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November 18, 2003

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Subject: HAI Project 4260-000

Dear Brian:

Enclosed is our report entitled "Review of EPA Action Related to AFFF Surfactants."

Please call if you have any questions.

Sincerely yours,

Robert L. Darwin, P.E.
Senior Engineer

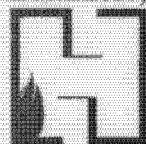
Enclosure

cc: Ross Davidson, China Lake (FedEx)

Review of EPA Action Related to AFFF Surfactants

CHRISTOPHER P. HANAUSKA
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REVIEW OF EPA ACTION RELATED TO AFFF SURFACTANTS

1.0 BACKGROUND

In May of 2000, 3M Company announced a decision to stop the production of the surfactants used in the making of its Light WaterTM brand AFFF and many other products. The decision by 3M was made when it became apparent that these compounds would be declared PBT's (Persistent, Bioaccumulative, and Toxic) by the EPA. These surfactants were made by the electrochemical fluorination process and are part of the PFOS (perfluorooctane sulfonates) family of chemicals.

Since then, EPA has issued a Significant New Use Regulation (SNUR), fundamentally closing the door on production or importation of PFOS related chemicals in the US. 3M has withdrawn from the foam firefighting business, with some currently minor exceptions (none containing fluorochemical surfactants).

These actions have prompted a more thorough look at fluorochemicals, including other manufacturers surfactants that are used in firefighting foam.

2.0 INTRODUCTION

This paper will provide information on the EPA's Enforceable Consent Agreement (ECA) process for PFOA (perfluorooctanoic acid) and its impact on foam. In this paper, the term foam includes all firefighting foam that contains fluorochemical surfactants, including aqueous film forming foam (AFFF), film forming fluoro-protein foam (FFFP), fluoro-protein foam (FP), and most alcohol resistant foams (AR).

The ECA being developed is very broad and includes many chemistries and activities not associated with foam. Only a very small amount of the ECA directly involves foam, while a larger portion indirectly may affect foam. This paper will focus almost exclusively on the direct foam involvement in the ECA process.

This inquiry really began as discussed in the background section. After the PFOS issue had settled, EPA turned its attention to the related chemical PFOA. PFOA is used as a processing aid for the manufacture of fluoropolymers, as an intermediate chemical, and for a number of other applications. It is also suspected that some telomer chemistries may degrade to PFOA. The post-PFOS foams contain telomer derived fluorosurfactants.

The EPA maintains a docket (OPPT-2003-0012, Perfluorooctanoic acid (PFOA), Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting). Most of the references in this paper can be found in the docket. The docket currently (as of November 11, 2003) has 230 entries, with some entries being multiple documents. The entire list of entries in the docket are included in the references. Specific references to the docket in this paper utilize the last 4 digits

of the docket entry. The docket can be accessed by going to www.epa.gov/edocket/ and in the quick search enter OPPT-2003-0012.

All the entries were searched for the terms "foam" "fire" and "AFFF" and every entry found with one of these terms was investigated (approximately 40 entries). Many other entries were also examined, even though they did not contain the search words.

The base chemicals that become the fluorosurfactants used in foam are initially manufactured by the telomerization process, which creates the fully fluorinated carbon chain. Further chemistry is done on the base telomers to create the surfactants (many different surfactants can be created). The fluorosurfactants are then blended with hydrocarbon surfactants, solvents, and other ingredients to make the finished foam concentrate. Each step, telomer manufacturing, surfactant manufacturing, and blending can be done by a different company.

The telomer based foams do not contain PFOA. The concern is the potential for the fluorosurfactants to degrade in the environment into PFOA. This concern is heightened by the nature of the use of foam which may result in widespread dispersion of the surfactants, PFOA or its precursors. This may be especially problematic if the foam reaches water courses that then could result in human exposure.

The initial work of the EPA was to conduct a hazard assessment of PFOA. This is essentially a look at the toxicity of the chemical. After the hazard assessment, a preliminary risk assessment was conducted. This looked at exposure and risk to humans from PFOA. This revealed significant holes in the data needed for a robust risk assessment. Industry has been supplying significant amounts of information and has issued Letters of Intent (LOI) to develop more data. However, EPA did not feel this was sufficient to fill all the data needs and entered into an Enforceable Consent Agreement (ECA) process.

3.0 DRAFT PFOA HAZARD ASSESSMENT

The EPA has undertaken a hazard assessment of PFOA and has issued several revisions. The latest Revised Draft Hazard Assessment [-0011] indicates that PFOA is persistent in the environment; it does not hydrolyze, photolyze or biodegrade under environmental conditions. Also, from groundwater samples taken near firefighting training areas it was demonstrated that PFOA can migrate through soil and persists in groundwater.

While there is limited data on PFOA serum levels in the general population, pooled blood bank and individual samples indicate mean serum levels ranged between 3 to 17 ppb. This indicates widespread exposure of the general population to PFOA, but at low levels. An ongoing 5 year half life study in 9 retired workers has suggested a mean serum half-life of over 4 years, providing evidence of the potential for PFOA to bioaccumulate in humans.

PFOA has also been found in a number of mink livers, but has rarely been found in fish or in fish eating birds. PFOA was not detected in quantifiable concentrations in oysters from the Chesapeake Bay and the Gulf of Mexico.

In a 6 month study with cynomolgus monkeys the Lowest Observable Adverse Effects Limit (LOAEL) was 3 mg/kg/day and a No Observable Adverse Effects Limit (NOAEL) was not established. In a two generation reproductive study in rats, there was a significant increase in post weaning mortality along with other effects. Carcinogenicity studies in Sprague-Dawley rats show that the ammonium salt of PFOA is weakly carcinogenic. The agency is further investigating the potential carcinogenicity and the relevance to humans.

Thus, the data suggests a potential for developmental/reproductive toxicity and immunotoxicity. However, there are many limitations to the studies in the Hazard Assessment and the results must be carefully interpreted.

4.0 PFOA PRELIMINARY RISK ASSESSMENT

The "Preliminary Risk Assessment of the Developmental Toxicity Associated with Exposure to Perfluorooctanoic Acid and Its Salts" [-0002] published on April 10, 2003 indicated a potential nationwide human exposure to low levels of PFOA. Toxicological studies in animals also indicates the potential risk of developmental and other adverse effects from these exposures to humans.

The risk assessment focused on the potential risk for developmental toxicity from the two generation rat reproductive study. A Margin of Exposure (MOE) approach was used. The MOE is a ratio of the NOAEL or the LOAEL at a specific endpoint to the estimated human exposure. The MOE provides a relative "distance" between the exposure level and the NOAEL and/or the LOAEL. The assessment concluded an estimated range of overlapping MOE values extends from about 100 to 10,000. There are considerable uncertainties in these values, and further refinement is expected to narrow the range towards the middle of the values.

This assessment identified areas where the lack of data results in significant uncertainty. The environmental concentrations and pathways for human exposure to PFOA are not well understood. Thus more information needs to be generated and assimilated before a more robust risk assessment can be completed and used as a basis for potential future voluntary or regulatory action.

A refined version of the preliminary risk assessment is expected to be submitted for review to the EPA's Science Advisory Board [-0120] sometime in 2004, perhaps the second quarter. This will be dependent on the success of the ECA process and the data that is submitted and assimilated.

5.0 PFOA ECA

On April 16, 2003 the EPA put a notice in the Federal Register for an Enforceable Consent Agreement (ECA) "Perfluorooctanoic Acid (PFOA), Fluorinated Telomers; Request for Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, and Notice of Public Meeting [-0001]." This action was a direct result of the need for more information identified in the Preliminary Risk Assessment.

An ECA is a publicly negotiated agreement between the EPA, industry, and other interested parties to generate and submit data on a specific schedule. This process is a faster way to develop needed data than going through the rulemaking process. Once an ECA is signed, it is enforceable, and the parties can be compelled to complete their commitments. If an ECA cannot be completed in a timely manner (about 6 months), the EPA has the option of entering the rulemaking process.

The notice established a call for interested parties (the only three that are known to be strictly foam related are the Firefighting Foam Coalition, FFFC, Air Force Research Laboratory and Hughes Associates, Inc., HAI) and set an initial meeting for June 6, 2003.

The EPA is asking for use and production volume data, data on the chemicals, biodegradation pathways, and information on the pathways that expose people to PFOA.

6.0 PFOA ECA MEETINGS; JUNE 6, 2003 (ATTENDED BY C. HANAUSKA, HAI)

The EPA sent out a "Preliminary Framework for Enforceable Consent Agreement Data Development for PFOA and Telomers" on May 20, 2003 [Not in the docket, included in Appendix A]. The data needs of the ECA will go beyond the Letters of Intent (LOI's) submitted by 3M, Fluoropolymers Manufacturers Group (FMG), Telomer Research Program (TRP), and all three groups jointly [-0007,-0012,-0013,-0016]. The EPA will not pursue health effects or human blood monitoring as part of this ECA. EPA considers the current data, supplemented by testing that is already underway, to adequately address the toxicity issue. Also, the EPA has nominated a number of fluorochemicals to be included in the next National Health and Nutritional Survey conducted by the Center for Disease Control, which would provide a baseline of population exposure to these chemicals through blood monitoring.

The May 20th document was intended by the EPA to be a "discussion guide," but it became the baseline for discussions. The document is broken into two parts; Telomer Data Needs and Fluoropolymer Data Needs. Foam falls under the Telomer Data Needs. A table for the Telomer Data Needs had a total of 12 elements, 3 of them directly indicating foam and one indirectly. These are shown in Table 1.

Table entries 5 and 8 indicated that foam should be included in aspects of the study that involved products that are made from or with telomers. Table entry 12 was a general statement on product stewardship that would presumably include foam.

Table entry 11 was specifically directed at foam and foam alone. This entry requested industry to produce data on PFOA and PFOA precursors in the soil, groundwater, surface runoff water, and air during and after use. Further refinement of this request was a goal of these meetings, but notwithstanding this, the data gathering would be a significant and expensive undertaking.

The May 20 document also identified the use of foam as a direct discharge to the environment of telomer chemicals. This appeared to be warranting special attention from the EPA as a potential route for human exposure to PFOA.

At this meeting the TRP specifically said they would not address Table entry 11 on foam. The TRP indicated they would address all the other Table entries (they were silent on whether foam would be included in the work of entries 5 and 8) and asked that they be moved to the workgroups. The TRP and the EPA looked to the FFFC for a response on how Table entry 11 could be handled and whether the members of the FFFC would enter an ECA for this data need. Tom Cortina of the FFFC indicated that he would need to get back to the EPA. Tom reported that the FFFC had just been made aware of some data collected from ground water sampling at DOD firefighting facilities. He volunteered that this would be collected and provided to the EPA.

7.0 PFOA ECA MEETING, JULY 10, 2003 (ATTENDED BY S. WALRATH, HAI)

On the agenda at this plenary session was a discussion of foam data. The FFFC has supplied information to the EPA on July 3rd, 2003 [-0143] that included a report by Dr. Jennifer Field [-0144]. The report was done for the FFFC and presents data on fluorinated alkyl surfactants in groundwater from 3 military base fire training areas. The report is copyright protected and is a pre-publication copy, therefore it is not available for distribution. It is available as "read only" at the EPA.

EPA says it is aware that telomer foam contains predominately C6 (6 fluorinated carbon atoms) rather than C8 chains. The C6 chains cannot degrade into PFOA (a C8 chain molecule) but the EPA stated they wanted to continue to review foam. The FFFC wanted these discussions to be restricted to Plenary sessions, but the EPA insisted that it go back to the Telomer Workgroup.

8.0 PFOA ECA MEETINGS, SEPTEMBER 16-18, 2003 (ATTENDED BY B. DARWIN, HAI)

At the Telomer Technical Workgroup meeting Tom Cortina of the FFFC presented information on the work by Field at four DoD sites that have had considerable AFFF discharges, mostly from aircraft rescue firefighter training. He also presented information on the chemistry of telomer based AFFF. The bottom line of the presentation was that telomer AFFF does not contain PFOA, nor can it degrade to PFOA, so they should be excluded from this ECA process for PFOA. During the discussion that followed there was not disagreement with the conclusions of the FFFC. The presentation materials are also considered "subject to copyright" and are only available at the EPA for review.

The EPA decided that at the next Telomer Workgroup meeting scheduled in late October a position by the EPA will be presented on the exclusion of foam from the ECA process. The Workgroup would then present this position during the plenary session that follows for a final decision.

NOTE: due to the unavailability of the Field document and the FFFC presentation materials, these have not yet been reviewed in depth.

Table 1 - Telomer Data Needs

Item	Data Need: Telomers	Test Substances	Suggested Test Methods
5.	Determination of incineration byproducts of telomers and telomer treated products and articles.	Representative telomers and telomer treated products and articles (paper, textile and carpet products, fire-fighting foams) from manufacturers and importers.	"Laboratory" Burn Test Protocol: 1. ASTM E1641: Decomposition Kinetics by Thermogravimetry. 2. Laboratory-Scale Thermal Degradation via GC/MS yielding the temperature for 99% destruction efficiency @ 2.0 second residence time & excess oxygen.
8.	*Presence/quantification of PFOA, telomer alcohol or other PFOA precursors in telomer-treated or telomer-containing products and articles.	Representative telomer-treated or telomer-containing products and articles (paper, textile and carpet products, fire-fighting foams), from manufacturers and importers.	Draft Study Plan received from TRP; however, Plan does not contemplate identifying PFOA precursors or addressing fire-fighting foams. Sampling and testing standards to be determined.
11.	Release and exposure assessments for PFOA and PFOA precursors from use of fire-fighting foam.	Representative telomers and related compounds in soil, groundwater, surface water runoff, and air during and after fire-fighting foam use.	Sampling and testing standards to be determined. 3M (OPPT-2003-0012-0035) and DuPont (Exygen) (OPPT-2003-0012-0040) PFOA methods may serve as initial point for water, but they lack differentiation for surface film. Mabury (as described in OPPT-2003-0012-0010) may provide air starting point.
12.	Product stewardship information concerning telomer products and articles	Telomer products and articles	None required.

*Denotes that the TRP has committed to provide some, but not necessarily all, information concerning this particular data need or endpoint for one or more chemicals. Analytical methods are to be determined, and data quality requirements need to be reviewed to determine appropriateness and acceptability in the context of this ECA. To the extent that chemicals beyond those being covered under the LOI are identified as possible test candidates, the need for such testing will be considered in the context of the ECA process.

Test methods may be amended and adapted through the ECA process, and where test methods have not been identified, they may be developed during the ECA process.

9.0 PFOA ECA MEETINGS; OCTOBER 27-29, 2003 (ATTENDED BY B. DARWIN)

The Telomer Workgroup met on October 27 and had on its agenda whether to recommend to the Plenary that foam not be considered further as part of this ECA process. The Workgroup decided to make this recommendation to the Plenary. This is based on the FFFC position that current telomer foams do not contain, nor degrade to, PFOA.

