing chemistry-pounds to be produced:	**333,600**
Y2002 POSF containing chemistry-pounds to be produced:	**15,300**
US Only	
Y2000 POSF containing chemistry-pounds produced:	**203,500**
Y2001 POSF containing chemistry-pounds to be produced:	**203,500**
Y2002 POSF containing chemistry-pounds to be produced:	**15,300**

	POSF and Core Reactant Product Volumes		
CAS#	CAS Name	1997 US Production as Reported in 1998 IUR Submission (lbs)	1997 US Production based on May 2000 rework (lbs)
307-35-7	1-Octanesulfonyl fluoride, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-	3,492,000	4,083,000
754-91-6	1-Octanesulfonamide, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-	0	
2991-51-7	Glycine, N-ethyl-N-[(heptadecafluorooctyl)sulfonyl]-, potassium salt	12,180	
4151-50-2	1-Octanesulfonamide, N-ethyl-1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-	31,081	
31506-32-8	1-Octanesulfonamide, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-N-methyl-	48,300	
1691-99-2	1-Octanesulfonamide, N-ethyl-1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-N-(2-hydroxyethyl)-	2,149,000	
24448-09-7	1-Octanesulfonamide, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-N-(2-hydroxyethyl)-N-methyl-	1,861,000	
423-82-5	2-Propenoic acid, 2-[ethyl[(heptadecafluorooctyl)sulfonyl]amino]ethyl ester	7,678	
25268-77-3	2-Propenoic acid, 2-[[(heptadecafluorooctyl)sulfonyl]methylamino]ethyl ester	777,765	
376-14-7	2-Propenoic acid, 2-methyl-, 2-[ethyl[(heptadecafluorooctyl)sulfonyl]amino]ethyl ester	53,507	
14650-24-9	2-Propenoic acid, 2-methyl-, 2-[[(heptadecafluorooctyl)sulfonyl]methylamino]ethyl ester	36,327	
423-50-7	1-Hexanesulfonyl fluoride, 1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluoro-	501,634	
307-51-7	1-Decanesulfonyl fluoride, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heneicosafluoro-	24,171	