



Perfluorooctanoic Acid (PFOA) and Fluorinated Telomers

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What is PFOA?

PFOA is an acronym for perfluorooctanoic acid, a synthetic (man-made) chemical that does not occur naturally in the environment. PFOA is sometimes called "C8."

Companies use PFOA to make fluoropolymers, substances with special properties that have thousands of important manufacturing and industrial applications. PFOA can also be produced by the breakdown of some fluorinated telomers, substances that are used in surface treatment products to impart soil, stain, grease, and water resistance.

EPA's efforts on perfluorinated chemicals (PFCs) are not limited to only PFOA. EPA is also investigating other PFCs, including perfluorooctyl sulfonate (PFOS), higher homologues of PFOA and PFOS, and other partially fluorinated chemicals that are potential precursors of these chemicals. [Read more about definitions of other perfluorinated compounds.](#)

What are the concerns related to PFOA?

PFOA is very persistent in the environment and has been found at very low levels both in the environment and in the blood of the general U.S. population. Studies indicate that PFOA can cause developmental and other adverse effects in laboratory animals. PFOA also appears to remain in the human body for a long time. All of these factors, taken together, prompted the Agency to investigate whether PFOA might pose a risk to human health and the environment at the levels currently being

found, or at levels that might be reached in the future as PFOA continues to be released into the environment.

What are fluoropolymers and telomers and how are they used?

Fluoropolymers impart valuable properties, including fire resistance and oil, stain, grease, and water repellency. They are used to provide non-stick surfaces on cookware and waterproof, breathable membranes for clothing. They are employed in hundreds of other uses in almost all industry segments, including the aerospace, automotive, building/construction, chemical processing, electrical and electronics, semiconductor, and textile industries.

Telomers are used as surfactants and as surface treatment chemicals in many products, including personal care and cleaning products; and oil, stain, grease, and water repellent coatings on carpet, textiles, leather, and paper. Some telomers are also used as high performance surfactants in products that must flow evenly, such as paints, coatings, and cleaning products, fire-fighting foams for use on liquid fuel fires, or the engineering coatings used in semiconductor manufacture.

When did the Agency begin looking into PFOA and its potential risks?

In the late 1990's, EPA received information indicating that PFOS was widespread in the blood of the general population, and presented concerns for persistence, bioaccumulation, and toxicity. Following discussions between EPA and 3M, the manufacturer of PFOS and PFOS-related chemicals, the company terminated production of these chemicals. Findings on PFOS led EPA to review similar chemicals, including PFOA, to determine whether they might present concerns similar to those associated with PFOS.

How are people exposed to PFOA?

The Agency does not have a full understanding of how people are exposed to PFOA, which is used as an essential processing aid in the manufacture of fluoropolymers, and may also be a breakdown product of other related chemicals, called fluorinated telomers. In April 2003, EPA released a preliminary risk assessment for PFOA, and started a public process to identify and generate additional information to better understand the sources of PFOA and the pathways of human exposure. Although the public process designed to produce additional information has been completed, new information continues to be generated as a result of the process and from other activities. This new information will assist the Agency in determining if there are potential risks and what risk management steps may be appropriate.

What is the 2010/15 PFOA Stewardship Program?

EPA is taking action to help minimize the potential impact of PFOA on the environment. In January 2006, former EPA Administrator Johnson's letter initiated the 2010/15 PFOA Stewardship Program, in which the eight major companies in the industry committed voluntarily to reduce facility emissions and product content of PFOA and related chemicals on a global basis by 95 percent no later than 2010, and to work toward eliminating emissions and product content of these chemicals by 2015.

What is the status of the Enforceable Consent Agreements (ECAs)?

An ECA is a publicly negotiated agreement among EPA, industry, and interested parties that requires certain signing parties to generate data and submit those data to EPA on a specified schedule. Test rules can take few years to complete, while typical ECAs can often be concluded in less than a year. ECAs that require new test protocols or adapted test methods can take longer to negotiate than standard ECAs. ECAs are enforceable, meaning that EPA can compel the submission of information agreed to under the ECA. Because they are negotiated in public, all parties who are interested in the data have the opportunity to participate.