The Plenary session took place on October 29 and heard the recommendation of the workgroup on the status of foam. The Plenary agreed to exclude telomer foams from the current process. There was not disagreement or other comment at the meeting to this action.

However, the EPA has repeatedly and specifically asserted it still has interest in the environmental impact of AFFF and may address this concern at a future date. While no longer a part of the PFOA ECA process, the potential form and action that could be taken on foam is not known.

The EPA has also requested the FFFC provide information on the inventory of current stocks of foam concentrates (the quantity and the location/use). The reasoning behind this request was not identified. The FFFC has agreed to this request and the exact form of the inventory is to be determined.

10.0 NOTES AND OPINIONS FROM THE AUTHOR

The following information represents the author's personal opinions based on actively monitoring this process and gathering information. This includes many discussions with people that are not referenceable. This portion of the report should not be viewed as based entirely on facts, but is to a large extent informed speculation.

The basis of having foam removed from the ECA process is the claim that the current telomer based foams do not contain any PFOA nor do the constituents degrade into PFOA. The first claim is almost certainly true, the foams do not contain any PFOA.

The second claim is not as simple to assess. Most of the fluorochemical surfactants used in these foams have a 6 carbon fluorinated chain, and these could not degrade to PFOA (but potentially could degrade to the homologue of PFOA). The estimates of the percentage that is 6 carbon chain have ranged from 75% to 95%. The majority of what remains is 8 carbon chain. Apparently, the FFFC claims that the unpublished Field report shows that even this does not degrade to PFOA in the field. An examination of this paper could not be made as it is only available at EPA headquarters for reading only (awaiting copyright).

Industry has indicated it could formulate foams that use only the 6 carbon chain surfactants, and apparently some manufacturers already do. This may result in an increased cost to further refine the telomer stream to remove the 8 carbon chains. If this was done across the entire industry, then it would not be possible to get degradation to PFOA from foam.

The EPA is clearly focused on PFOA, and apparently PFOA almost exclusively, in the current ECA process. There have been comments in the process [-0077] that the EPA should broaden the focus to include homologues or entire families of chemicals. EPA has not broadened the focus, but has stated it may do so in the future. The reason behind the narrow focus has not been given. One theory is that if the EPA cannot muster the data to impose constraint on PFOA when the human exposure and toxicity are nominally established, any other chemical would be much more difficult. Also, as with PFOS, once a single chemical was established as a PBT, the entire family of chemicals essentially went with it. PFOA is certainly a major, if not the most important chemical, in this family of chemicals.

There appears in the industry some recognition that the long term viability of the fluorochemical surfactant based foams may be limited. Although what the limits may be and when they may be imposed are unknown. Some efforts are underway to develop formulations that use less surfactants, to develop better surfactants (fire performance and/or environmental performance), and to assess the capability of fluorosurfactant free foams. These efforts do not appear to be proceeding as high priorities or with huge development efforts.

It is interesting to note that early on in this issue, when the FFFC was first formed, the claim was made that no other producer was going to go the way of 3M and pull out of the market. They all assured the users this was a viable business and they were in it for the long haul. In the last year, Ciba Specialty Chemicals has sold its fluorochemical surfactant foam business to Chemgaard and DuPont has bought Atofina's fluorochemical surfactant business. Two major players have exited the business by being consolidated with other existing players. The reasoning behind these moves may or may not have anything to do with the current environmental issue.

Also, the TRP, which is made up specifically of the telomer chemical producers, pointedly refused to support the EPA data request in the ECA that concerned foam. They directed any data request that would concern foam to the FFFC. Again, the reasoning behind this move was not clear. Some speculation was simply that because the FFFC existed and was present, the TRP was going to attempt to offload this requirement and its associated costs. The ability for the foam industry alone to shoulder any significant costs from future data requirements of the EPA is unknown.

The FFFC has brought up, and the EPA has acknowledged, that foam is often used in life safety situations. Under the Toxic Substances Control Act (TSCA), the EPA is ultimately required to do a cost benefit analysis before regulating. Even if foam was having a significant negative environmental impact, it is possible the cost/benefit analysis would provide for continued use. However, if the telomer business is otherwise severely impacted by regulation, the supply side of surfactants for foam could dry up or become prohibitively expensive. It is likely these impacts will be felt before any direct regulatory impact occurs.

The reason behind the EPA inventory request during the October meetings has not been established. One explanation is they are interested primarily in 3M foam, which did contain some PFOA (why they would then not ask specifically for 3M foam inventory is a question). Another explanation is they recognize that production quantities may not represent the potential for release because of the large inventory and want to be thorough on their data gathering. Or, it

could be the beginning of the foam specific process, now that foam is out of the PFOA ECA process.

Whether foam getting out of the PFOA ECA process will ultimately help or hurt its cause will be determined by future events. It almost certainly will provide the ability for the foam manufacturers to claim a victory and will probably buy some time. The EPA has its focus and resources on PFOA and appears unlikely at this time to spend a lot of effort on foam. They have stated, however, that they will eventually turn their attention back to foam.

The process, data needs, and timeline for foam had been reasonably well defined in the PFOA ECA process. Of course the end result was not yet apparent. Now, with foam removed from the ECA, neither the process, the data needs (with the exception of the inventory) nor the timing is defined. This will need to be worked out with the EPA over the course of time. However, the PFOA ECA process, and how it affects the fluorochemical industry in general, still has the potential for a large and defining impact on foam. This process must still be monitored, but the ability to influence it may have been degraded.

11.0 CONCLUSIONS

While foam is out of the PFOA ECA process, the longer term, bigger picture, is not clear. The EPA has indicated they still have interest in foam and have asked for inventory data. Ultimately, the degradation products of the fluorochemical surfactants in foam may need to be identified. The resultant chemicals will be persistent, and the affect of these chemicals on humans and the environment may need to be established. While these data issues are not yet being pressed, it is a logical extension of the current process, if PFOA is found to be an unacceptable risk. This process needs to continue to be monitored.

The current PFOA ECA process will provide significant information on the degradation products of telomers. This process should continue to be monitored to derive any useful information on foam fluorosurfactants that can be deduced. Also of importance are the results of the PFOA risk assessment and the impact on the entire fluorochemical industry. Understanding the industry will provide forewarning of impending impacts on foam surfactant production, cost, use, etc. Certainly, information, and the regulators response to the information, for the telomers still in the ECA process will give some indication of what might be in store for foam.

Understanding the bigger landscape of the fluorochemical/environment issue may also be useful if evaluation of alternate fluorochemicals is necessary. It may be useful to explore the chemistry of these molecules in greater depth to understand their human and environmental impact.

Currently, the input into the ECA process relative to foam has consisted of information from the FFFC and also several citizens. The FFFC is basically an association of foam, and/or foam surfactant, manufacturers. While the positions of the FFFC and the information it has provided all appear reasonable, it does have a relatively narrow interest. Comments by citizens [-0026, -0033, -0045, -0111, -0152, -0162, -0187, -0188, -0189, -0190, -0191] were often against the interests of foam. Many of these comments appear inspired by the proponents of alternate technologies. Also, a number of these comments are on significantly outdated material or are

fundamentally irrelevant. It may be necessary, for the interests of the Navy and the DoD to be specifically represented and made known in this process.

12.0 REFERENCES

OPPT-2003-0012-0001—Perfluorooctanoic Acid (PFOA), Fluorinated Telomers; Request For Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, and Notice of Public Meeting, 4/16/2003, Federal Register, Notice.

OPPT-2003-0012-0002—Preliminary Risk Assessment of the Developmental Toxicity Associated With Exposure to Perfluorooctanoic Acid and Its Salts, 4/10/2003, Support-Background, Notice.

OPPT-2003-0012-0003—Federal Register Notices: Perfluorooctyl Sulfonates (PFOS) and Perfluoroalkyl Sulfonates (PFAS) Significant New Use Rules, Federal Register, Notice.

OPPT-2003-0012-0004—PFOS Presentation to CMA by Charles M. Auer, U.S. EPA, 6/19/2000, Speech, Notice.

OPPT-2003-0012-0005—Revision of PFOA Hazard Assessment and Next Steps, 9/27/2002, Memorandum, Notice.

OPPT-2003-0012-0006—Sulfonated Perfluorochemicals in the Environment: Sources, Dispersion, Fate, and Effects, 3/1/2000, Report, Notice.

OPPT-2003-0012-0007—Environmental Health And Safety Measures Relating to Perfluorooctanoic Acid And Its Salts, 3/13/2003, Letter, Notice.

OPPT-2003-0012-0008—Characterization of Fluorinated Metabolites by Gas Chromatographic-Helium Microwave Plasma Detector; the Biotransformation of 1H, 1H, 2H, 2H-Perfluorodecanol to Perfluorooctanoate, 6/16/1981, Publication, Notice.

OPPT-2003-0012-0009—Revision 1, Biodegradation Screen Study for Telomer-Type Alcohols, 11/6/2002, Study, Notice.

OPPT-2003-0012-0010—Annual Report of Activities for Telomer Research Program Grant to University of Toronto, 9/1/2002, Report, Notice.

OPPT-2003-0012-0011—Revised Draft Hazard Assessment of Perfluorooctanoic Acid And Its Salts, 11/4/2002, Support-Background, Notice.

OPPT-2003-0012-0012—Voluntary Actions to Evaluate and Control Emissions of Ammonium Perfluorooctanoate (APFO), 3/14/2003, Letter, Notice.

OPPT-2003-0012-0013—Letter of Intent for the Telomer Research Program, 3/14/2003, Letter, Notice.

OPPT-2003-0012-0014—Order on Consent between E.I. duPont de Nemours and Company and U.S. Environmental Protection Agency Region 3 and Region 5, 3/13/2002, Support-Background, Notice.

OPPT-2003-0012-0015—Final Ammonium Perfluorooctanoate (C8) Assessment of Toxicity Team (CATT) Report, 8/30/2002, Report, Notice.

OPPT-2003-0012-0016—Letter from APFO Users, Telomer Companies, and 3M to Stephen L. Johnson, US EPA, 3/31/2003, Letter, Notice.

OPPT-2003-0012-0017—PFOA Preliminary Risk Assessment External Letter Peer Review Documents, 4/8/2003, Support-Background, Notice.

OPPT-2003-0012-0018—Comments requested by May 16, 2003 [Comment by a Citizen, responding to the Perfluorooctanoic Acid, Fluorinated Telomers; Request For Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting], 4/16/2003, Public Comment, Notice.

OPPT-2003-0012-0019—Comments regarding C-8 [Comment by a Citizen, responding to the Perfluorooctanoic Acid, Fluorinated Telomers; Request for Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public meeting], 4/23/2003, Public Comment, Notice.

OPPT-2003-0012-0020—Email Notification Concerning PFOA from Charles M. Auer to Members of the Organization for Economic Cooperation and Development (OECD) Existing Chemicals Steering Group, 4/23/2003, Letter, Notice.

OPPT-2003-0012-0021—C8 Chemical to Produce Teflon by DuPont Chemical Co. [Comment by a Citizen, responding to the PFOA, Fluorinated Telomers; Request For Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting], 4/24/2003, Public Comment, Notice.

OPPT-2003-0012-0022—Establishing C8 exposure limits [Comment by a Citizen, responding to the Perfluorooctanoic Acid, Fluorinated Telomers; Request For Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting], 4/24/2003, Public Comment, Notice.

OPPT-2003-0012-0023—Comments requested by May 16, 2003 [Comment by Citizens, responding to the Perfluorooctanoic Acid, Fluorinated Telomers; Request for Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting], Public Comment, Notice.

OPPT-2003-0012-0024—C-8 Ohio River and Environs [Comment by a Citizen, responding to the Perfluorooctanoic Acid, Fluorinated Telomers; Request For Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting], 5/1/2003, Public Comment, Notice.

OPPT-2003-0012-0025—Request Close Consideration [Comment by a Citizen, responding to the Perfluorooctanoic Acid, Fluorinated Telomers; Request For Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting], 5/1/2003, Public Comment, Notice.

OPPT-2003-0012-0026—PFOA Use in Fire Fighting Foams [Comment by a Citizen, responding to the Perfluorooctanoic Acid, Fluorinated Telomers; Request For Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting], 5/2/2003, Public Comment, Notice.

OPPT-2003-0012-0027—Trace Levels of Chemicals are Not a Risk to Health [Comment by ACSH, responding to the PFOA, Fluorinated Telomers; Request for Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public meeting], Public Comment, Notice.

OPPT-2003-0012-0028—Email from Ward Penberthy, EPA, to Mike Santoro, 3M, Follow-up Questions Regarding 3M LOI Commitments, 4/30/2001, Letter, Notice.

OPPT-2003-0012-0029—Email from Ward Penberthy, EPA, to Lynne Harris, SPI/FMG, Follow-up Questions Regarding FMG LOI Commitments, 4/30/2001, Letter, Notice.

OPPT-2003-0012-0030—Email from Ward Penberthy, EPA, to Stephen H. Korzeniowski, DuPont, Follow-up Questions Regarding TRP LOI Commitments, 4/30/2001, Letter, Notice.

OPPT-2003-0012-0031—Alternative Materials to Products which may Degrade to PFOA [Comment responding to the PFOA, Fluorinated Telomers; Request for Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development & Notice of Public Meeting], 5/12/2003, Public Comment, Notice.

OPPT-2003-0012-0032—Request to be considered an "Interested Party" [Request responding to the PFOA, Fluorinated Telomers; Request for Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting], 5/12/2003, Public Comment, Notice.

OPPT-2003-0012-0033—Fluorocarbon Based Fire Fighting Foams have Environmental Impact beyond those Identified in EPA Actions to Date [Comment by a Citizen, responding to EPA's PFOA, Fluorinated Telomers Notice], 5/13/2003, Public Comment, Notice.

OPPT-2003-0012-0034—FMG Correction to LOI Addendum in OPPT-2003-0012-0012; Letter from David Sarvadi, Keller & Heckman, to Margaret Schneider, US EPA, 4/16/2003, Letter, Notice.

OPPT-2003-0012-0035—3M Response to OPPT-2003-0012-0028, Follow-Up Questions Regarding 3M and Dyneon LOI Environmental Monitoring Commitments; Letter from Mike Santoro, 3M, to Wardner Penberthy, US EPA, 5/7/2003, Letter, Notice.

OPPT-2003-0012-0036—MG Response to OPPT-2003-0012-0029, Follow-Up Questions Regarding APFO Users' LOI Commitments; Letter from Don Duncan, SPI/FMG, to Wardner Penberthy, US EPA, 5/5/2003, Letter, Notice.

