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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

85010000006

FYI-0600-13785

Re: Phase-out Plan for POSF-Based Products

ORIGINAL

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 assure a smooth transition to substitute chemistries.

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 96 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.

## 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

June 16, 2000

expeditiously as practicable. Second, we want to minimize marketplace disruption and provide for an orderly transition to alternate 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. Where our products meet critical customer needs, an abrupt termination of availability could cause major disruption to commerce or compromise vital health, safety or environmental interests such as the protection of people and property threatened by serious fires.

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 scale-down in production and import volumes after the end of the year. We foresee that significant levels of production may be necessary through the first quarter of 2001 in order to meet customer requirements. 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 between 10 and 30 percent of the projected 2000 baseline and would decline to 4 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 first quarter of 2001, 3M manufacturing capacity will be committed entirely to certain proposed "critical use" applications for POSF-based products by our customers or other 3M businesses. These proposed "critical uses" are identified in *Attachments 3 and 4*. [Attachments 3 and 4 are CBI.] They were selected on the basis of a careful evaluation process within 3M. We look forward to early feedback from EPA on 3M's initial judgments so that 3M can provide definitive guidance to its customers as soon as possible. We also urge EPA to solicit public comment on critical use decisions for POSF-based chemistries in the very near future so that 3M customers and other interested parties can provide input on 3M's phase-out plan.

3M is developing substitutes for certain products that will require Premanufacture Notice (PMN) submissions before commercialization. It is essential that EPA and 3M conduct an immediate dialogue on these substitute chemistries so that we can provide informed guidance to our customers on substitution options at the earliest possible date with the aim of switching these customers 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 critical use 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 5*. [Attachment 5 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.

**Production During the First Quarter of 2001.** At the present time, the highest-volume use categories for POSF-based products are paper and packaging coatings and textile, leather and carpet protectors. While it is 3M's desire substantially to discontinue manufacture of these

June 16, 2000

products by the end of the year, this objective must be balanced with the needs of 3M's customers. To accommodate these needs, 3M plans to allow customers to place final orders by October 1, 2000. We have informed customers that they will have the option of ordering up to fifty (50) percent of their purchase volumes during 1999. If all customers exercise this option, 3M will lack production capacity to fully satisfy customer requirements during the remainder of 2000 and will need to continue production during the first quarter of 2001. Therefore, our phase-out plan allows for manufacture of paper and packaging and textile, leather and carpet protectors through April 1, 2001 at levels of up to 25 percent of 2000 production volumes.

Taking into account possible production of these product classes during the first quarter of 2001, *Attachments 1 and 2* illustrate the downward trend in production of POSF-based materials throughout 2001 and 2002 in the aggregate and by product category. This analysis shows that, depending on the size of the orders 3M receives in October of this year, anticipated production volumes in 2001 should be *9.8 percent to 30.2 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.

***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 6* 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 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 critical use 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 set production caps for purposes of a SNUR controlling manufacture of POSF-based chemistries.

## **PROPOSED CRITICAL USE APPLICATIONS**

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

1. Does the product provide environmental, health or safety benefits?
2. Does the product perform a unique or important function for which there is no technically acceptable substitute available or for which additional time will be 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?
4. Does 3M have binding contractual commitments to customers which extend into 2001 and beyond?

Products meeting one or more of these criteria were assigned to the critical use category and deemed suitable for production following the first quarter of 2001.

*Attachment 3* provides background on critical use products identified during 3M's screening process. For each product class, the *Attachment* describes affected customers and provides the rationale for continued production beyond Year 2000. *Attachment 4* complements this information by providing CAS numbers, chemical compositions and projected volumes for these critical use categories. The two 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 note that the CAS names that appear in *Attachment 4* are those that are specifically tied to 3M's proposed critical uses. Critical uses that are identified subsequent to the date of this submission may require limited production of chemicals not shown in the CAS names column.

***Need for Further Input on Critical Use Selection.*** It is important to keep in mind that the judgments reflected in *Attachment 3* and *4* are preliminary and were based on information currently available to 3M employees regarding the downstream 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 critical use selection. To permit users of POSF-based products or other interested parties to address this subject, we would encourage EPA to solicit public comment on the critical use aspects of 3M's phase-out plan at the earliest possible date.

***Surfactant Properties of POSF-Based Materials.*** As *Attachment 3* illustrates, the great majority of the proposed critical use 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 with its customers to switch to [CBI].

