3M Decatur Chemical Plant

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3M

January 30, 2009

Mr. Michael Hom
U.S. Environmental Protection Agency
Clean Water Enforcement Branch
61 Forsyth St., S.W.
Atlanta, GA 30303-8960

Re: Section 308 Information Requests

Dear Mr. Hom:

3M Company ("3M") and its subsidiary, Dyneon LLC ("Dyneon") are responding to EPA's Clean Water Act Section 308 Information Requests concerning the possible discharge of perfluorinated compounds to the Decatur Utilities sanitary sewer collection system ("Decatur Utilities"). 3M and Dyneon are providing a joint response to the Information Requests. Although the Companies are separate legal entities which operate distinct businesses, they operate from a common facility in Decatur, Alabama, and share many operations, including on-site treatment and direct discharge of process wastewater via an NPDES permit.

Responses to the individual questions in the Information Requests are set out below. However, we first provide some background regarding 3M's and Dyneon's activities at the Decatur, Alabama site.

For the purposes of this Information Request, it is useful to refer to three distinct operations at the Decatur site - 3M, Dyneon and Dyneon Plastics.

- 3M operates a Materials Resource Division plant ("Chemical Plant") and a Film Manufacturing Division and Supply Chain Operations plant ("Film Plant"), constructed in 1961 and 1962, respectively, at the Decatur facility. During the period covered by the Information Request, process wastewater from the Chemical and Film Plants was (and continues to be) treated in 3M's on-site wastewater treatment system and discharged via an NPDES permit to Baker's Creek, a tributary of the Tennessee River. The 3M process wastewater is treated using physical chemical treatment followed by an activated sludge process prior to discharge. 3M began discharging sanitary wastewater from the Decatur facility to Decatur Utilities in 1999. (Our November 26, 2008 letter to Decatur Utilities, attached as Tab 1, put this date at 2001, but our further investigation places the sanitary wastewater discharge to Decatur Utilities beginning in 1999.)

- Dyneon LLC was formed in 1996 to conduct business related to the research and development, marketing and sale of products including fluoropolymers, fluoromonomers, mold release compounds and rubber curatives and processing aids. For purposes of this response, Dyneon refers to the Dyneon fluoroelastomer facility located on the southern portion of the Decatur facility. Dyneon's fluoroelastomer operations at Decatur had previously been a part of 3M's manufacturing processes at the Site. All process wastewater from Dyneon's operations is managed through 3M's wastewater treatment system. Sanitary wastewater is combined with the 3M sanitary wastewater and discharged to Decatur Utilities.

- Dyneon operates a separate business at the Decatur facility, referred to by EPA as "Dyneon Plastics," which is part of Dyneon LLC. [1] Dyneon Plastics manufactures both vinylidene fluoride ("VDF"), a monomer, and polyvinylidene fluoride ("PVDF"), a solid fluoroplastic produced by the polymerization of VDF. Pursuant to a State Indirect Discharge (SID) permit, Dyneon Plastics discharges process wastewater to Decatur Utilities. However, the production processes for VDF and PVDF do not use or generate perfluorinated chemicals.

Our specific responses to the numbered questions are set forth below.[2]

1. **Provide a narrative description of the products manufactured or services provided by the Company's primary and secondary business at its Decatur, Alabama location for each calendar year beginning with calendar year 1996 to the present.**

The 3M portion of the Decatur facility is divided into two plants - the Film Plant and the Chemical Plant. Since 1996, the Film Plant has manufactured a broad range of specialty films, including multi-layer optical film and a variety of porous, laminator, duplicator and backing film. The films are primarily polyester, but certain varieties of film are coated with other materials depending upon the specific product end use.