OPPT-2003-0012-0037—DuPont Response to Question 2a of OPPT-2003-0012-0029, Pertaining to the FMG LOI; Letter from Andrea Malinowski, DuPont, to Charles Auer, US EPA, 5/7/2003, Letter, Notice.

OPPT-2003-0012-0038—Consent Order Issued Pursuant to Articles 5 and 12, Chapter 22 and Article 1, Chapter 16 of the West Virginia Code, 11/14/2001, Other, Notice.

OPPT-2003-0012-0039—C-8 Data Summary Report - Consent Order GWR-2001-019, 2/5/2003, Report, Notice.

OPPT-2003-0012-0040—Method of Analysis for the Determination of Ammonium Perfluorooctanoate (APFO) in Water Revision 1, Report, Notice.

OPPT-2003-0012-0041—Groundwater Investigation Quality Assurance Project Plan for Washington Works Plant, Report, Notice.

OPPT-2003-0012-0042—FMG LOI - Response from Dupont to EPA Questions re Addendum III, Item 4 "Monitor Groundwater and Surface for APFO in the Vicinity of the Facility" Specific to APO Manufacturing Facility, 5/7/2003, Other, Notice.

OPPT-2003-0012-0043—Work Plan to Monitor PFOA in Water - Dupont Fayetteville Works, Other, Notice.

OPPT-2003-0012-0044—January 2003 Baseline C-8 Sampling Dupont Fayetteville Works Fayetteville, North Carolina, 3/6/2003, Report, Notice.

OPPT-2003-0012-0045—PFOA and PFOS DERIVED AFFF FIRE FIGHTING FOAMS DO NOT WORK [Comment by a Citizen, regarding the PFOA, Fluorinated Telomers; Request For Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting], 5/15/2003, Public Comment, Notice.

OPPT-2003-0012-0046—Interested Party [in Response to the PFOA, Fluorinated Telomers; Request for Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting], Public Comment, Notice.

OPPT-2003-0012-0047—Make Producers Accountable & Create Test Method for Woman [Comment responding to the PFOA, Fluorinated Telomers; Request for Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development & Notice of Public Meeting], Public Comment, Notice.

OPPT-2003-0012-0048—Appropriate Use of Biomonitoring Information in Risk Assessment Docket ID Number OPPT-2003-0012 (68 Fed. Reg. 18626, April 16, 2003) Perfluorooctanoic Acid (PFOA), Fluorinated Telomers; Request for Comments, 5/16/2003, Public Comment, Notice.

OPPT-2003-0012-0049—TRP Response to OPPT-2003-0012-0030, Follow-Up Questions Regarding TRP LOI Commitments; email transmission from Katie Smythe, TRP Administrator, to Charles Auer and Ward Penberthy, US EPA, 5/9/2003, Letter, Notice.

OPPT-2003-0012-0050—Analysis of "Aged" Telomer-Based Polymeric Products and "In Use" Telomer-Treated Articles: Draft Work Plan for EPA Review and Comment, 5/9/2003, Report, Notice.

OPPT-2003-0012-0051—Biodegradation Analysis of Telomer-Based Polymeric Products: A Draft Proposal, 5/9/2003, Report, Notice.

OPPT-2003-0012-0052—Study Protocol: Inherent Biodegradability of using the Zahn-Wellens/EMPA Test Procedure, 5/5/2003, Other, Notice.

OPPT-2003-0012-0053—Telemer Research Program: Analysis of Telomer-Based Products and Telomer-Treated Articles, 3/31/2003, Report, Notice.

OPPT-2003-0012-0054—LC/MS/MS Analysis of Articles and Products: Samples and Suggested Sampling Procedures, 2/12/2003, Report, Notice.

OPPT-2003-0012-0055—Comment by a Citizen, regarding the PFOA, Fluorinated Telomers; Request For Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting, 5/6/2003, Public Comment, Notice.

OPPT-2003-0012-0056—EPA Materials for June 6, 2003 Meeting (NOTE: time changed to 12:00 pm, from 1:00 pm), 5/21/2003, Meeting Notes, Notice.

OPPT-2003-0012-0057—Comment by Dainippon Ink and Chemicals, Incorporated, regarding the PFOA, Fluorinated Telomers; Request For Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting [Company Sanitized], 5/14/2003, Public Comment, Notice.

OPPT-2003-0012-0058—Comment by a Citizen, regarding the PFOA, Fluorinated Telomers; Request for Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, and Notice of Public Meeting, Public Comment, Notice.

OPPT-2003-0012-0059—Comment, by the Society of the Plastics Industry, Inc. (SPI), regarding the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, 5/16/2003, Public Comment, Notice.

OPPT-2003-0012-0072—Comment by ATOFINA Chemicals, Inc., regarding the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, Public Comment, Notice.

OPPT-2003-0012-0073—Request to be considered an "Interested Party" [Request responding to the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting], 5/15/2003, Public Comment, Notice.

OPPT-2003-0012-0074—Comment by the Tupper Plains-Chester Water District, regarding the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, 5/13/2003, Public Comment, Notice.

OPPT-2003-0012-0075—Comment by a Citizen, regarding the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, 5/14/2003, Public Comment, Notice.

OPPT-2003-0012-0076—Comment by a Citizen, regarding the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, with Attachment, 5/14/2003, Public Comment, Notice.

OPPT-2003-0012-0077—Determination of Perfluoroalkanoic Acids in the Aquatic Environment; and Screening Level Cumulative Risk Assessment-Perfluorinated Alkyl Acids on Human Health, Public Comment Attachment, Notice.

OPPT-2003-0012-0078—Comment by a Citizen, regarding the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, Public Comment, Notice.

OPPT-2003-0012-0079—Comment by a Citizen, regarding the PFOA/Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, 5/16/2003, Public Comment, Notice.

OPPT-2003-0012-0080—Comment by a pair of Citizens, regarding the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, 5/16/2003, Public Comment, Notice.

OPPT-2003-0012-0081—Comment by a Citizen, regarding the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, 5/16/2003, Public Comment, Notice.

OPPT-2003-0012-0082—Comment by the Center for Regulatory Effectiveness (CRE), regarding the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, 5/16/2003, Public Comment, Notice.

OPPT-2003-0012-0083—Comment by the TMJ Association, regarding the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, with Attachment, 5/16/2003, Public Comment, Notice.

OPPT-2003-0012-0084—The TMJ Report: The Newsletter in Support of TMJ Sufferers around the Country-Spring/Summer 1994, Public Comment Attachment, Notice.

OPPT-2003-0012-0085—Comment by a Citizen, regarding the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, 5/18/2003, Late Public Comment, Notice.

OPPT-2003-0012-0086—Comment by the Environmental Working Group (EWG), regarding the PFOA, Flourinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, 5/16/2003, Public Comment, Notice.

OPPT-2003-0012-0087—Comment by 3M, regarding the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, 5/16/2003, Public Comment, Notice.

OPPT-2003-0012-0088—Comment by E.I. du Pont de Nemours & Company, regarding the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, 5/16/2003, Public Comment, Notice.

OPPT-2003-0012-0089—Comment by Little Hocking Water Association, Inc. responding to the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for Enforceable Consent Agreement Development; and Notice of Public Meeting, with Attachments, 5/15/2003, Public Comment, Notice.

OPPT-2003-0012-0090—Chemical Concerns Persist - Residents Could have more C8 in Blood than Workers, a DuPont Model Indicates, 5/13/2003, Public Comment Attachment, Notice.

OPPT-2003-0012-0091—Aerial view of DuPont and Little Hocking Well Field, Public Comment Attachment, Notice.

OPPT-2003-0012-0092—Memorandum from C Auer (EPA OPPT) to Hernandez, Weber, and Penberthy (all are EPA) regarding the Revision of the PFOA Hazard Assessment and Next Steps, 9/27/2002, Public Comment Attachment, Notice.

OPPT-2003-0012-0093—DuPont Confronted over Chemical's Safety - EPA and W. Va. Lawsuit Challenge Risks Posed by C-8, Used to Make Teflon, 4/15/2003, Public Comment Attachment, Notice.

OPPT-2003-0012-0094—Letter written to the West Virginia Department of Environmental Protection stating EWG's Findings, 11/12/2002, Public Comment Attachment, Notice.

OPPT-2003-0012-0095—DuPont Chemical Showing up in Blood of Children, Adults, 4/5/2003, Public Comment Attachment, Notice.

OPPT-2003-0012-0096—DuPont Hid Teflon Pollution for Decades - Company Kept 1984 Tap Water Tests Secret after Finding C8 Contamination in Ohio Town, 12/13/2002, Public Comment Attachment, Notice.

OPPT-2003-0012-0097—Letter to the Governor of West Virginia, 3/12/2003, Public Comment Attachment, Notice.

OPPT-2003-0012-0098—Judge: DuPont Chemical is Toxic, 5/8/2003, Public Comment Attachment, Notice.

OPPT-2003-0012-0099—Internal Warnings - Industry Memos Show DuPont Knew for Decades that a Chemical Used to Make Teflon is Polluting Workers and Neighbors, 2/16/2003, Public Comment Attachment, Notice.

OPPT-2003-0012-0100—DuPont Chemical Worries Ohio EPA - C8 Levels Near Plant in West Virginia Pose No Risk, Company Says, 2/23/2003, Public Comment Attachment, Notice.

OPPT-2003-0012-0101—Map Showing Production Wells, Test Wells, and Boring Locations within Little Hocking Water District, 5/1/2003, Public Comment Attachment, Notice.

OPPT-2003-0012-0102—Court Won't Lift Ban on Destroying Documents, 7/3/2002, Public Comment Attachment, Notice.

OPPT-2003-0012-0103—TSCA 8(E) Substantial Risk Notice on: Ammonium Perfluorooctanoate CAS#: 3825-26-1, 2/28/2002, Public Comment Attachment, Notice.

OPPT-2003-0012-0104—Five Tables with C-8 Results for Water Supply Wells, Test Wells, Ground-Water Results from Borings, Distribution System, and Soil Results from Borings, Public Comment Attachment, Notice.

OPPT-2003-0012-0105—Letter to Bossert (DuPont) from Jones (Ohio Environmental Protection Agency) regarding Ammonium Perfluorooctanoate (C8) Impacts in Little Hocking, Ohio, 1/7/2003, Public Comment Attachment, Notice.

OPPT-2003-0012-0106—Further Discussion on the Origin of PFOA in the Environment [Responding to the Perfluorooctanoic Acid, Fluorinated Telomers; Request For Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting], 6/1/2003, Late Public Comment, Notice.

OPPT-2003-0012-0107—Updated Materials for PFOA Meeting, June 6, 2003; Email from Ward Penberthy, EPA, to Interested Parties and Meeting Attendees, 6/3/2003, Support-Background, Notice.

OPPT-2003-0012-0108—Addendum to the American Council on Science and Health (ACSH)'s Previous Submission OPPT-2003-0012-0032 [and OPPT-2003-0012-0027] [Attached document referred to below is copyright protected--go to the website listed below to view full-text], 5/2/2003, Public Comment, Notice.

OPPT-2003-0012-0109—Table: Typical Fluoropolymer End Use Applications, submitted by the Society of the Plastics Industry, 3/27/2003, Public Comment Attachment, Notice.

OPPT-2003-0012-0110—PBC [Comment by a citizen, responding to the Perfluorooctanoic Acid, Fluorinated Telomers; Request for Comment, Solicitation of Interested Parties for Enforceable Consent Agreement Development, & Notice of Public Meeting], 6/4/2003, Late Public Comment, Notice.

OPPT-2003-0012-0111—EPA PFOA Telomer ECA Meeting June 6, 2003 [Comments by a citizen regarding PFOA use in Fire Fighting Foams], 6/10/2003, Late Public Comment, Notice.

OPPT-2003-0012-0112—Scheduling PFOA Technical Workgroup Meetings: Email message from Barbara Leczynski, EPA, to Members of PFOA ECA Technical Workgroups, 6/12/2003, Letter, Notice.

OPPT-2003-0012-0113—Second Revised Draft Agenda: Public Meeting-Enforceable Consent Agreement Development for Perfluorooctanoic Acid (PFOA) and Fluorinated Telomers, with List of [Pre-Registered] "Interested Parties" for PFOA and Telomer ECA Negotiations, 6/2/2003, Meeting Notes, Notice.

OPPT-2003-0012-0114—PFOA Public Meeting -- June 6, 2003: Complete Attendance List, 6/12/2003, Meeting Notes, Notice.

OPPT-2003-0012-0115—Opening Statement: the Little Hocking Water Association, Inc., Little Hocking, OH, 6/6/2003, Meeting Notes, Notice.

OPPT-2003-0012-0116—Statement by Uma Chowdhry, Global Vice President, DuPont Central Research & Development, Before the United States Environmental Protection Agency Public Meeting: Enforceable Consent Agreement Development for PFOA and Fluorinated Telomers, 6/6/2003, Meeting Notes, Notice.

OPPT-2003-0012-0117—Opening Statement for the Telomer Research Program, 6/6/2003, Meeting Notes, Notice.

OPPT-2003-0012-0118—Comments of Donald K. Duncan, President, The Society of the Plastics Industry, Inc.: EPA Public Meeting - Enforceable Consent Agreement Development for PFOA and Fluorinated Telomers - June 6, 2003, 6/6/2003, Meeting Notes, Notice.

OPPT-2003-0012-0119—The Society of the Plastics Industry, Inc. - Fluoropolymer Manufacturers Group Response to EPA Preliminary Framework for ECAs on PFOA, June 6, 2003, 6/6/2003, Meeting Notes, Notice.

OPPT-2003-0012-0120—PFOA ECA Public Meeting Summary, June 6, 2003, prepared by U.S. EPA: Email Transmission from Barbara Leczynski to All Parties on the PFOA ECA Notification List, 6/17/2003, Meeting Notes, Notice.

OPPT-2003-0012-0121—Draft Agendas for PFOA ECA Technical Workgroup Meetings, June 23-24, 2003, prepared by U.S. EPA: Email Transmission from Barbara Leczynski to All Parties on the PFOA ECA Notification List, 6/17/2003, Meeting Notes, Notice.

OPPT-2003-0012-0122—Follow-Up to Oral Comments Presented on June 6, 2003, 6/16/2003, Late Public Comment, Notice.

OPPT-2003-0012-0123—Public Comments made at the first Public Enforceable Consent Agreement (ECA) Meeting on June 6, 2003, 6/16/2003, Late Public Comment, Notice.

OPPT-2003-0012-0124—Dupont had Concerns about C-8 in 1981 and had a TSCA Complaint Filed around 1984-86 [Comment responding to the PFOA, Fluorinated Telomers; Request for Comment; Solicitation of Interested Parties for ECA Development; and Notice of Public Meeting], 6/20/2003, Late Public Comment, Notice.

OPPT-2003-0012-0125—Materials from 6-23-03 Meeting, PFOA ECA Fluoropolymer Technical Workgroup, including Draft Agenda, Attendance List, Industry Presentation Materials, Industry document "Basic Fluoropolymer Data", 6/23/2003, Meeting Notes, Notice.