While *Attachments 3 and 4* list critical industrial 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 SNUR developed by EPA allow additional industrial uses during 2001-2002 if such uses are determined to be critical by 3M or its customers. To place limits on such uses, the SNUR might include an annual cap on total production of POSF-based products for industrial applications 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 is "critical."

## **INTRODUCTION OF SUBSTITUTES FOR POSF-BASED PRODUCTS**

At the current time, 3M is planning to introduce [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 its ongoing 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.

\* \* \* \* \*

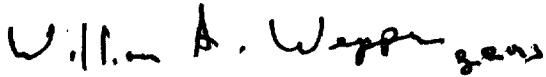
Page 7

June 16, 2000

We look forward to meeting with you and your staff on June 20 to discuss our phase-out plan and obtain EPA's feedback.

We appreciate EPA's cooperation on this matter.

Best regards,

A handwritten signature in black ink, appearing to read "William A. Weppner". The signature is fluid and cursive, with the last name "Weppner" being more prominent.

William A. Weppner, Ph.D.

Director

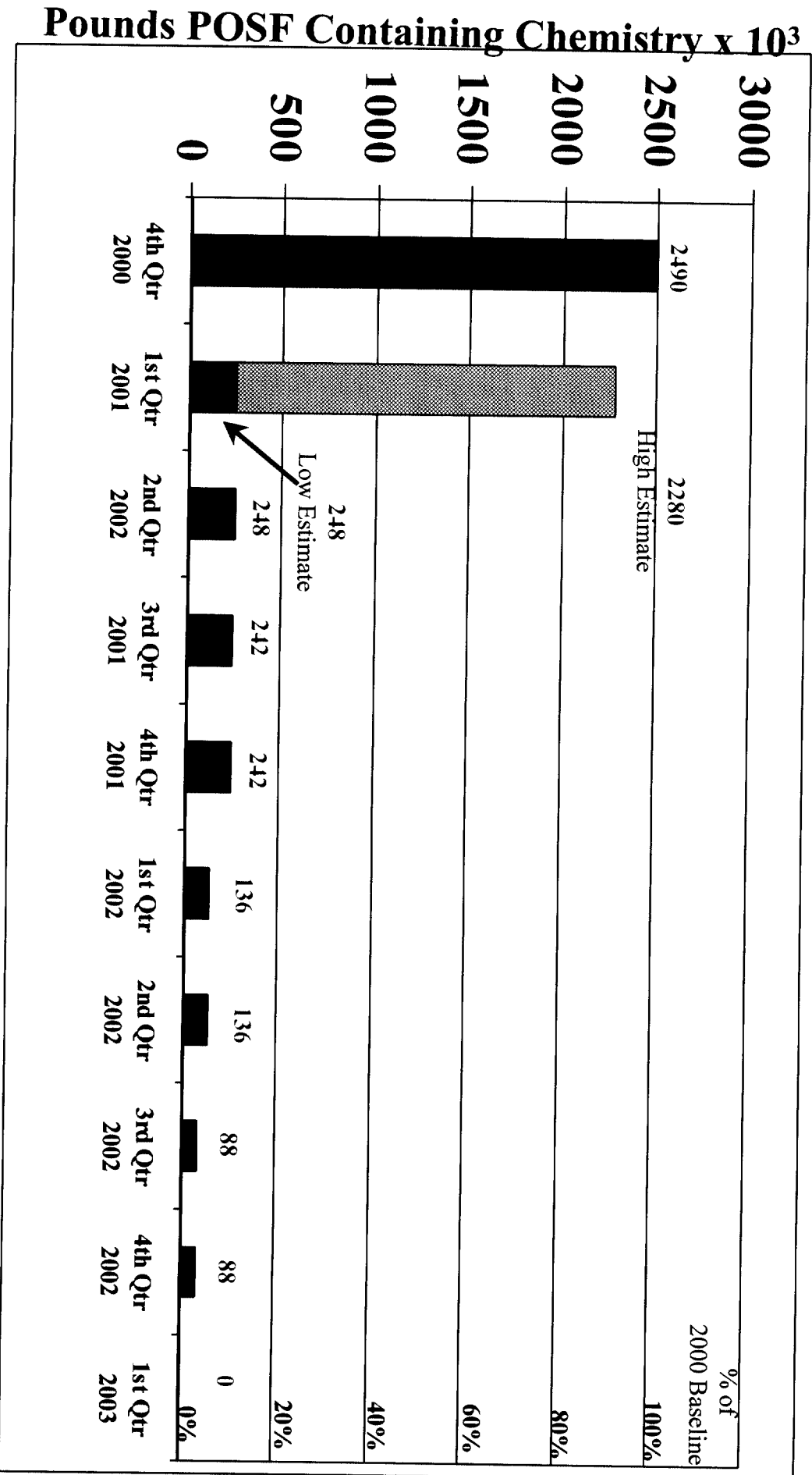
Environmental, Health, Safety & Regulatory Affairs

Speciality Material Markets Group

3M Center, Bldg. 236-1B-10

St. Paul, MN 55144

# POSF-Containing Chemistry Production Phase-Out



# 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. Critical uses requiring production in 2001 and 2002 are included on Attachment 3.