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[1] The business referred to as "Dyneon Plastics" was formed in January 1998 as two businesses operated by separate legal entities, Solvay Advanced Polymers, Inc. (which later changed its name to Solvay Fluoropolymers, Inc.) ("Solvay Fluoropolymers"), a subsidiary of Solvay America, Inc., and Alventia LLC ("Alventia"), a joint venture company of Solvay Fluoropolymers and Dyneon. Alventia began VDF production in 1999; Solvay Fluoropolymers began PVDF production in 2000. In 2003, Dyneon acquired both Alventia and Solvay Fluoropolymers, and they were merged into Dyneon to form the business referred to here as Dyneon Plastics.

[2] We note that EPA's definition of "perfluorinated compounds" for purposes of its request is not a standard definition or a term that is commonly used as EPA has defined it. The definition combines a number of different types of chemistry. Rather than using the generic term as defined by EPA, we will endeavor to be specific regarding the types of perfluorinated compounds described in response to each question.

The Chemical Plant is a specialty chemicals manufacturing facility which produces a wide array of household and industrial use products, many of which are used elsewhere within 3M as raw materials. The Chemical Plant previously manufactured materials based on perfluorooctanyl sulfonate chemistry for use as "building blocks" or intermediates in the production of various products, including surfactants and polymers. The majority of these products were used as protective treatment for carpet, paper, and textiles, although there were numerous applications. From 1998-2000, the 3M Decatur Chemical Plant also produced ammonium perfluorooctanoate (APFO, the ammonium salt of PFOA), a carboxylate material. 3M phased out of the production of the both the sulfonate and carboxylate perfluorooctanyl (C8) building block chemistry at this site at the end of 2000, and by the end of 2002 discontinued production of materials or polymers based on those materials. Beginning in 2003 and continuing at this time, the Chemical Plant has processed materials based on perfluorobutane sulfonate (C4) chemistry.

Fluoroelastomer products have been produced at the site first by 3M, and since its creation in 1996, by Dyneon LLC. The fluoroelastomers are made by an emulsion polymerization process, and are dry, solid fluoropolymer products.

Since 1999, Dyneon Plastics has manufactured vinylidene fluoride ("VDF"), a monomer, and since 2000, has manufactured polyvinylidene fluoride ("PVDF"), a solid, produced from the polymerization of VDF. VDF is produced through the dehydrohalogenation of 1-chloro-1, 1-difluoroethane ("HCFC-142b") in a pyrolysis furnace. PVDF is produced through a batch polymerization process involving the introduction of VDF into an aqueous medium. No perfluorochemical materials are used in or produced as a result of the manufacture of VDF or PVDF.

2. **Provide the Standard Industrial Classification and North American Industry Classification System codes for the Company's business(es) at its Decatur, Alabama location for each calendar year beginning with calendar year 1996 to the present.**

Various Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes have applied since 1996 to the businesses for 3M, Dyneon and Dyneon Plastics at the Decatur site. We list below first the primary code for each plant, followed by the secondary codes:

3M Chemical
primary: 2899
secondary: 2843; 2822; 3081; 32611; 325998; 325613; 326113; 325119; 2869; 2672; 322222

3M Film
primary: 3081
secondary: 2821, 325211

Dyneon
primary: 2822
secondary: 3252-12; 2822-0-72; 325212; 2899; 3081; 2843; 2821

Dyneon Plastics
primary: 2821
secondary: 2869

3. **Provide a list and a general estimate of the amounts of raw and finished materials that may have contained PFCs which were used in the Company's operations to manufacture products or provide services at its Decatur, Alabama location for each calendar year beginning with calendar year 1996 to the present.**

3M and Dyneon will answer beginning with the calendar year 1999, the inception of any discharge to Decatur Utilities.