OPPT-2003-0012-0126—Materials from 6-23-03 Meeting, PFOA ECA Monitoring Technical Workgroup. Draft Agenda, Attendance List, Industry Presentation Materials, 6/23/2003, Meeting Notes, Notice.

OPPT-2003-0012-0127—Materials from 6-24-03 Meeting, PFOA ECA Communications Workgroup. Draft Agenda, Attendance List, Copy of Handout from 1985 EPA TSCA Chemical Substance Inventory "Appendix B: Generic Names for Confidential Chemical Substance Identities", 6/24/2003, Meeting Notes, Notice.

OPPT-2003-0012-0128—Materials from 6-24-03 Meeting, PFOA ECA Telomer Technical Workgroup. Draft Agenda, Attendance List, Industry Presentation Materials, 6/24/2003, Meeting Notes, Notice.

OPPT-2003-0012-0129—Email message from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup Meeting Attendees, 6/25/2003, Meeting Notes, Notice.

OPPT-2003-0012-0130—Email message from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup Meeting Attendees, 6/26/2003, Meeting Notes, Notice.

OPPT-2003-0012-0131—[Meeting Transcript] The United States Environmental Protection Agency Public Meeting: Enforceable Consent Agreement Development for Perfluorooctanoic Acid (PFOA) and Fluorinated Telomers, Friday, June 6, 2003 12:00 p.m., 6/6/2003, Meeting Notes, Notice.

OPPT-2003-0012-0132—PFOA ECA Fluoropolymer Technical Workgroup Meeting Summary, 6-2-3-2003, 7/2/2003, Meeting Notes, Notice.

OPPT-2003-0012-0133—PFOA ECA Monitoring Technical Workgroup Meeting Summary, 6-23-2003, 7/2/2003, Meeting Notes, Notice.

OPPT-2003-0012-0134—PFOA ECA Communications Workgroup Meeting Summary, 6-24-2003, 7/2/2003, Meeting Notes, Notice.

OPPT-2003-0012-0135—PFOA ECA Telomer Technical Workgroup Meeting Summary, 6-24-2003, 7/2/2003, Meeting Notes, Notice.

OPPT-2003-0012-0136—PFOA ECA Workgroup and Plenary Meeting Notice, July 9-10, 2003; Email from Mary Dominiak, EPA, to all Interested Parties and others on the PFOA ECA email notification list, 7/2/2003, Letter, Notice.

OPPT-2003-0012-0137—PFOA ECA Technical Workgroup Meeting Summaries, June 23-24, 2003; Email from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup Meeting Attendees, 7/3/2003, Letter, Notice.

OPPT-2003-0012-0138—TRP Submission - Document Reference Lists; Email from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup Meeting Attendees, with Attachments, 7/3/2003, Letter, Notice.

OPPT-2003-0012-0139—TRP Document Submission Reference Lists; Letter from Katie Smythe, TRP Administrator, to Mary Dominiak, EPA, Transmitting Two Attachments, 7/3/2003, Letter, Notice.

OPPT-2003-0012-0140—TRP Letter of Intent (LOI) Submissions to EPA [Attachment to Letter from Katie Smythe, TRP Administrator, to Mary Dominiak, EPA], 7/3/2003, Other, Notice.

OPPT-2003-0012-0141—TRP Submissions to EPA -- Study Reports [Attachment to Letter from Katie Smythe, TRP Administrator, to Mary Dominiak, EPA], 7/3/2003, Other, Notice.

OPPT-2003-0012-0142—FMG Response to EPA's Quick Action Items; Email from Lynne Harris, SPI/FMG, to Mary Dominiak, EPA, with Attachments (Included), 7/7/2003, Meeting Notes, Notice.

OPPT-2003-0012-0143—Email from Tom Cortina, Fire Fighting Foam Coalition, to Mary Dominiak, EPA, with Attached Report on Groundwater Monitoring [Attached Report is subject to copyright, not available on the Internet or for reproduction], 7/3/2003, Letter, Notice.

OPPT-2003-0012-0144—Fluorinated Alkyl Surfactants in Groundwater at Military Bases Contaminated by Aqueous Film-Forming Foams (AFFF) [Pre-Publication Article subject to Copyright by Dr. Jennifer A. Field], 7/3/2003, Publication, Notice.

OPPT-2003-0012-0145—Materials from PFOA ECA Fluoropolymer Technical Workgroup Meeting, July 9, 2003: Draft Agenda, Attendee List, EPA Presentation Materials, EPA Incineration Proposal, and Industry Presentation Materials, 7/9/2003, Meeting Notes, Notice.

OPPT-2003-0012-0146—Materials from PFOA ECA Monitoring Technical Workgroup Meeting, July 9, 2003: Draft Agenda, Attendee List, EPA Presentation Materials, and Industry Presentation Materials, 7/9/2003, Meeting Notes, Notice.

OPPT-2003-0012-0147—Materials from PFOA ECA Telomer Technical Workgroup Meeting, July 10, 2003: Draft Agenda, Attendee List, EPA Presentation Materials, EPA ECA Incineration Proposal, and Industry Presentation Materials, 7/10/2003, Meeting Notes, Notice.

OPPT-2003-0012-0148—Materials from PFOA ECA Plenary Session Meeting, July 10, 2003: Draft Agenda, Complete List of Interested Parties, Meeting Attendee List, and Technical Workgroup Summary Presentation Materials, 7/10/2003, Meeting Notes, Notice.

OPPT-2003-0012-0149—Letter from Michael Santoro, 3M, to Mary Dominiak, EPA, transmitting electronic copies of a robust summary and report entitled: "Laboratory Scale Thermal Degradation of Perfluoro-Octanyl Sulfonate and Related Substances", 7/8/2003, Letter, Notice.

OPPT-2003-0012-0150—Robust Summary of study report entitled: "Laboratory Scale Thermal Degradation of Perfluoro-Octanyl Sulfonate and Related Substances", 7/3/2003, Report, Notice.

OPPT-2003-0012-0151—Final Report - Laboratory-Scale Thermal Degradation of Perfluoro-Octanyl Sulfonate and Related Substances, University of Dayton Research Institute, Environmental Science and Engineering Group, 6/19/2003, Study, Notice.

OPPT-2003-0012-0152—Bioassay of Air Force FC-206 Fire-Fighting Foam, Final Report; Eric H. Wang Civil Engineering Research Facility, University of New Mexico, 4/1/1977, Study, Notice.

OPPT-2003-0012-0153—PFOA ECA Technical Workgroup and Plenary Materials, July 9-10, 2003; Quick Action Items: Email message from Mary Dominiak, EPA, to Technical Workgroup and Plenary Meeting Attendees, 7/18/2003, Letter, Notice.

OPPT-2003-0012-0154—Selection of Telomer Products for Study Under ECA, 7/23/2003, Late Public Comment, Notice.

OPPT-2003-0012-0155—PFOA ECA Technical Expert Subgroup Meeting Materials; Email message from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Meeting Attendees, with attached file, 7/29/2003, Letter, Notice.

OPPT-2003-0012-0156—Scheduling Sept-Oct PFOA ECA Technical Workgroup and Plenary Meetings; Email from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Meeting Attendees, 8/1/2003, Letter, Notice.

OPPT-2003-0012-0157—PFOA ECA Fluoropolymer Technical Workgroup Meeting Summary, 7-9-2003, 8/1/2003, Meeting Notes, Notice.

OPPT-2003-0012-0158—PFOA ECA Monitoring Technical Workgroup Meeting Summary, 7-9-2003, 8/1/2003, Meeting Notes, Notice.

OPPT-2003-0012-0159—PFOA ECA Telomer Technical Workgroup Meeting Summary, 7-10-2003, 8/1/2003, Meeting Notes, Notice.

OPPT-2003-0012-0160—Enforceable Consent Agreement Development for Perfluorooctanoic Acid (PFOA) and Fluorinated Telomers, Summary of July 10, 2003 Public Plenary Meeting, 8/1/2003, Meeting Notes, Notice.

OPPT-2003-0012-0161—Summaries of PFOA ECA Technical Workgroup and Plenary Meetings, July 9-10, 2003; Email from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Meeting Attendees, with Attachments, 8/5/2003, Letter, Notice.

OPPT-2003-0012-0162—[Effectiveness of Fire Fighting Foams]: Performance Advantages of Medium Expansion/High Stability Air Foam Systems, Late Public Comment, Notice.

OPPT-2003-0012-0163—Submission of Monitoring Data Pursuant to the 3M LOI dated March 13, 2003 and APFO Users LOI dated March 14, 2003; Letter from Mike Santoro, 3M, to EPA Docket [Note: Submission has been corrected--see OPPT-2003-0012-0171 to view the corrected version], 8/1/2003, Letter, Notice

OPPT-2003-0012-0164—Perfluorooctanoic Acid Physiochemical Properties and Environmental Fate Data; Letter from Mike Santoro, 3M, to EPA Docket, with attached summary report, 8/1/2003, Letter, Notice.

OPPT-2003-0012-0165—Basic Fluoroelastomer (Copolymer, Terpolymer and Perfluoroelastomer) Data, 8/8/2003, Report, Notice.

OPPT-2003-0012-0166—Basic Fluoroelastomer (Base Resistant Elastomer) Data, 8/8/2003, Report, Notice.

OPPT-2003-0012-0167—Basic Fluoropolymer and Fluoroelastomer Data (Part 2), 8/8/2003, Report, Notice.

OPPT-2003-0012-0168—Revised Materials for Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) August Telomer Technical Subgroup Meetings; Email from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Attendees, with Attached Files, 8/8/2003, Letter, Notice.

OPPT-2003-0012-0169—Limited Distribution Copies of OECD Test Guidelines 303-A, 307, 308, and Draft 311 [Attachment to OPPT-2003-0012-0168], 8/8/2003, Publication, Notice.

OPPT-2003-0012-0170—Proposed: Incineration Goals and Agenda: Interested Parties; Email from John Blouin, EPA, to PFOA ECA Technical Workgroup and Plenary Attendees, 8/11/2003, Letter, Notice.

OPPT-2003-0012-0171—CORRECTED VERSION: Submission of Monitoring Data Pursuant to the 3M LOI dated March 13, 2003 and APFO Users LOI dated March 14, 2003; Letter from Mike Santoro to Docket AR-226 and the FYI Docket, 8/11/2003, Letter, Notice.

OPPT-2003-0012-0172—Revised Materials for August PFOA ECA Fluoropolymer Technical Subgroup Meetings; E-mail from Mary Dominiak, EPA, to Technical Workgroup and Plenary Meeting Attendees, with Attached Files, 8/14/2003, Letter, Notice.

OPPT-2003-0012-0173—Comment referring to "[Perfluorooctanoic Acid] PFOA [Enforceable Consent Agreement] ECA Process - Telomer and Fluoropolymer Monitoring Subgroup Comment" submitted by Robert A. Bilott, Taft, Stettinius & Hollister LLP, 8/7/2003, Late Public Comment, Notice.

OPPT-2003-0012-0174—A Simple, Conservative Compartmental Model to Relate Ammonium Perfluorooctanoate (APFO) Exposure to Estimates of Perfluorooctanoate (PFO) Blood Levels in Humans [Draft], 10/21/2001, Public Comment Attachment, Notice.

OPPT-2003-0012-0175—Hearing Transcript in the Circuit Court of Wood County, West Virginia (Civil Action Number 01-C-608) between Plaintiffs vs. E.I. du Pont de Nemours & Company and Lubeck Public Service District (Defendants) April 18, 2003 [Selected Pages], 4/18/2003, Public Comment Attachment, Notice.

OPPT-2003-0012-0176—Attachment C to OPPT-2003-0012-0173: E-mail Letter from Dieter Sedlak to Robert C. Buck, E.I. du Pont de Nemours & Company (DuPont) referring to "Fluoro Organics", 10/31/2002, Public Comment Attachment, Notice

OPPT-2003-0012-0177—Toxic Substances Control Act (TSCA) Confidential Business Information (CBI) Document; No Sanitized (i.e., All CBI Removed) Version Provided-Documents Control Number (DCN) 63030000037, Late Public Comment, Notice.

OPPT-2003-0012-0178—Company Sanitized Letter to the Document Control Officer, EPA OPPT, from Noel Misa, Safety, Health and Environmental Manager, Asahi Glass Fluoropolymers USA, Inc., re: "Fluoropolymer/Fluoroelastomer Production Report", 8/15/2003, Letter, Notice.

OPPT-2003-0012-0179—Company Sanitized Letter to Charles Auer, Director, EPA OPPT CCD, from George H. Millet, Quality, Environmental, Health and Safety Director, Dyneon LLC, referring to "Voluntary Commitments Made during the [Enforceable Consent Agreement] ECA Process", 8/15/2003, Letter, Notice

OPPT-2003-0012-0180 — Daphnia Magna Reproduction Test [per Organization for Economic Cooperation and Development(OECD) 211], 8/25/2003, Study, Notice

OPPT-2003-0012-0181—ECA Technical Meetings August 14 thru 21,2003: Including All Documents (Agendas, Goals, Presentations, etc.) Associated with Meetings, 8/29/2003, Meeting Notes, Notice

OPPT-2003-0012-0182—Comment referring to Perfluorooctanoic Acid "PFOA Materials" submitted by Robert A. Bilott, Taft, Stettinius & Hollister LLP, 8/26/2003, Late Public Comment, Notice

OPPT-2003-0012-0183—Screening Assessment of the Potential for Long-Range Atmospheric Transport of Perfluorooctanoic Acid [PFOA], 3/24/2002, Public Comment Attachment, Notice

OPPT-2003-0012-0184—RCRA Facility Investigation Report: DuPont Washington Works, Washington, West Virginia -- USEPA Permit Number WVD04-587-5291, with Transmittal Letter from R.L. Ritchey, Washington Works, to Martin Kotsch, USEPA Region 3, 6/30/1999, Public Comment Attachment, Notice

OPPT-2003-0012-0185—Comment referring to "Surfactants as Blackbird Stressing Agents", submitted by David Kalkstein, 8/16/2003, Late Public Comment, Notice

OPPT-2003-0012-0186—Surfactants as Blackbird Stressing Agents, , Public Comment Attachment, Notice

OPPT-2003-0012-0187—Comment referring to "A New Vapor-Securing Agent for Flammable-Liquid Fire Extinguishment" submitted by David Kalkstein, 8/16/2003, Late Public Comment, Notice

OPPT-2003-0012-0188—A New Vapor-Securing Agent for Flammable-Liquid Fire Extinguishment, 3/13/1964, Public Comment Attachment, Notice