### **Total 3M POSF Chemistry manufactured**

#### **Y2000 Baseline**

|                                                                                                 |           |
|-------------------------------------------------------------------------------------------------|-----------|
| Y2000 <sup>1</sup> perfluorooctanyl containing chemistry-pounds produced <sup>2</sup> globally: | 9,957,000 |
| Y2000 perfluorooctanyl containing chemistry-pounds produced in US:                              | 6,551,500 |

#### **Other Information for Baseline comparison**

|                                                                                       |           |
|---------------------------------------------------------------------------------------|-----------|
| 1999 perfluorooctanyl containing chemistry-pounds imported into the US <sup>3</sup> : | 239,900   |
| Y2000 perfluorooctanyl containing chemistry-pounds used for FDA applications are      | 3,532,000 |

#### **Y2001**

Y2001 perfluorooctanyl containing chemistry-pounds to be produced globally: 979,000 to 3,009,700 or 9.8% to 30.2%, respectively, of 2000 base-line. See categories below for US production numbers.  
Y2001 perfluorooctanyl containing chemistry-pounds used for FDA applications will be 300,000.

#### **Y2002**

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

### **SORTED BY CATEGORY**

#### **Paper & Packaging Category**

##### **Global**

|                                                                                |                 |
|--------------------------------------------------------------------------------|-----------------|
| Y2000 perfluorooctanyl containing chemistry-pounds produced:                   | 3,297,200       |
| 1/1/01 to 3/31/01 perfluorooctanyl containing chemistry-pounds to be produced: | zero to 824,300 |

Anticipated complete phase-out by 4/1/01.

##### **US Only**

|                                                                                |                 |
|--------------------------------------------------------------------------------|-----------------|
| Y2000 perfluorooctanyl containing chemistry-pounds produced:                   | 2,670,700       |
| 1/1/01 to 3/31/01 perfluorooctanyl containing chemistry-pounds to be produced: | zero to 677,700 |

<sup>1</sup> Estimation based on Y2000 forecasts from customers before phase-out plan announcement.

<sup>2</sup> This estimate includes total solid pounds of fluorochemical containing compound and has not been broken down to the POSF molecule.

<sup>3</sup> 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 perfluorooctanyl containing chemistry-pounds produced: 4,825,500  
1/1/01 to 3/31/01 perfluorooctanyl containing chemistry-pounds to be produced: 0 to 1,206,400  
Anticipated complete phase-out by 4/1//01.

#### **US Only**

Y2000 perfluorooctanyl containing chemistry-pounds produced: 2,419,300  
1/1/01 to 3/31/01 perfluorooctanyl containing chemistry-pounds to be produced: 0 to 604,800

### **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 perfluorooctanyl containing chemistry-pounds produced: 1,500,700  
Y2001 perfluorooctanyl containing chemistry-pounds to be produced: 881,700  
Y2002 perfluorooctanyl containing chemistry-pounds to be produced: 432,600

#### **US Only**

Y2000 perfluorooctanyl containing chemistry-pounds produced: 1,258,000  
Y2001 perfluorooctanyl containing chemistry-pounds to be produced: 808,400  
Y2002 perfluorooctanyl containing chemistry-pounds to be produced: 428,400

### **Fire Fighting Foams Category**

#### **Global**

Y2000 perfluorooctanyl containing chemistry-pounds produced: 333,600  
Y2001 perfluorooctanyl containing chemistry-pounds to be produced: 97,300  
Y2002 perfluorooctanyl containing chemistry-pounds to be produced: 15,300

#### **US Only**

Y2000 perfluorooctanyl containing chemistry-pounds produced: 203,500  
Y2001 perfluorooctanyl containing chemistry-pounds to be produced: 56,800  
Y2002 perfluorooctanyl 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-heneicosfluoro-             | 24,171                                                      |                                                   |

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