The 3M Decatur Chemical Plant produced PFC-related products at this site (and also from time to time processed PFC-related products from other 3M locations). The Chemical Plant produced primarily eight-carbon compounds. Perfluorooctane sulfonyl fluoride, or POSF, was the starting material. POSF was produced by combining a hydrocarbon feedstock and hydrogen fluoride in electrochemical fluorination ("ECF") cells. Applying electric current in the cell causes the hydrogen atoms to be replaced with fluorine atoms, resulting in the formation of the perfluorinated (or fully fluorinated) material. POSF was then derivatized to manufacture various perfluorooctanyl sulfonate intermediate or "building block" chemicals, all of which could degrade or metabolize to PFOS. Those building block materials were used to produce a variety of products, primarily polymers, used as surfactants or protective treatment of carpet, textiles and paper. Most of these products were in the form of long-chained stable urethane and acrylate fluorochemical polymers. Volume of production of POSF in 1999 was 4.0 million pounds and in 2000 was 4.6 million pounds. Production of POSF ceased at the end of 2000.

The 3M Chemical Plant also produced APFO (the ammonium salt of PFOA) during 1999 and 2000. The principal raw material made for the manufacture of this product was perfluorooctanoyl fluoride. Perfluorooctanoyl fluoride was hydrolyzed to form APFO. Production of perfluorooctanoyl fluoride in 1999 was 0.10 million pounds and in 2000 was 0.11 million pounds. Production ceased at the end of 2000.

Dyneon's fluoroelastomer manufacturing facility used several perfluorochemical products as polymerization emulsifiers or in one case as an additive in fluoroelastomer products. APFO was used in limited quantities as an emulsifier to make specialty fluoroelastomers. (It was an emulsifier in the process, not an ingredient in the final products.) Volumes are proprietary information and are provided in Tab 2, which is submitted as "Confidential Business Information" pursuant to EPA regulations. Dyneon's use of APFO in the Decatur facility

ceased at the end of 2004. Dyneon continues to make specialty fluoroelastomer products but without the use of any perfluorochemical emulsifier.

In addition to APFO, Dyneon used a PFOS potassium salt product as a polymerization emulsifier for other grades of fluoroelastomer. Volumes are proprietary information and are provided in Tab 2, which is submitted as "Confidential Business Information" pursuant to EPA regulations. Dyneon stopped using this PFOS product at the end of 2002. Dyneon continues to make these specific fluoroelastomers, but without the use of any perfluorochemical emulsifier.

A PFOS-related product was also used as an additive in many of the fluoroelastomer products manufactured by Dyneon. Volumes are proprietary information and are provided in Tab 2, which is submitted as "Confidential Business Information" pursuant to EPA regulations. The use of this PFC-related additive ceased at the end of 2003.

The fluoroplastics manufactured at the Dyneon Plastics facility are polymerized by an aqueous suspension process that does not use or generate any perfluorochemical materials. The vinylidene fluoride monomer used in these plastics is made on site. The starting material is HCFC-142b.

4. **Provide a copy of the Material Safety Data Sheets for the raw materials used in the Company's operations to manufacture products or provide services at its Decatur, Alabama location for each calendar year beginning with calendar year 1996 to the present.**

Because 3M and Dyneon manufactured or used numerous perfluorochemical products, there are thousands of MSDSs for raw materials, intermediates or products, most of which are not relevant to Decatur Utilities. We are attaching at Tab 3 copies of Material Safety Data Sheets for FC-95, a PFOS product, and for FC-143, the ammonium salt of PFOA. We can arrange for you to review MSDSs of substances related to PFOS and PFOA if necessary upon request.

5. **Has the company ever used PFCs in its operations to manufacture products or provide services at its Decatur, Alabama location? If so, provide the name of the PFC and a general estimate of the amounts used for each calendar year beginning with calendar year 1996 to the present.**

Please see discussion above.

6. **Has the Company ever used telomers or fluoropolymers in its operations to manufacture products or provide services at its Decatur, Alabama location? If so, provide the name of the telomer or fluoropolymer and a general estimate of the**

amounts used for each calendar year beginning with calendar year 1996 to the present.