OPPT-2003-0012-0189—Comment by J.D. Dunne, sending 3 Parts (Manager's Summary, Description of Chemicals (OPPT-2003-0012-0190) and Details of the Research (OPPT-2003-0012-0191)) of a Report entitled "Ecological Effects of Fire Retardant Chemicals and Fire Suppressant Foams", 8/22/2003, Late Public Comment, Notice

OPPT-2003-0012-0190—Ecological Effects of Fire Retardant Chemicals and Fire Suppressant Foams: Manager's Summary [and] Description of Chemicals, 3/2/1998, Public Comment Attachment,

OPPT-2003-0012-0191—Ecological Effects of Fire Retardant Chemicals and Fire Suppressant Foams: Details of the Research, 3/2/1998, Public Comment Attachment, Notice

OPPT-2003-0012-0192—Materials for 9-9-03 PFOA ECA Telomer Degradation Subgroup conference call; Email from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Meeting Attendees, with Attachments, 9/4/2003, Letter, Notice

OPPT-2003-0012-0193—PFOA ECA Biodegradation Subgroup Meeting / Conference Call (Sept 9) -- TRP Slides; Email from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Meeting Attendees, forwarding email from Katie Smythe, Telomer Research Program, with Attachment, 9/9/2003, Letter, Notice

OPPT-2003-0012-0194—Materials from PFOA ECA Telomer Degradation Subgroup Teleconference Meeting, September 9, 2003: Draft Agenda, List of Anticipated Attendees, Attendee List, Telomer Research Program Presentation Slides, 9/9/2003, Meeting Notes, Notice

OPPT-2003-0012-0195—Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) Expert Subgroup Meeting Summaries, 8/14-15/03, 8/19-21/03; Email from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Attendees, with Attachments, 9/12/2003, Meeting Notes, Notice

OPPT-2003-0012-0196—Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) Technical Workgroup Draft Agendas, Attendees for 9-16 to 9-18-03 Meetings; Email from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Attendees, with Attachment, 9/12/2003, Letter, Notice

OPPT-2003-0012-0197—TRP and FMG Materials for Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) Technical Workgroups, 9/16-17/2003; Email from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Meeting Attendees, including Attachments, 9/15/2003, Meeting Notes, Notice

OPPT-2003-0012-0198—Materials from Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) Telomer Technical Workgroup Meeting, 9-16-2003: Draft Agenda, Anticipated Attendees, Attendance List, Presentation Materials and Handouts, 9/16/2003, Meeting Notes, Notice

OPPT-2003-0012-0199—Materials from Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) Fluoropolymer Technical Workgroup Meeting, 9-17-2003: Draft Agenda, Anticipated Attendees, Attendance List, Presentation Materials and Handouts, 9/17/2003, Meeting Notes, Notice

OPPT-2003-0012-0200—Materials from Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) Monitoring Technical Workgroup Meeting, 9-22-2003: Draft Agenda, Anticipated Attendees, Attendance List, Presentation Slides and Handouts, 9/22/2003, Meeting Notes, Notice

OPPT-2003-0012-0201—AFFF [Aqueous Film-Forming Foam] Groundwater Monitoring Data: Slide Presentation by Tom Cortina, Fire Fighting Foam Coalition, at the Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) Telomer Technical Workgroup Meeting, 9/16/2003, 9/16/2003, Meeting Notes, Notice

OPPT-2003-0012-0202—Comment Entitled "Longer Half-Life in Blood of Shorter Homologs: Importance for [Aqueous Film Forming Foam] AFFF Consideration" submitted by Rich Purdy, 9/25/2003, Late Public Comment, Notice

OPPT-2003-0012-0203—Comment referring to "Submission of DuPont Progress Report on Environmental Assessments Pursuant to the APFO [Ammonium Perfluorooctanoate (C-8)] Users [Letter of Intent] LOI dated March 14, 2003" submitted by David Rurak, DuPont Fluoroproducts, 9/15/2003, Late Public Comment, Notice

OPPT-2003-0012-0204—Ammonium Perfluorooctanoate (C-8) Groundwater Investigation Steering Team Report, 8/1/2003, Public Comment Attachment, Notice

OPPT-2003-0012-0205—Comment entitled "Relative Weight of Selection Criteria" submitted by Barry M. Rosenbaum, Director of Technology, OMNOVA Solutions, Inc., 9/29/2003, Late Public Comment, Notice

OPPT-2003-0012-0206—Anonymous Comment entitled "That Stinks!", , Late Public Comment, Notice

OPPT-2003-0012-0207—Company Sanitized Comment referring to "Voluntary Submittal Made Pursuant to the ECA Process" submitted by L. William Buxton, DuPont Fluoroproducts, 9/12/2003, Late Public Comment, Notice

OPPT-2003-0012-0208—Comment referring to "Progress Report on Monitoring Efforts at Daikin America, Inc. Decatur Facility" submitted by Randy Roussel, Safety Manager, Daikin America, Inc., 9/15/2003, Late Public Comment, Notice

OPPT-2003-0012-0209—Comment referring to "TRP [Telomer Research Program] Document Submission (Study Report)" submitted by Katie Smythe, TRP Administrator, Telomer Research Program, 9/30/2003, Late Public Comment, Notice

OPPT-2003-0012-0210—Telomer Research Program Study Summary: Study of the Atmospheric Fate of Fluorinated Alcohols, 9/30/2003, Public Comment Attachment, Notice

OPPT-2003-0012-0211—Study of the Atmospheric Fate of Fluorinated Alcohols, 7/1/2003, Public Comment Attachment, Notice

OPPT-2003-0012-0212—Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) October Meeting Agenda Development; Email from Mary Dominiak, EPA, to PFOA ECA Technical Meeting and Plenary Attendees, 10/2/2003, Letter, Notice

OPPT-2003-0012-0213—Comment entitled "C:\My Email to Charles Auer on Postponing PFOA Risk Assessment" submitted by Rich Purdy, 8/30/2003, Late Public Comment, Notice

OPPT-2003-0012-0214—Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) 10-9-2003 Telomer Monitoring Meeting Draft Presentation Materials; Email from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Meeting Attendees, 10/8/2003, Meeting Notes, Notice

OPPT-2003-0012-0215—Materials from Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) Telomer Monitoring Technical Subgroup Meeting, 10-9-03; Email from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Meeting Attendees, 10/9/2003, Meeting Notes, Notice

OPPT-2003-0012-0216—Letter from Ann K. Masse, DuPont, to Mary Dominiak, EPA, transmitting a report entitled "DuPont Telomer Manufacturing Sites: Environmental Assessment of [Perfluorooctanoic Acid] PFOA Levels in Air and Water", 9/26/2003, Letter, Notice

OPPT-2003-0012-0217—DuPont Telomer Manufacturing Sites: Environmental Assessment of [Perfluorooctanoic Acid] PFOA Levels in Air and Water, 9/26/2003, Report, Notice

OPPT-2003-0012-0218—Summaries of the Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) Technical Workgroup Meetings, Sep. 16, 17, and 22, 2003; Email from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Meeting Attendees, with attached files, 10/14/2003, Meeting Notes, Notice

OPPT-2003-0012-0219—Materials from DuPont Letter of Intent Monitoring/Modeling Experts Meeting with EPA: Attendance List, DuPont Presentation Slides & copy of DuPont Report: Site Screening Level Assessments for PFOA [Perfluorooctanoic Acid] and The Relevance of Soil Sampling, 10/22/2003, Meeting Notes, Notice

OPPT-2003-0012-0220—Draft Agendas for Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) Meetings, October 27-29, 2003; E-mail from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Meeting Attendees, 10/22/2003, Letter, Notice

OPPT-2003-0012-0221—Comment referring to "Sampling Investigation Results, Little Hocking Water Association Wellfield, April 2003" submitted by Robert L. Griffin, Little Hocking Water Association, Inc. (Incomplete Version -- Go to OPPT-2003-0012-0222), 10/23/2003, Late Public Comment, Notice

OPPT-2003-0012-0222—Corrected Version of Comment referring to "Sampling Investigation Results, Little Hocking Water Association Wellfield, April 2003" submitted by Robert L. Griffin, Little Hocking Water Association, Inc., 9/20/2003, Late Public Comment, Notice

OPPT-2003-0012-0223—Letter referring to "Follow-up to September 15, 2003 Submission of DuPont Progress Report on Environmental Assessments Pursuant to the APFO Users LOI dated March 14, 2003: Air Dispersion Modeling Reports" submitted by David Rurak, DuPont Fluorochemicals, 10/20/2003, Letter, Notice

OPPT-2003-0012-0224—Attachment 1: Year 2002 Air Dispersion Modeling Analysis of APFO [Ammonium Perfluorooctanoate] Emissions: DuPont Washington Works Facility Parkersburg, West Virginia, 10/17/2003, Report, Notice

OPPT-2003-0012-0225—Attachment 2: September 2002 through August 2003 Air Dispersion Modeling Analysis of APFO [Ammonium Perfluorooctane] Emissions, 10/17/2003, Report, Notice

OPPT-2003-0012-0226—Comment entitled "EWG Comments for PFOA [Perfluorooctanoic Acid] 3rd Plenary Meeting. PFOA has been associated with the 8:2 telomer alcohol since 1981." submitted by Jennifer Klein, Senior Fellow, Environmental Working Group (EWG), , Public Comment, Notice

OPPT-2003-0012-0227—10-9-2003 Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) Telomer Monitoring Technical Subgroup Meeting Summary; E-mail from Mary Dominiak, EPA, to PFOA ECA Technical Workgroup and Plenary Meeting Attendees, with Attached Summary, 10/24/2003, Meeting Notes, Notice

OPPT-2003-0012-0228—Perfluorooctanoic Acid Enforceable Consent Agreement (ECA) Fluoropolymer Technical Workgroup 10/29/03 Meeting Materials; Draft Fluoropolymer Incineration Testing Program Submission; & EPA Discussion Paper on Proposed Key Factors for Aged Article Testing, 10/24/2003, Meeting Notes, Notice

OPPT-2003-0012-0229—Perfluorooctanoic Acid Enforceable Consent Agreement Telomer Technical Workgroup 10/27/03 Meeting Materials; Telomer Incineration Testing Program Submission; EPA Slide Presentation "Telomer Degradation: TRP & EPA Proposals for Testing"; EPA Analysis, 10/24/2003, Meeting Notes, Notice

OPPT-2003-0012-0230—Statement from Charles M. Auer, Director of EPA Office of Pollution Prevention and Toxics, re the Perfluorooctanoic Acid (PFOA) Enforceable Consent Agreement (ECA) Process; Email from John Blouin, EPA, to Technical Workgroup and Plenary Meeting Attendees, 11/3/2003, Letter, Notice

APPENDIX

PRELIMINARY FRAMEWORK FOR ENFORCEABLE CONSENT AGREEMENT DATA DEVELOPMENT FOR PFOA AND TELOMERS

Preliminary Framework for Enforceable Consent Agreement Data Development for PFOA and Telomers

Background

As indicated in the Agency's *Federal Register* notice (68 FR 18626; April 16, 2003) on perfluorooctanoic acid (PFOA) and fluorinated telomers, EPA is interested in developing enforceable consent agreements (ECAs) under section 4 of the Toxic Substances Control Act (TSCA) to identify environmental fate and transport information, as well as other relevant information to enhance understanding of the sources of PFOA in the environment and the pathways by which human exposure to PFOA is occurring.

EPA anticipates that the ECA process will focus on data needs issues beyond or supplemental to those contained in the industry letters of intent (LOIs) (3M, OPPT-2003-0012-0007; Fluoropolymer Manufacturers Group (FMG), OPPT-2003-0012-0012; Telomer Research Program (TRP), OPPT-2003-0012-0013; and all three groups jointly, OPPT-2003-0012-0016). All documents referenced in this Framework with OPPT-2003-0012 designation numbers can be found in the electronic docket on EPA's website at www.epa.gov/edocket/ by using the "Quick Search" feature to locate the specific document number.

EPA will not pursue additional health effects testing of PFOA through this ECA process. At this time, and for the purpose of this ECA process, EPA considers that the existing database of hazard information, as augmented by additional studies already underway, presents an adequate understanding of PFOA toxicity.

Independently of this ECA process, EPA has nominated a number of fluorochemicals for inclusion in the next National Health and Nutrition Examination Survey (NHANES) conducted by the Centers for Disease Control and Prevention (CDC). If the CDC includes these chemicals in the NHANES survey, the NHANES data would provide a national baseline for current general population exposures to these chemicals via human blood samples. If blood samples are analyzed for fluorochemicals over time, this would allow the tracking of trends to determine whether exposures are increasing or decreasing over time. Accordingly, EPA will not pursue human biomonitoring through these ECAs, although targeted sampling might be considered in the future if warranted by data produced through ECAs, voluntary activities, CDC studies, or other information available to EPA.

EPA anticipates that multiple ECAs may result from this process. For example, separate ECAs may be negotiated for telomer chemicals and products and for fluoropolymer chemicals and products, where the issues presented by these chemicals and products prove to be different and where test batteries differ. In addition, it may be possible to come rapidly to agreement and closure on certain data needs involving standard test protocols and screening-level data. In that instance, an ECA for the generation of screening-level data may be signed while negotiations continue on the need for other data to be developed by more advanced and/or new protocols. For example, biodegradation testing may be an area for which an ECA could be developed rapidly. Similarly, ECA testing requirements may be tiered, providing that subsequent testing in certain areas would depend on the outcome of screening studies.

All data to be developed under this ECA process will be subject to the requirements of EPA's Quality Assurance Guidelines (EPA Order 5360./A2, May 2000), which can be found at www.epa.gov/quality/. These guidelines may require the preparation of a written Quality Assurance Project Plan (QAPP) describing the project design, the methods to be used, the project organization and responsibilities, and specific quality assurance and quality control activities that will be implemented to achieve specified data quality goals or requirements. Information on QAPPs and other quality management and quality assurance tools are available on EPA's website at www.epa.gov/quality/qatools.html. In addition, all testing required by a TSCA Section 4 ECA will be conducted in accordance with the EPA Good Laboratory Practice Standards (GLPS) found at 40 CFR part 792.

TSCA includes provisions which allow manufacturers, processors, and distributors to designate data which they believe are entitled to confidential treatment, making them exempt from public disclosure, and to submit those data separately from information which will be publicly accessible (15 USC 2613). EPA's regulations regarding confidential business information (CBI) are found at 40 CFR Part 2, Subpart B (see also, 5 USC 552). EPA anticipates that certain items referenced in this Preliminary Framework Document may be claimed as CBI, possibly including specific chemical identities, product formulations, and production volumes. No CBI information will be discussed or disclosed in public meetings or documents. Where CBI information is involved in this ECA process, EPA will work directly with the submitter to ensure both that CBI is protected and that the goals of this ECA process will be met.