PFOA is used in the manufacture of fluoropolymers. Fluoropolymers are used in a wide variety of industrial and consumer products, including non-stick cookware, chemical and fire-resistant cables and tubing, and waterproof, breathable clothing. The ECA incineration testing of fluoropolymers will help determine whether the chemicals used in these items may break down to release PFOA if they are disposed of in municipal incinerators.

PFOA may also be a breakdown product of some fluorotelomers. Fluorotelomers are used as surface application treatments on carpets, textiles, paper, leather, and construction materials to provide water,

stain, grease, and soil resistance properties, and may be used as surfactants in cleaning and coating products. The ECA incineration testing of fluorotelomers will help determine whether the chemicals used in these items may break down to release PFOA if they are disposed of in municipal incinerators.

What is the status of the Memorandums of Understanding (MOUs)?

EPA signed a Memorandum of Understanding (MOU) with 3M and Dyneon LLC on October 25, 2004 for monitoring in the vicinity of a fluoropolymer manufacture facility in Decatur, Alabama. All information relevant to this MOU can be found in [Docket OPPT-2004-0112](#)

EPA also signed on MOU with DuPont on August 2005, concerning monitoring at the Washington Works facility in Parkersburg, WV. All information relevant to this MOU can be found in [Docket OPPT-2004-0113](#).

These MOUs are publicly negotiated agreements among EPA, industry, and interested parties that require the signing companies to generate data and submit those data to EPA on a specified schedule. These are very similar to ECAs except that these MOUs are non-enforceable.

These MOUs are expected to characterize potential releases from manufacturing facilities to evaluate the potential presence of PFOA and PFOA precursors in air, water, soils, sediments, and biota.

Has the Agency brought an enforcement case against DuPont on PFOA?

EPA brought civil administrative actions against DuPont in 2004 and 2005 for failing to report information concerning PFOA to the Agency as required by section 8(e) of Toxic Substance Control Act (TSCA). On December 14, 2005, EPA forwarded to the Environmental Appeals Board a settlement with DuPont for the largest civil administrative penalty EPA has ever obtained under any federal environmental statute. [Read more information on EPA's enforcement action here.](#)

Is there a risk assessment on PFOA?

To ensure that the most rigorous science is used in the Agency's ongoing evaluation of PFOA, OPPT submitted in 2005 a draft risk assessment for formal peer review by the Agency's Science Advisory Board (SAB). That draft was preliminary and did not provide conclusions regarding potential levels of concern. The SAB reviewed the information that was available at the time, and suggested that the PFOA cancer data are consistent with the EPA guidelines descriptor "likely to be carcinogenic to humans." Since their review, additional research has been conducted pertaining to the carcinogenicity of PFOA. EPA is still in the process of evaluating this information, and has not made any definitive conclusions at this time. [Read more on the PFOA Risk Assessment available here.](#)

What is the status of the Agency's on-going process to reduce the scientific uncertainties and to more fully understand the pathways of human exposure and potential risks from PFOA?

EPA identified the need to improve its understanding of the sources and pathways of exposure to PFOA in 2003 and initiated a process to develop needed new data on the issue. This new information will assist the Agency in determining if there are potential risks and what risk management steps may be appropriate.

Specifically, EPA is working with industry and other stakeholders to obtain additional environmental monitoring information on PFOA, exposures resulting from incineration or loss from products as they are used over time, and telomer biodegradation as a potential source of PFOA. The Agency has finalized TSCA Section 4 ECAs and MOUs for exposure-related studies with industry in a public process involving a large number of interested parties, and is cooperating with industry and other stakeholders on additional voluntary research activities. In addition, EPA's Office of Research and Development (ORD) has collaborated with the Office of Pollution Prevention and Toxics (OPPT) and is conducting research focused on the health effects and exposures to PFOA and other perfluorinated chemicals. This research is designed to generate enhanced science knowledge and high quality data that will help the Agency address these key uncertainties in pathways of exposure and potential risks from PFOA.

What is the status of the Agency's efforts regarding reducing exposure to PFOS?