3M's perfluorochemical production at the Decatur Chemical Plant is based on the electrochemical fluorination (ECF) process, an entirely different process from the telomer process. Using the ECF process, 3M produced or produces the intermediate perfluorochemicals and then a number of fluorochemical polymer products (*e.g.*, urethanes, acrylates, esters), used primarily as protective treatments for carpet, textiles, and paper and as surfactants. These products are perfluorochemical-based polymers, but are distinct from the materials typically referred to as "fluoropolymers." The materials produced by the 3M Chemical Plant typically consisted of a perfluorochemical intermediate (a fully fluorinated or "perfluorinated" carbon chain with a functional end group) reacted with non-fluorinated substances into polymers such as acrylates or urethanes.

Dyneon manufactures fluoropolymers, specifically fluoroelastomers. Dyneon's fluoroelastomers are high molecular weight polymer chains made from fluorinated monomers such as hexafluoropropylene, tetrafluoroethylene and vinylidene fluoride. These are stable materials typically used as structural or functional components of articles, and are used, for example, in the manufacture of automotive shaft seals, hydraulic system O-rings, gasoline engine fuel lines, and similar applications.

In contrast, telomer-based fluoropolymers are typically acrylate copolymers of hydrocarbon acrylate monomers and acrylic acid esters of perfluorinated telomer alcohols or polyurethane copolymers of hydrocarbon and perfluorinated telomer-derivatized monomers. The telomer-containing fluoropolymers are generally used as surface treatments or modifiers. None of these types of fluoropolymers are manufactured by Dyneon.

As noted above, Dyneon previously used a small amount of APFO, some of which originated from 3M's ECF process and some of which was purchased from other suppliers who employed a telomer process to manufacture the APFO.

7. **Provide a narrative description of the byproducts, waste streams and emissions from the Company's operations to manufacture products or provide services at its Decatur, Alabama location for each calendar year from calendar year 1996 to the present.**

As EPA has issued this request under Section 308 of the Clean Water Act, 3M and Dyneon accordingly will respond with respect to wastewater and associated waste streams.

Process wastewater from 3M and Dyneon operations is treated at 3M's wastewater treatment facility which includes physical chemical treatment followed by an activated sludge process. This process generates wastewater treatment sludge. Treated wastewater is then discharged to the Tennessee River pursuant to 3M's NPDES permit.

Dyneon Plastics process wastewater is discharged to Decatur Utilities. In addition, the VDF is isolated in a scrubbing process which removes aqueous hydrochloric acid ("HCl") and caustic; the HCl wastewater is recycled, and the caustic wastewater is treated and discharged to Decatur Utilities, by a third party.[3] This wastewater would not contain any perfluorochemicals.

We also note that 3M and Dyneon have undertaken a detailed characterization of the presence of certain perfluorochemicals in environmental media associated with the Decatur Site as part of a Memorandum of Understanding between 3M and Dyneon LLC and US EPA OPPT, and as part of an additional voluntary study by the companies. Voluminous data have been submitted to EPA's public dockets.[4]

The reports already submitted to EPA present analyses of over 1,000 environmental samples and provide further information regarding waste disposal (including the disposal of wastewater treatment sludge) associated with the site. Given the size of the dockets, we are providing for EPA Region 4's convenience with this submission a copy of three summary reports:

- the Data Assessment Report for PFOA dated January 2008, attached here as Tab 4;
- a subsequent Status Report with additional data for the period July 25, 2007 to August 2008, attached here as Tab 5; and

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[3] The HCl and caustic solutions are pumped to Veolia (formerly known as U.S. Filter), a separate legal entity which operates in leased space at the Dyneon Plastics site. To our knowledge, Veolia recycles the HCl (about 18-25% in solution) to other customers. Veolia also uses a portion of the HCl to neutralize the caustic (which is < 20% sodium hydroxide), which Veolia discharges to Decatur Utilities through its own discharge point.