Introduction

In this document, EPA presents for discussion a preliminary framework for the development of data that the Agency believes would be appropriate to address the outstanding PFOA source and exposure questions identified in the *Federal Register* notice. This document is intended as a discussion guide for the June 6, 2003 meeting, not as a predetermined list of information needs defining the outcome of the ECA process.

This document is presented in two parts, accompanied by two appendices. The two document sections, *Telomer Data Needs* and *Fluoropolymer Data Needs*, present brief identifications of overarching needs, with tables listing possible test substances and study protocols. Appendix A, *Rationales for Proposed Fate Testing and Monitoring and Sampling Activities*, provides more detailed explanations of and rationales for the specific tests and protocols identified in the tables in the first two sections. Appendix B, *Determination of Test Substances*, provides examples and explanations of how specific test substances, which are only identified generally in the tables in the Preliminary Framework Document, may be determined during the ECA process.

Telomer Data Needs

In their LOI (OPPT-2003-0012-0013), the member companies of the Telomer Research Program (TRP) announced their commitment to analyze products containing telomer chemicals and articles treated with telomer products, including "aged" products and "in use" articles, for the presence of PFOA; to characterize potential releases of PFOA from telomer-based product

and article manufacture; to analyze possible biodegradation of telomer-based polymeric products; and to evaluate the fate and disposal routes for telomer-treated articles in the United States. The term "products" in this context generally refers to chemical formulations, including fire fighting foams and either dry or liquid coatings for factory applications, while the term "article" refers to an item of commerce to which a telomer product formulation has been applied, such as carpet or textiles. As described in the LOI, the focus of the TRP product, article, and manufacturing analysis is on the presence of PFOA in products, articles, the manufacturing workplace, and in manufacturing releases and waste streams.

EPA requested clarification of some of the TRP LOI commitments on April 30, 2003 (OPPT-2003-0012-0030). TRP responded on May 9, 2003. The TRP response and attachments can be found in the docket at OPPT-2003-0012-0049 through 0054.

Fate, Biodegradation, and Incineration

There is some evidence to suggest that the degradation of telomers to PFOA in the environment may be a stepwise process. To gain a better understanding of possible pathways, EPA believes that screening for the presence of precursors to PFOA formation, as well as for PFOA itself, is appropriate. Such precursors could include, for example, residual monomer telomer alcohols present in polymeric products.

The TRP LOI commitments include biodegradation studies on various telomer alcohols, telomer products, and telomer-treated articles. These biodegradation studies appear to be screening-level studies, predominantly involving 28-day ready or inherent biodegradation studies. The final report for a ready biodegradability test of ¹⁴C labeled 8-2 telomer B alcohol is expected May/June 2003. Protocols have been submitted for inherent biodegradation testing of telomer based polymeric products and polymeric products. These studies are expected to be conducted during the second and third quarter of 2003. Results indicating that these substances undergo biodegradation would trigger further fate testing on the biodegradation products. Negative results from these studies will be evaluated in the context of the study design and test conditions, including test duration, to make a determination as to how widely the results can be applied. One possible result is that EPA may request that the test duration be extended. Regardless of the outcome of these tests, EPA believes that longer term biodegradation studies, conducted under environmentally realistic conditions, may be necessary to provide confirmation that the data from the shorter-term studies accurately characterize the true long-term degradation potential of these chemicals. For the purposes of the ECA, EPA will seek to incorporate these LOI screening-level data results into a more general decision process for testing beyond the screening level.

Many telomer-based products or telomer-treated articles may be subject to disposal by incineration, particularly in municipal incinerators, which operate at lower temperatures than hazardous waste incinerators. The strength of the carbon-fluorine bond suggests that very high heat would be needed to break the bond and destroy the fluorinated compound, and that lower temperature incineration processes might instead release PFOA or PFOA precursors into the environment. EPA considers it important to develop an understanding of the incineration products of telomer chemicals, products, and treated articles.

Monitoring

With respect to characterizing releases from telomer-based product and article manufacture, EPA believes that screening-level environmental monitoring in the immediate vicinity of all telomer manufacturing facilities, as well as a selection of facilities from different industries that apply telomer products to end-use articles, is appropriate. In addition, it may be useful to characterize releases attributable to dispersive uses of telomer products that are associated with direct discharges into the environment, such as the use of fire fighting foams which contain telomer chemicals as fluorosurfactants. Accordingly, EPA is suggesting possible sampling and monitoring activities addressing the potential presence of PFOA and of PFOA precursors in air, water, soils, sediments, and biota at telomer manufacturing and use facilities, and at locations where fire fighting foams may be discharged into the environment.

Information concerning blood levels in workers may help to identify and characterize the sources and pathways of exposure, and may be contemplated in the future depending upon the results of monitoring for PFOA and PFOA precursors in the vicinity of telomer manufacturing and use facilities, and upon other information available to EPA. EPA will not pursue blood monitoring as part of this ECA process.

Product Stewardship

One additional area of information which EPA believes is necessary concerns an overall improved understanding of industry's product stewardship efforts with respect to the products and issues for which PFOA is a concern. Accordingly, EPA considers the reporting of specific product stewardship information as a data need which should be discussed during this ECA process. Product stewardship information may include, but is not limited to, descriptions of worker training and labeling and other hazard communication tools, descriptions of guidance provided to downstream users of products and articles (including, for example, specific processes to be used during factory applications of coatings), and steps to control and reduce exposures, releases, and wastes.

EPA has identified potential data needs for telomer chemicals, products, and treated articles in Table 1. Some of these needs appear to be met in whole or in part under the TRP LOI commitments, and are identified in the following table with an asterisk (*). This ECA process offers the opportunity to further refine and develop related testing and approaches to address needs or to generate data that go beyond those expressed in the existing TRP LOI commitments.

EPA recognizes that the suggested test methods identified in the table may need to be modified in light of the unique properties of these fluorinated chemicals. EPA requests that available understanding of and experience with these chemicals and their unique properties be made available as part of this process to enable the identification and selection of appropriate representative test substances.

Where possible, example test substances or chemicals have been identified in the table or suggested in Appendix B, but the actual test substances will be determined during this ECA process. Test substances should be representative of products currently in commerce.

In some cases, for the purpose of the ECA process, telomer-treated or telomer-containing products are of interest, and general types of products have been identified for testing. In other cases, PFOA precursors in telomer chemical products have been identified as either potential test substances or as substances which should be the subject of screening and detection tests. In this latter case, a broad scan of telomer products, accompanied by appropriate speciation and quantitation, could assist in identifying the appropriate precursors for testing under an ECA.

Fluoropolymer Data Needs

The fluoropolymers of concern to the Agency are those for which PFOA (generally in the form of ammonium perfluorooctanoate, APFO) is used as a polymerization aid. Information currently available suggests that these fluoropolymers would not break down to form PFOA as a degradation product. The industry has indicated that PFOA is not expected to be present in fluoropolymer products manufactured using PFOA as a fluoropolymer processing aid, and has proposed in their LOI (OPPT-2003-0012-0012) to test products for the presence of PFOA. Such information may be helpful in constructing an understanding of PFOA's mass balance in these processes. Questions remain concerning potential releases of PFOA from the incineration of fluoropolymer products. EPA's concern is for potential releases of PFOA from fluoropolymer and PFOA manufacturing processes, and from any potential presence of residual PFOA in fluoropolymer products or resulting from the incineration of such products.

EPA requested clarification of certain of 3M's and FMG's LOI commitments on April 30, 2003 (OPPT-2003-0012-0028 and 0029, respectively). 3M responded on May 7, 2003 (OPPT-2003-0012-0035), and FMG and DuPont responded on May 5 and May 7, 2003 (OPPT-2003-0012-0036 through 0044).

Fate, Biodegradation, and Incineration

EPA has identified some questions with respect to the potential for fluoropolymer degradation, and with the fate and degradation of the products of fluoropolymer incineration. Accordingly, EPA is suggesting certain physical/chemical property, fate, and incineration testing, as shown on the following table.

Table 1 — Telomer Data Needs

Item	Data Need: Telomers	Test Substances	Suggested Test Methods
1.	*Comprehensive telomer market information: CAS numbers Chemical names Synthetic sequences Production/import volumes Uses/applications	All telomers and polymers made from telomers.	None required
2.	P-chem properties to inform fate testing. This information should be obtained prior to fate testing of representative test substances. Unnecessary for certain polymeric materials.	Examples: Telomer iodides Telomer alcohols Telomer esters of (meth) acrylates Telomer sulfonates	The following, as appropriate: * Water solubility OECD 105. * Vapor pressure OECD 104. * Soil and sludge adsorption/desorption isotherm OPPTS 835.1220. * UV/visible absorption OPPTS 830.7050. * Hydrolysis as a function of pH OPPTS 835.2130.
3.	Elucidation of degradation pathways and identification of degradation products.	Telomer products will be specified, and should be individual representative test substances with appropriate chain lengths representative of desired product information, and different classes of telomer-based polymers such as polyethers, polyurethanes, and polyacrylates. The choice of testing material should also be based on structure, production volume, use, and environmental exposures.	The following, as appropriate: * Inherent Biodegradability Zahn-Wellens/EMPA Test 835.3200. * Activated sludge sorption isotherm OPPTS 835.1110. Aerobic and Anaerobic Transformations in Soil OECD 307. Aerobic and Anaerobic Transformations in Aquatic. Sediment systems OECD 308. Direct Photolysis in Water OPPTS 835.2210. Indirect Photolysis Screening Test OPPTS 835.5270. * Determination of air/water partition coefficient / Henry's Law Constant (method to be determined). Simulation test-Aerobic Sewage Treatment (Activated Sludge Units) OECD 303A. Anaerobic biodegradability of organic compounds in digested sludge: measurement of gas production, OECD 311.

Table 1 — Telomer Data Needs (continued)

Item	Data Need: Telomers	Test Substances	Suggested Test Methods
4.	Determination of p-chem, fate and transport properties of major degradation products.	Synthesis and testing of standards for known degradants (e.g., Rf-acetate and Rf-acrylate).	P-Chem properties/Fate/Transport in 2 & 3 above. Determination of air/water partition coefficient / Henry's Law Constant (method to be determined). UV/visible absorption OPPTS 830.7050. Direct Photolysis in Water OPPTS 835.2210. Indirect Photolysis Screening Test OPPTS 835.5270.
5.	Determination of incineration byproducts of telomers and telomer treated products and articles.	Representative telomers and telomer treated products and articles (paper, textile and carpet products, fire- fighting foams) from manufacturers and importers.	"Laboratory" Burn Test Protocol: 1. ASTM E1641: Decomposition Kinetics by Thermogravimetry. 2. Laboratory-Scale Thermal Degradation via GC/MS yielding the temperature for 99% destruction efficiency @ 2.0 second residence time & excess oxygen.
6.	Determination of p-chem, fate and transport properties of incineration byproducts.	Representative telomer incineration byproducts (direct release of PFAC / Rf acetate). Potential olefins from incineration oxidation / conversion to acids.	To be determined based on incineration test results. [half life gas phase HO. Reactivity]
7.	*Presence/quantification of PFOA, telomer alcohol or other PFOA precursors in telomer chemical products.	Representative telomers from manufacturers and importers.	Draft Study Plan received from TRP; however, Plan does not contemplate identifying PFOA precursors. Sampling and testing standards to be determined.
8.	*Presence/quantification of PFOA, telomer alcohol or other PFOA precursors in telomer-treated or telomer-containing products and articles.	Representative telomer-treated or telomer-containing products and articles (paper, textile and carpet products, fire-fighting foams), from manufacturers and importers.	Draft Study Plan received from TRP; however, Plan does not contemplate identifying PFOA precursors or addressing fire fighting foams. Sampling and testing standards to be determined.

Table 1 — Telomer Data Needs (continued)

Item	Data Need: Telomers	Test Substances	Suggested Test Methods
9.	*Presence of PFOA, telomer alcohol or other PFOA precursors emitted from telomer treated products and articles as they age during use.	Representative telomers and telomer treated products and articles from manufacturers and importers in indoor air adjacent to - and dust from or adjacent to - carpet, textile, and paper products.	Draft Study Plan received from TRP; however, Plan does not contemplate identifying PFOA precursors or performing air or dust analysis. Sample before, during, and after such activities as chemical re-treatment of carpet and apparel, carpet vacuuming, steam cleaning, and laundry washing and drying (apparel). The range of chemical emissions from these products and articles can be estimated under laboratory conditions such as in test chambers or test houses.
10.	Release and exposure assessments for PFOA and PFOA precursors adjacent to telomer manufacturing and use facilities; also of control areas.	Representative telomers and related compounds in air, stream and quiet surface waters (surface film and subsurface), groundwater, sediment, surface soil, and biota.	Sampling and testing standards to be determined. 3M (OPPT-2003-0012-0035) and DuPont (Exygen) manufacturing and use facilities; also of control (OPPT-2003-0012-0040) PFOA methods may serve as initial point for water, but they lack differentiation for surface film. Mabury (as described in OPPT-2003-0012-0010) may provide air starting point.
11.	Release and exposure assessment for PFOA and PFOA precursors from use of fire-fighting foam.	Representative telomers and related compounds in soil, groundwater, surface water runoff, and air during and after fire-fighting foam use.	Sampling and testing standards to be determined. 3M (OPPT-2003-0012-0035) and DuPont (Exygen) (OPPT-2003-0012-0040) PFOA methods may serve as initial point for water, but they lack differentiation for surface film. Mabury (as described in OPPT-2003-0012-0010) may provide air starting point.
12.	Product stewardship information concerning telomer products and articles.	Telomer products and articles.	None required.

* Denotes that the TRP has committed to provide some, but not necessarily all, information concerning this particular data need or endpoint for one or more chemicals. Analytical methods are to be determined, and data quality requirements need to be reviewed to determine appropriateness and acceptability in the context of this ECA. To the extent that chemicals beyond those being covered under the LOI are identified as possible test candidates, the need for such testing will be considered in the context of the ECA process.

Test methods may be amended and adapted through the ECA process, and where test methods have not been identified, they may be developed during the ECA process.

Monitoring

With respect to characterizing releases from PFOA manufacture, from fluoropolymer manufacture, and from the use of fluoropolymer dispersions in treating articles, EPA believes that screening-level environmental monitoring in the immediate vicinity of all PFOA and fluoropolymer manufacturing facilities, as well as a selection of facilities from different industries that utilize fluoropolymer dispersions to coat or treat other manufactured articles, are appropriate. Accordingly, EPA is suggesting potential sampling and monitoring activities addressing the potential presence of PFOA in air, water, soils, sediments, and biota at PFOA and fluoropolymer manufacturing facilities, and at facilities utilizing fluoropolymer dispersions. EPA is also suggesting the sampling and testing of fluoropolymer products and fluoropolymer-treated articles to determine the potential residual presence of PFOA or the release of PFOA during use and aging.