In the late 1990's, EPA received information indicating that PFOS was widespread in the blood of the general population, and presented concerns for persistence, bioaccumulation, and toxicity. Following discussions between EPA and 3M, the manufacturer of PFOS, the company terminated production of

these chemicals. Findings on PFOS led EPA to review similar chemicals, including PFOA, to determine whether they might present concerns similar to those associated with PFOS.

Following the voluntary phase out of PFOS by the principal worldwide manufacturer, EPA took prompt regulatory action under TSCA to limit any future manufacture or importation of 88 PFAS (perfluoroalkyl sulfonate) chemicals specifically included in that phase out. EPA uses the generic term PFAS to encompass more generally the category of perfluorinated compounds, which includes those with eight carbons (C8) as well as those with higher and lower amounts of carbon.

These significant new use rules (SNURs) allowed the continuation of a few specifically limited, highly technical uses of these chemicals for which no known alternatives were available, and which were characterized by very low volume, low exposure, and low releases. Any other uses of these chemicals would require prior notice to and review by the Agency.

Subsequently, EPA identified 183 more PFAS chemicals that it believed were no longer being manufactured, imported or used in the U.S., with the possible exception of the same uses excluded from the earlier SNURs. However, based on comments received during the public comment period and related communications, EPA learned of additional limited uses of PFAS chemicals. Consequently, those uses for particular chemicals were excluded from the final SNUR. EPA published an [October 2007 Federal Register notice](#) finalizing the SNUR on these 183 chemicals. [Read more information on PFOS and related chemicals here.](#)

How do Agency's actions affect aqueous film forming foams (AFFF)?

AFFF that contain perfluorinated compounds are typically used to extinguish highly flammable or combustible liquid fires, such as fires involving gas tankers and oil refineries. The biggest users of AFFF are U.S. military, petrochemical, and aviation industries.

EPA is not conducting an assessment of AFFF because fluorinated AFFF products currently on the market are predominantly C6-based. Nevertheless, AFFF discharges may be subject to various local and state restrictions.

The Agency's [SNUR regulations](#) do not affect the continued use of existing stocks of the C8-based chemicals that had been manufactured or imported into the U.S. prior to the effective date of the SNURs. Existing products and formulations already in the U.S. containing these chemicals – for example, PFOS-based fire fighting foams produced before the rules took effect in 2002 – can still be used.

The Minnesota Department of Health (MDH) will sample drinking water supplies, starting in 2009, around the state where repeated use of firefighting foams possibly may have resulted in seeping into the ground of AFFF chemicals. [Read more information on the MDH investigation here.](#)

Are EPA's efforts showing any results?

Although more time will be needed to assess the full impact of these efforts, a possible indication of progress can be found in a U.S. Centers for Disease Control and Prevention (CDC) study, published in 2007, which reported significant reductions in human blood concentrations of PFOS and PFOA from 1999-2000 compared to the most recent data in 2003-2004. The geometric mean for PFOA in human blood was reduced by 25 percent over this period and PFOS was reduced by 32 percent. The report concluded that these reductions were most likely related to changes brought about by EPA efforts on these chemicals and other related efforts by government and industry.

Are there steps that consumers can take to reduce their exposure to PFOA?

Consumer products made with perfluorochemicals include some non-stick cookware and products such as breathable, all-weather clothing. They are also employed in hundreds of other uses in almost all industry segments, including the aerospace, automotive, building/construction, chemical processing, electrical and electronics, semiconductor, and textile industries. Telomers are used as surfactants and as surface treatment chemicals in many products, including fire fighting foams; personal care and cleaning products; and oil, stain, grease, and water repellent coatings on carpet, textiles, leather, and paper. Consumer products made with fluoropolymers and fluorinated telomers, such as Teflon and other trademark products, are not PFOA. PFOA is used as a processing aid in the manufacture of

fluoropolymers and can be also be produced by the breakdown of some fluorinated telomers. The information that EPA has available does not indicate that the routine use of consumer products poses a concern. At present, there are no steps that EPA recommends that consumers take to reduce exposures to PFOA.

<http://www.epa.gov/oppt/pfoa/pubs/faq.html>
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