[4] In October 2004, 3M Company and Dyneon LLC entered into a Memorandum of Understanding (MOU) with US EPA to conduct a site characterization and an exposure assessment for PFOA at the 3M Decatur manufacturing site. Under that agreement, 3M and Dyneon have carried out an extensive environmental monitoring program, culminating in a Peer Consultation Process occurring in April 2008. All information, analytical data results from the environmental monitoring activities, and reports have been entered into an electronic Docket Number EPA-HQ-OPPT-2004-0112.

3M and Dyneon also conducted a similar monitoring program for the compounds PFOS, PFHS and PFBS, *i.e.*, the C8, C6 and C4 sulfonates. The summary of data for this program appears in a report entitled Perfluorinated Sulfonates Report dated September 2008. This report has been entered into a different Docket, namely, AR-226 (OPPT), and is also attached as part of this submission.

Finally, the EPA Docket Number AR-226 (OPPT) also contains over 60,000 pages of environmental, toxicology and epidemiology studies conducted by 3M, which supplement the hundreds of articles in the published scientific literature regarding perfluorochemicals. (This information is available from the docket office on CDs.)

- a separate Perfluorinated Sulfonates Report dated September 2008 covering certain perfluorinated sulfonate compounds including (PFOS), attached here as Tab 6.

8. **Provide a narrative description of the disposal methods and disposal locations of the byproducts, waste streams and emissions from the Company's operations to manufacture products or provide services at its Decatur, Alabama location for each calendar year from calendar year 1996 to the present.**

As noted in response to the previous question, given that EPA's request is issued under Section 308 of the Clean Water Act, we will respond with respect to wastewater and associated waste streams. We refer you to the summary reports 3M has submitted to EPA (attached at Tabs 4, 5 and 6), providing information on disposal locations and characterizing the presence of perfluorochemicals in environmental media related to its Decatur facility.

9. **Provide a narrative description of any pollution abatement equipment and/or pretreatment process that has been applied to the byproducts and waste streams from the Company's operations to manufacture products or provide services at its Decatur, Alabama location prior to their discharge into the Decatur Utilities sewer system for each calendar year beginning with calendar year 1996 to the present.**

3M and Dyneon began discharging sanitary wastewater to Decatur Utilities in 1999. The sanitary wastewater is not pre-treated prior to discharge. The Dyneon Plastics process wastewater discharged to Decatur Utilities is treated through a pH adjustment process before discharge.

10. **Provide any analytical data or monitoring results indicating the presence of PFCs or fluoride in the byproducts and waste streams from the Company's operations to manufacture products or provide services at its Decatur, Alabama location that were discharged into the Decatur Utilities sewer system for each calendar year beginning with calendar year 1996 to the present.**

As noted above, 3M and Dyneon have previously submitted to EPA extensive work characterizing the presence of perfluorochemicals in environmental media related to the Decatur facility, as set forth in EPA's dockets. This sampling program included sampling of the 3M and Dyneon discharge to Decatur Utilities (upstream of the Dyneon Plastics discharge) in 2006. Those data are summarized in the recent letter to Decatur Utilities attached at Tab 1, as well as in the reports provided at Tabs 4-6 with this letter.

On December 29, 2008, ADEM sampled 3M's and Dyneon's combined sanitary discharge to Decatur Utilities. (ADEM did not sample Dyneon Plastics' discharge.) 3M is not

aware of the results of ADEM's analyses. 3M analyzed split samples, and those laboratory analyses are provided at Tab 7. 3M and Dyneon are continuing to investigate potential sources for the presence of low part-per-billion perfluorinated chemicals in the discharge, as well as the reliability of the flow monitoring on the sanitary discharge.

In addition to sampling the discharge, 3M's and Dyneon's investigation included sampling various municipal water supplies and Decatur Utilities effluent and sludge in 2005, and those media plus Decatur Utilities influent in 2006. Results of the sampling under the Memorandum of Understanding were submitted to EPA headquarters in quarterly reports and regular briefings, and are in the public docket.