Information concerning blood levels in workers may further help to identify and characterize the sources and pathways of exposure, and may be contemplated in the future depending upon the results of monitoring for PFOA in the vicinity of fluoropolymer and PFOA manufacturing and use facilities, and other information available to EPA. EPA will not pursue blood monitoring as part of this ECA process.

Product Stewardship

One additional area of information which EPA believes is necessary concerns an overall improved understanding of industry's product stewardship efforts with respect to the products and issues for which PFOA is a concern. Accordingly, EPA considers the reporting of specific product stewardship information as a data need which should be discussed during this ECA process. Product stewardship information may include, but is not limited to, descriptions of worker training and labeling and other hazard communication tools, descriptions of guidance provided to downstream users of products and articles (including, for example, specific processes to be used during factory applications of coatings), and steps to control and reduce exposures, releases, and wastes.

EPA has identified potential data needs for PFOA and fluoropolymers in Table II. Some of these needs appear to be met in whole or in part under the 3M and FMG LOIs, and are identified in the following table with an asterisk (*). This ECA process offers the opportunity to further refine and develop related testing and approaches to address needs or to generate data that go beyond those expressed in the existing 3M and FMG LOI commitments.

Table II — Telomer Data Needs

Item	Data Need or Issue: Fluoropolymers	Test Substances	Suggested Test Methods
1.	*Comprehensive fluoropolymer market information: CAS numbers Chemical names Production/import volumes Uses/applications	All fluoropolymers made using PFOA as fluoropolymer polymerization aid (FPA).	None required
2.	P-chem properties to inform fate testing.	Representative fluoropolymers.	The following, as appropriate: Soil adsorption/desorption isotherm OPPTS 835.1220. Hydrolysis as a function of pH OPPTS 835.2130. UV/visible absorption OPPTS 830.7050.
3.	Elucidation of degradation pathways and identification of degradation products.	Representative fluoropolymers. The choice of testing material will be targeted based on structure, production volume, uses, and environmental exposures.	The following, as appropriate: Inherent Biodegradability Zahn-Wellens/EMPA Test 835.3200. Activated sludge sorption isotherm OPPTS 835.1110. Aerobic and Anaerobic Transformations in Soil OECD 307. Aerobic and Anaerobic Transformations in Aquatic. Sediment systems OECD 308. Direct Photolysis in Water OPPTS 835.2210. Indirect Photolysis Screening Test OPPTS 835.5270. Determination of air/water partition coefficient / Henry's Law Constant (method to be determined). Simulation test-Aerobic Sewage Treatment (Activated Sludge Units) OECD 303A. Anaerobic biodegradability of organic compounds in digested sludge: measurement of gas production, OECD 311.

Table II — Fluoropolymer Data Needs (continued)

Item	Data Need or Issue: Fluoropolymers	Test Substances	Suggested Test Methods
4.	Determination of p-chem, fate and transport properties of major degradation products.	To be determined based on test results.	P-Chem properties/Fate/Transport in 2 & 3 above. Determination of air/water partition coefficient / Henry's Law Constant (method to be determined). UV/visible absorption OPPTS 830.7050. Direct Photolysis in Water OPPTS 835.2210. Indirect Photolysis Screening Test OPPTS 835.5270.
5.	Determination of PFOA FPA contamination of processed fluoropolymer (solid), including a detailed material balance focusing on interstage transfers and releases to environmental compartments.	Analysis of processed fluoropolymer products: PTFE homopolymers, copolymers, fluoroelastomers. Validation of engineering models with analytical data. Documentation of PFOA removal/destruction (asserted in AR226-1000).	To be determined based on granular vs fine powder solids. The TRP proposed method for detecting PFOA impurity in carpet/textile/paper may serve as a starting point.
6.	*Presence of PFOA in fluoropolymer and fluoropolymer treated products and articles.	Representative fluoropolymers and representative fluoropolymer treated products and articles (paper, textile and carpet products, PTFE cookware, engine oil with PTFE) from manufacturers and importers.	Sampling and testing standards to be determined. Stability of products during melt processing or molding/extrusion procedures.
7	Presence of PFOA emitted from fluoropolymer treated products and articles as they age during use.	Representative fluoropolyomers from manufacturers and importers in indoor air adjacent to – and dust from or adjacent to – carpet, textile, and paper.	Sample before, during, and after such activities as chemical re-treatment of carpet and apparel, carpet vacuuming, steam cleaning, and laundry washing and drying (apparel). The range of chemical emissions from these products and articles can be estimated under laboratory conditions such as in test chambers or test houses. Sampling and testing standards to be determined.

Table II — Fluoropolymer Data Needs (continued)

Item	Data Need or Issue: Fluoropolymers	Test Substances	Suggested Test Methods
8.	Determination of incineration byproducts of fluoropolymer and fluoropolymer treated products and articles.	Representative fluoropolymers and fluoropolymer treated products and articles (paper, textile and carpet products, engine oil with PTFE) from manufacturers and importers.	"Laboratory" Burn Test Protocol: 1. ASTM E1641: Decomposition Kinetics by Thermogravimetry. 2. Laboratory-Scale Thermal Degradation via GC/MS yielding the temperature for 99% destruction efficiency @ 2.0 second residence time & excess oxygen.
9.	Determination of p-chem, fate and transport properties of incineration products.	Representative incineration products from 8 above.	To be determined based on incineration test results.
10.	*Release and exposure assessment adjacent to PFOA and fluoropolymer manufacturing and use facilities; also of control areas.	Fluoropolymer polymerization aids (FPAs) and related compounds in air, stream and quiet surface waters (surface film and subsurface), groundwater, sediments, surface soil, and biota.	Sampling and testing standards to be determined. 3M (OPPT-2003-0012-0035) and DuPont (Exygen) (OPPT-2003-0012-0040) PFOA methods in docket may serve as initial point for water, but they lack differentiation for surface film. Mabury (as described in OPPT-2003-0012-0010) may provide air starting point.
11.	Product stewardship information concerning PFOA and fluoropolymer product and article manufacturing, use, and disposal.	PFOA and fluoropolymer products and articles.	None

* Denotes that 3M and/or FMG have committed to provide some, but not necessarily all, information concerning this particular data need or endpoint for one or more chemicals. Analytical methods are to be determined, and data quality requirements need to be reviewed to determine appropriateness and acceptability in the context of this ECA. To the extent that chemicals beyond those being covered under the LOI are identified as possible test candidates, the need for such testing will be considered in the context of the ECA process.

Test methods may be amended and adapted through the ECA process, and where test methods have not been identified, they may be developed during the ECA process.

APPENDIX A

Rationales For Proposed Fate Testing and Monitoring and Sampling Activities

This Appendix presents additional information explaining why certain testing may be proposed, and discussing proposed test standards and methodologies. The information in this Appendix applies to both the telomer and fluoropolymer tables in the Preliminary Framework Document.

Testing: chemical properties

Objective—Obtain fundamental chemical property data on subject telomers and fluoropolymers.

Tests—Water solubility; vapor pressure; soil adsorption/desorption isotherm; UV-Visible absorption spectrum; hydrolysis.

Rationale—These data are prerequisites to and inform subsequent fate testing. OECD guidelines 307, 308, and 303A (respectively soil; sediment; activated sludge tests) all state that information on water solubility, vapor pressure, soil adsorption/desorption isotherm and hydrolysis should be available before additional testing is done. Information on these endpoints is required to ensure the correct design of fate protocols for sediment, soil and sludge, so that they accomplish their objectives. UV-Visible absorption spectrum is also easily determined in the laboratory and indicates whether the test substance absorbs light in the visible range. If it does, the possibility exists that direct photolysis may be a significant fate process, and a more definitive test to quantify this process should then be performed. In addition, water solubility and vapor pressure together (as the vapor pressure/solubility ratio) provide an estimate of the Henry's Law constant (H_c), which is an important indicator of volatility from water. If a test substance has an estimated Henry's Law constant within a certain range (to be decided), the substance should then be subject to more definitive testing to determine H_c experimentally.

Testing: environmental transformation

Objective—Identify the most important environmental transformation (degradation) processes for subject telomers and fluoropolymers. Elucidate degradation pathways and identify and quantify major degradation products to the extent possible.

Tests—Inherent biodegradability: Zahn/Wellens/EMPA test (OPPTS 835.3200 or OECD 302B); Activated Sludge Sorption Isotherm (OPPTS 835.1110); Aerobic and anaerobic transformation in aquatic sediment, OECD 308; Aerobic and anaerobic transformation in soil, OECD 307; Simulation test-aerobic sewage treatment, OECD 303(A: Activated sludge test); direct and indirect photolysis in water; Anaerobic biodegradability of organic compounds in digested sludge: measurement of gas production, OECD 311. Because of the unique properties of these perfluorinated chemicals, the analytical methods themselves may need to be tailored to attain valid results.

Rationale—See below.

Zahn-Wellens/EMPA test—OPPTS 835.3200. The inherent biodegradability of a test substance is an important fundamental characteristic. In concert with supplemental analytical techniques the Zahn-Wellens test can allow the identification of important biodegradation products and pathways under conditions conducive to aerobic biodegradation in an activated sludge medium. The test also gives an indication of the potential for removal of the test substance via sorption to the activated sludge inoculum.

*Aerobic and anaerobic transformation in aquatic sediment, OECD 308—*Test substances may enter shallow or deep surface waters by a variety of routes, including industrial or domestic effluents, waste disposal and atmospheric deposition. The subject guideline is capable of yielding quantitative information on a substance's fate in aquatic sediment samples collected from the environment and brought into the laboratory for study. The guideline is written so as to accommodate a variety of specific objectives which include multiple sampling locations (thus sediments with a variety of characteristics); identification and quantification of major degradation products; and specification of test conditions (e.g. duration, temperature) as appropriate. Transformation rates and half-lives can also be determined for subsequent use in environmental fate and exposure modeling (e.g. EXAMS II) if that is done.

*Aerobic and anaerobic transformation in soil, OECD 307—*Test substances may enter soils by a variety of routes, including land application of biosolids, waste disposal (landfilling) and atmospheric deposition. The subject guideline is capable of yielding quantitative information on a substance's fate in soil samples collected from the environment and brought into the laboratory for study. The guideline is written so as to accommodate a variety of specific objectives which include multiple sampling locations (thus soils with a variety of characteristics); identification and quantification of major degradation products; and specification of test conditions (e.g. duration, temperature, pressure) as appropriate. Transformation rates and half-lives can also be determined for subsequent use in environmental fate and exposure modeling if that is done.

*Simulation test-aerobic sewage treatment: OECD 303A, Activated sludge test—*Aqueous wastes from manufacture, processing and use of telomers and fluoropolymers may be disposed in a variety of ways. Activated sludge secondary treatment is the chief removal process in publicly owned treatment works (POTWs) and also in many if not most industrial wastewater treatment systems. OECD 303A is a simulation test for activated sludge treatment and as such, assuming proper conduct of the test, optimum selection of test conditions, etc., can yield information on removal that can be used in subsequent modeling and exposure assessment. Primary objectives would be to:

- (1) Identify the most important transformation (degradation) processes for subject telomers and fluoropolymers. Elucidate degradation pathways and identify and quantify major degradation products (if any) to the extent possible;
- (2) Obtain measured values and standard deviations for overall removal rates for the test substances and any degradation products that are also determined in the studies;
- (3) Measure and quantify test substances and degradation products in the three main "waste" streams from such treatment; namely effluent, waste sludge and aeration off gases.

If such testing yields negative results, defined as no formation of biotransformation products greater than xx % relative to starting material, then additional testing for this endpoint may be unnecessary. An exception may occur because any fate test can only yield a snapshot of likely environmental processes. It is always possible that the snapshot may turn out to be unrepresentative of some specific treatment plants(s) of interest, which might not even be identified at the time the test is done. Positive results could trigger further investigation of a specific removal process (e.g., volatilization, sorption).

Anaerobic biodegradability of organic compounds in digested sludge: measurement of gas production, OECD 311—In wastewater treatment a principal disposition of many chemical substances is to partition to the solids phase. Chemical properties are a driving force in this process, wherein partitioning to solids is favored for the less water-soluble substances. In typical treatment plants, especially those using activated sludge secondary treatment, excess sludge is generated during treatment and normally is sent to an adjacent anaerobic digester to reduce volume and organic load prior to ultimate disposal. Conditions are not identical to those of a fullscale digester, but results of the test should provide a good indication of the potential for degradation at full scale. Important test conditions—e.g. temperature, duration, etc.—can be selected so as to mimic actual digestors (although the test is not regarded as a simulation test). The test is intended to measure ultimate anaerobic degradation via total gas production (a standard method), but it can be modified to incorporate substance-specific analysis.

This test can be triggered by “significant” presence of test substances in the sludge, as determined in the activated sludge simulation test (OECD 303A), above). Assuming optimum selection of test conditions, test duration, analytical methods, etc., it should be possible to obtain sufficient data to develop a picture of the most probable anaerobic biotransformation pathway(s) and products (if any). Quantitative data on removal of test substances and removal/formation of degradation products (if any) can be used in subsequent exposure modeling, to adjust the amount of the given substance calculated to be sent later to landfill, spread on land surfaces, etc. If such testing yields negative results, defined as no formation of biotransformation products greater than xx % relative to starting material, then additional testing should be unnecessary.

Activated Sludge Sorption Isotherm, OPPTS 835.1110—The sorption of chemical compounds to activated sludge biomass in biological wastewater treatment systems is an important process that affects the distribution of the compounds between solid, aqueous, and vapor phases. If a chemical compound is sorbed to sludge biomass, it may be removed from the system along with other solids by clarification. If a compound is not sorbed, it will remain in the aqueous phase where it is subject to removal via biodegradation, chemical interactions, and/or volatilization. A non-sorbing, non-biodegradable, non-interacting, nonvolatile compound will pass through a biological treatment system unaffected. Information on sorption potential is needed to assess the possibility for the removal of chemical compounds in biological wastewater treatment systems. While the focus of the Activated Sludge Sorption Isotherm test is the measurement of *sorption* of the test chemical to sludge, it can be modified to assess the potential for *desorption* of the test chemical as well. This modification would permit the assessment of the potential for a chemical sorbed to sludge to be leached from sludge. The additional information would be useful in examining the potential for migration of the test chemical from sludge as a result of sludge land application.

Exposure Monitoring and Modeling

Accurate estimation of total human and environmental exposures requires extensive knowledge of chemical behavior (fate), routes and location of exposure, and human activity patterns that lead to exposure. For a diverse set of chemicals in widespread use, a complex mix of information must be tailored for well-designed monitoring tests or meaningful modeling. Insufficient information, poorly designed and/or incomplete tests or models will defeat the reasonable estimation of exposures.

Testing: Monitoring Of Environmental, General Population And Consumer Exposure

Chemical monitoring in the outdoor environment is usually tailored to the known or estimated behavior (fate) of the chemical(s), e.g., if it is known that a chemical partitions to water, monitoring can focus on the water pathway. Because neither all the chemicals' identities nor their fate are known, the monitoring suggested here must be considered as subject to change as more information becomes available. Given these limitations, the initial monitoring proposal is based on the fate known for PFOA, as follows:

- For facilities that have manufactured or used the chemical(s), measure appropriate chemicals in air, water, soil, sediments, and biota. Similar facility samplings should be done at sites with no expected sources of exposure – control sites. All samplings should be designed to find significant differences between sampling locations (control and expected), and sampling times, e.g., before, during, and after emissions.
- Facility air, water, soil, sediments, and biota samples should be taken before, during, and after emissions to those respective media. Since PFOA may partition to water surfaces, both surface and subsurface water samples should be gathered, from appropriate stream and quiet water sites. Since PFOA may partition to airborne particulates, surface soil samples should be gathered, from areas that air monitoring or modeling indicate are probable for particulate deposition.
- Exposures to chemical emissions from products should be estimated from appropriate studies of product use/activities in chamber or test houses. These should include testing the indoor air and dust on samples before, during, and after such activities as chemical re-treatment of carpet and apparel, carpet vacuuming, steam cleaning, and laundry washing and drying (apparel).

Monitoring Uncertainties

As in the fate rationale presented above, exposure monitoring may constitute no more than a snapshot of a rapidly changing situation and so not be adequately representative. This is especially true for media that the chemical moves through but doesn't partition to. Conversely, media that act as sinks where the chemical can accumulate can obscure the source(s) and pathway(s) of exposure, e.g., PFOA in biota. Repeating samplings over time may address these concerns, as changes measured over time in the pathways and in biota may correlate with observed changes in environmental concentrations. More certain correlation of pathway exposure and corresponding environmental levels can be investigated with carefully planned

radioisotope studies, which, if in sufficient concentration to be detected, can be tracked from release through exposure.

Testing: Modeling Of Environmental, General Population And Consumer Exposure

An attempt to model correlations between environmental concentrations and human blood levels of PFOA was made by DuPont (Hinderliter and Jepson, 2001). More chemical fate and PBPK information would be needed to validate/improve this model. EPA is aware that additional PBPK studies in rats are underway in Europe.

APPENDIX B

Determination of Test Substances

This Appendix provides examples and explanations of how specific test substances, which are only identified generally in the tables in the Preliminary Framework Document, may be determined during the ECA process.

Telomers

The telomer chemicals of greatest interest to the EPA are those currently in commerce. EPA is aware that the specific identities of many of the telomer chemicals currently produced are claimed as confidential business information (CBI) under the Toxic Substances Control Act (TSCA), and are thus not subject to public disclosure. Accordingly, EPA would expect that certain of the identities of specific telomer test substances to be used in this ECA process would also be claimed as CBI, although the test results would be publicly available.

For the purpose of defining the types of telomer chemicals which would be of interest to the EPA in the context of this ECA process, EPA conducted a search of the public TSCA Inventory to identify telomer chemicals that reflect the scope of the Agency's interest. These chemicals are listed below. This list is not comprehensive, nor do the chemicals on this list necessarily represent chemicals that the Agency would propose as test substances for this ECA process. This list is offered to illustrate and provide examples of the generic descriptive terms used in the tables in this preliminary framework document.

Example Telomer Chemicals and Polymers

C4-C18 alcohols, gamma.-omega.

CAS 54949-76-5:	1-Butanol, 3,3,4,4,4-pentafluoro-
CAS 2043-47-2:	1-Hexanol, 3,3,4,4,5,5,6,6,6-nonafluoro-
CAS 647-42-7:	1-Octanol, 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluoro-
CAS 678-39-7:	1-Decanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptadecafluoro-
CAS 865-86-1:	1-Dodecanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,12-heneicosafluoro-
CAS 39239-77-5:	1-Tetradecanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,14-pentacosfluoro-
CAS 60699-51-6:	1-Hexadecanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,16,16,16-nonacosfluoro-
CAS 65104-67-8:	1-Octadecanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,16,16,17,17,18,18,18-tritriacontfluoro-

C4-C20 alcohols, gamma.-omega.-perfluoro (meth)acrylates

CAS 52591-27-2:	2-Propenoic acid, 3,3,4,4,5,5,6,6,6-nonafluorohexyl ester
CAS 17527-29-6:	2-Propenoic acid, 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl ester

CAS 27905-45-9:	2-Propenoic acid, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptafluorodecyl ester
CAS 17741-60-5:	2-Propenoic acid, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,12-heneicosafuorododecyl ester
CAS 34395-24-9:	2-Propenoic acid, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,14-pentacosafuorotetradecyl ester
CAS 34362-49-7:	2-Propenoic acid, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,16,16,16-nonacosafuorohexadecyl ester
CAS 2144-53-8:	2-Propenoic acid, 2-methyl-, 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl ester
CAS 2144-54-9:	2-Propenoic acid, 2-methyl-, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,12-heneicosafuorododecyl ester
CAS 6014-75-1:	2-Propenoic acid, 2-methyl-, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,14-pentacosafuorotetradecyl ester
CAS 4980-53-4:	2-Propenoic acid, 2-methyl-, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,16,16,16-nonacosafuorohexadecyl ester
CAS 59778-97-1:	2-Propenoic acid, 2-methyl-, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,16,16,17,17,18,18,18-tritriacontafuorooctadecyl ester
CAS 65104-66-7:	2-Propenoic acid, 2-methyl-, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,16,16,17,17,18,18,19,19,20,20-heptatriacontafuoroeicosyl ester

Other (meth)acrylates

CAS 49859-70-3:	2-Propenoic acid, 2-[methyl[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]ethyl ester
CAS 48077-95-8:	2-Propenoic acid, 2-[[[(3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptafluorodecyl)sulfonyl]methylamino]ethyl ester

Phosphates

CAS 148240-85-1:	1,3-Propanediol, 2,2-bis[[[g-w-perfluoro-C4-10-alkyl]thio]methyl] derivs., phosphates, ammonium salts
CAS 148240-87-3:	1,3-Propanediol, 2,2-bis[[[g-w-perfluoro-C6-12-alkyl]thio]methyl] derivs., phosphates, ammonium salts
CAS 148240-89-5:	1,3-Propanediol, 2,2-bis[[[g-w-perfluoro-C10-20-alkyl]thio]methyl] derivs., phosphates, ammonium salts

Other Class 1/2 Compounds

CAS 54950-05-9:	Butanedioic acid, sulfo-, 1,4-bis(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl) ester, sodium salt
CAS 70983-60-7:	1-Propanaminium, 2-hydroxy-N,N,N-trimethyl-, 3-[(g-w-perfluoro-C6-20-alkyl)thio] derivs, chlorides
CAS 71608-61-2:	Pentanoic acid, 4,4-bis[(g-w-perfluoro-C8-20-alkyl)thio] derivs., compds. with diethanolamine
CAS 82199-07-3:	Carbamic acid, [2-(sulfothio)ethyl]-, C-(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl) ester,

monosodium salt

*POLYMERS**Polyethers*

- CAS 68784-73-6: 2-Propenoic acid, 2-methyl-, 2-[methyl[(g-w-perfluoro-C8-14-alkyl)sulfonyl]amino]ethyl esters, reaction products with polyethylene glycol bis(mercaptoacetate)
- CAS 72480-32-1: 2-Propenoic acid, 2-(methylamino)ethyl ester, N-[(g-w-perfluoro-C8-14-alkyl)sulfonyl] derivs., reaction products with polyethylene glycol bis(thioglycolate)
- CAS 183146-60-3: Oxirane, methyl-, polymer with oxirane, mono[2-hydroxy-3-[(g-w-perfluoro-C8-20-alkyl)thio]propyl] ethers
- CAS 70983-59-4: Poly(oxy-1,2-ethanediyl), a-methyl-w-hydroxy-, 2-hydroxy-3-[(g-w-perfluoro-C6-20-alkyl)thio]propyl ethers
- CAS 68784-73-6: 2-Propenoic acid, 2-methyl-, 2-[methyl[(g-w-perfluoro-C8-14-alkyl)sulfonyl]amino]ethyl esters, reaction products with polyethylene glycol bis(mercaptoacetate)
- CAS 72480-32-1: 2-Propenoic acid, 2-(methylamino)ethyl ester, N-[(g-w-perfluoro-C8-14-alkyl)sulfonyl] derivs., reaction products with polyethylene glycol bis(thioglycolate)

Poly(meth)acrylate (meth)acrylamide

- CAS 70969-47-0: Thiols, C8-20, g-w-perfluoro, telomers with acrylamide
- CAS 65636-35-3: Ethanaminium, N,N-diethyl-N-methyl-2-[(2-methyl-1-oxo-2-propenyl)oxy]-, methyl sulfate, polymer with 2-ethylhexyl 2-methyl-2-propenoate, a-fluoro-w-[2-[(2-methyl-1-oxo-2-propenyl)oxy]ethyl]poly(difluoromethylene), 2-hydroxyethyl 2-methyl-2-propenoate and N-(hydroxymethyl)-2-propenamide
- CAS 68239-43-0: 2-Propenoic acid, 2-methyl-, 2-ethylhexyl ester, polymer with a-fluoro-w-[2-[(2-methyl-1-oxo-2-propenyl)oxy]ethyl]poly(difluoromethylene), 2-hydroxyethyl 2-methyl-2-propenoate and N-(hydroxymethyl)-2-propenamide
- CAS 196316-34-4: 2-Propenoic acid, 2-methyl-, 2-(dimethylamino)ethyl ester, polymers with g-w-perfluoro-C10-16-alkyl acrylate and vinyl acetate, acetates
- CAS 186397-57-9: 2-Propenoic acid, 2-methyl-, 2-(dimethylamino)ethyl ester, polymers with g-w-perfluoro-C10-16-alkyl acrylate and vinyl acetate
- CAS 174125-96-3: 2-Propenoic acid, 2-methyl-, 2-(dimethylamino)ethyl ester, polymers with d-w-perfluoro-C10-16-alkyl acrylate and vinyl acetate
- CAS 150135-57-2: 2-Propenoic acid, 2-methyl-, 2-(dimethylamino)ethyl ester, polymers with Bu acrylate, g-w-perfluoro-C8-14-alkyl acrylate and polyethylene glycol monomethacrylate, 2,2'-azobis[2,4-dimethylpentanenitrile]-initiate
- CAS 68988-55-6: 2-Propenoic acid, 2-methyl-, C7-18-alkyl esters, polymers with 2-[methyl[(g-w-perfluoro-C8-14-alkyl)sulfonyl]amino]ethyl acrylate
- CAS 68988-54-5: 2-Propenoic acid, 2-methyl-, C7-8-alkyl esters, polymers with 2-[methyl[(g-w-perfluoro-C8-14-alkyl)sulfonyl]amino]ethyl acrylate
- CAS 68988-53-4: 2-Propenoic acid, 2-methyl-, C4-18-alkyl esters, polymers with 2-[methyl[(g-w-perfluoro-C8-14-alkyl)sulfonyl]amino]ethyl acrylate
- CAS 68988-52-3: 2-Propenoic acid, 2-methyl-, C4-8-alkyl esters, polymers with 2-[methyl[(g-w-perfluoro-C8-14-alkyl)sulfonyl]amino]ethyl acrylate

Other Polymeric Compounds

- CAS 68988-25-0: 1,4-Butanediol, 2,3-bis[(g-w-perfluoro-C4-18-alkyl)thio] derivs., polymers with 1,6-diisocyanato-2,2,4(or 2,4,4)-trimethylhexane and polyethylene-polypropylene glycol bis(2-aminomethylethyl) ether
- CAS 68037-23-0: 1,4-Butanediol, 2,3-bis[(g-w-perfluoro-C6-20-alkyl)thio] derivs., polymers with 1,6-diisocyanatotrimethylhexane and 2,2'-(methylimino)bis[ethanol]
- CAS 135228-60-3: Hexane, 1,6-diisocyanato-, homopolymer, g-w-perfluoro-C6-20-alc.-blocked
- CAS 71205-28-2: 1,4-Butanediol, polymers with 2,3-bis[(g-w-perfluoro-C6-20-alkyl)thio]-1,4-butanediol, C36-alkylene diisocyanate and 1,6-diisocyanato-2,2,4(or 2,4,4)-trimethylhexane
- CAS 68990-40-9: Fatty acids, C18-unsatd., dimers, diisocyanates, polymers with 2,3-bis(g-w-perfluoro-C4-18-alkyl)-1,4-butanediol, 1,6-diisocyanato-2,2,4(or 2,4,4)-trimethylhexane and 2,2'-(methylimino)bis[ethanol]
- CAS 68037-22-9: 2-Butenedioic acid (2E)-, bis(g-w-perfluoro-C4-20-alkyl) esters, polymers with 1-(ethenyloxy)butanol, ethylene, 1,4-hexadiene and propene
- CAS 170424-64-3: Siloxanes and Silicones, hydroxy Me, Me octyl, Me (g-w-perfluoro C8-14-alkyl)oxy, ethers with polyethylene glycol mono-Me ether

Fluoropolymers

The Fluoropolymer Manufacturers Group (FMG) identified in their LOI a list of fluoropolymers and fluoroelastomers which may be made with PFOA, and also identified monomers which are used in fluoropolymer manufacture. FMG subsequently submitted a slightly revised list correcting typographical errors (OPPT-2003-0012-0034). EPA anticipates that the fluoropolymer and fluoroelastomer test substances to be used for the purposes of this ECA process would be drawn from this list.

Fluoropolymers and Fluoroelastomers Which May Be Made With APFO

Polymer family	CAS Number	Monomers
<i>Fluoropolymers</i>		
PTFE	9002-84-0	TFE
FEP	25067-11-2	TFE, HFP
PFA	26655-00-5	TFE, PMVE
THV	25190-89-0	TFE, HFP, VDF
ETFE	68258-85-5	TFE, E
HTE	35560-16-8	TFE, HFP, E
<i>Fluoroelastomers</i>		
Copolymers	9011-17-0	VDF, HFP
Terpolymers	25190-89-0	TFE, HFP, VDF
Base resistant elastomers	54675-89-7, 27029-05-6	TFE, VDF, P TFE, P
CTFE elastomers	9010-75-7	CTFE, VDF
Low temperature elastomers		TFE, VDF

Monomers Used in Fluoropolymers

Acronym	Monomer name	CAS Number
CTFE	Chlorotrifluoroethylene	79-38-9
TFE	Tetrafluoroethylene	116-14-3
HFP	Hexafluoropropylene	116-15-4
VDF	Vinylidene fluoride	75-38-7
PMVE	Perfluoromethyl vinyl ether	1187-93-5
PPVE	Perfluoropropyl vinyl ether	1623-05-8
E	Ethylene	74-85-1
P	Propylene	115-07-1