3M and Dyneon also shared sampling results for Decatur Utilities with the Alabama Department of Environmental Management (ADEM) and the City of Decatur in early 2007, calling to their attention the presence of perfluorinated chemicals in the Decatur Utilities sludge and the apparent contribution of perfluorinated substances to the Decatur Utilities plant from sources in addition to 3M and Dyneon. [5]

11. Provide a copy of any permit, contract or agreement that the Company may have or have had relating to the discharge of byproducts and waste streams into the Decatur Utilities sewer system (include with this information copies of any permit applications) for each calendar year beginning with calendar year 1996 to the present.

We are attaching at Tab 8 the State Indirect Discharge Permits issued May 19, 1999 to Solvay Advanced Polymers and April 20, 2005 to "3M Decatur (Dyneon Plastics)(Formerly Solvay Advanced Polymers)."

12. Has the Company performed any monitoring or sampling of ambient air, surface water, groundwater or soil for PFCs at and around the Company's Decatur, Alabama location? If so, provide the resulting analytical data or monitoring results.

This request appears quite broad in the context of Section 308 of the Clean Water Act. However, as EPA is aware, 3M and Dyneon have already conducted, and shared with EPA the results of several years of extensive sampling at their Decatur facility. The results from analyses of over 1,000 samples are available in various EPA dockets and are summarized in the documents we provide at Tabs 4-6.

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[5] In addition to the existence of additional industrial dischargers of perfluorochemicals, we understand some amount of leachate from the Morgan County landfill is treated at Decatur Utilities. 3M's and Dyneon's sampling program tested leachate from the Morgan County landfill in both 2005 and 2006 and reported those data to EPA. The Morgan County landfill has been used for disposal of wastewater treatment sludge from the 3M treatment system that handles process water. That leachate would also reflect contributions from other users of the landfill. Leachate levels are summarized in the letter at Tab 1 and in the reports at Tabs 3-5.

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EPA's letters ask that 3M and Dyneon preserve all records relating to the matters covered in its letters. 3M has for some time had in place record preservation requirements due to private tort litigation allegedly relating to its Decatur perfluorochemical manufacturing operations. 3M and Dyneon have issued additional record preservation notices to relevant personnel in response to EPA's letters.

3M and Dyneon would be pleased to meet with the agency to provide additional information on perfluorochemistry or their operations if that would be helpful. Please do not hesitate to contact Mr. Michael Santoro of 3M at 651-733-6374 if there is any way in which we can assist.

Sincerely,

James E. Fincher
3M Decatur Site Manager

George H. Millet
Quality, EHS Director
Dyneon LLC

cc: Glenda Dean, ADEM
Michael A. Santoro, 3M Director of Regulatory Affairs
Michael A. Nash, Esq., 3M Office of General Counsel
Katherine L. Rhyne, Esq., King & Spalding
Adam Sowatzka, Esq., King & Spalding

Attachments:
Tab 1 November 26, 2008 letter from 3M to Decatur Utilities
Tab 2 Confidential Business Information
Tab 3 Material Safety Data Sheets for FC-95 and FC-143
Tab 4 Data Assessment Report for Perfluorooctanoic Acid (PFOA), January 2008
Tab 5 Status Report with additional data for the period July 25, 2007 to August 2008
Tab 6 Perfluorinated Sulfonates Report, September 2008
Tab 7 Final Report, 3M Environmental Laboratory, "Fluorochemical Characterization of Aqueous Samples, Decatur Sanitary Sewage Samples - December 2008," Jan. 15, 2009
Tab 8 State Indirect Discharge Permits issued May 19, 1999 to Solvay Advanced Polymers (for Dyneon Plastics) and April 20, 2005 to "3M Decatur (Dyneon Plastics)(Formerly Solvay Advanced Polymers)."

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

James E. Fincher
3M Decatur Site Manager

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George H. Millet
Dyneon LLC