



## Perfluorooctane Sulfonate (PFOS) and Health

### Issue

Perfluorooctane sulfonate or perfluorooctanyl sulfonate (PFOS) is a synthetic (human made) chemical belonging to a large family of compounds known as perfluorinated chemicals. The exposure of some wildlife organisms in Canada (e.g., polar bear, bird species) to PFOS could be near or at levels that are harmful to them. Current exposure for humans in Canada is not significant enough to be considered dangerous to human health under the *Canadian Environmental Protection Act, 1999* (CEPA 1999).

### Background

Perfluorinated chemicals have been widely detected in the environment and in organisms, including in remote areas of the world such as the Canadian Arctic. PFOS is exceptionally persistent (meaning that it takes a very long time to break down in the environment) and can “bioaccumulate” or build up in certain living organisms. A number of related chemicals, referred to as “PFOS precursors” can transform or degrade into PFOS in the environment. PFOS is the final degradation product, and is not known to be subject to any further degradation in the environment or change in living organisms (i.e., metabolism).

PFOS, its salts and its precursors were used historically as water, oil, soil and grease repellents for carpets, fabric and upholstery and food packaging, and as surfactants in specialized applications such as fire-fighting foams, aviation hydraulic fluids, and fume suppressants for metal plating. While there may still be some manufacture globally, the key producer of PFOS phased out worldwide production in 2002 and direct uses in Canada have largely been phased out.

### Sources

PFOS, its salts and its precursors are not manufactured in nor exported from Canada. Almost 600 tonnes of perfluorinated chemicals were imported into Canada between 1997 and 2000 as chemicals or in various products. Approximately 43 percent of these imports were identified as PFOS, its salts or its precursors. When the primary supplier of PFOS voluntarily phased out production in 2002, imports into Canada of PFOS, its salts and precursors essentially ceased. The exception was approximately 3 tonnes of PFOS imported in 2004 for use as a surfactant in fume suppressants. While an estimated 3 tonnes of PFOS are contained in stockpiles of aqueous film-forming foam (AFFF) used for firefighting, it is believed that most other supplies of PFOS have been depleted.

PFOS, its salts and its precursors may enter into the environment through treated or untreated municipal/industrial wastewater discharges to surface water and through leachates from landfills when products and materials containing these substances are sent for final disposal. PFOS may also be released directly to air, land and surface water when products containing PFOS are used.

### Health Risks

Health Canada has completed a State of the Science Report for a Screening Health Assessment for PFOS (July 2006). Nearly all Canadians carry low levels of perfluorinated chemicals, including PFOS, in their blood as a result of exposure. While exact exposure routes are not well understood, people can be potentially exposed to perfluorinated chemicals from contaminated air, surface and ground water, contaminated foods, in certain occupational settings, and from the possible release of perfluorinated chemicals during the normal degradation or possible use of commercial products that contain them. Health Canada’s assessment concluded that adequate margins of exposure existed between the amount of PFOS in human blood compared to levels at which effects occurred in animals, including consideration of age differences and differences within and between species. Specific consideration of the risk to children’s health was an integral part of the assessment.

## Role of Governments

Health Canada and Environment Canada have completed ecological and human health screening assessments for PFOS, its salts and precursors. The human health screening concluded that current levels would not have a harmful effect on human health. In July 2006, the final ecological screening assessment report concluded that PFOS, its salts and precursors are entering into the environment in a quantity or concentration or under conditions that have or may have an immediate or long-term harmful effect on the environment or its biological diversity under CEPA 1999. The final ecological screening report also concluded that PFOS and its salts meet the criteria for persistence according to the CEPA 1999 *Persistence and Bioaccumulation Regulations*. While the weight of scientific evidence is sufficient to conclude that PFOS and its salts are bioaccumulative, the relevant data for these substances do not meet the numeric criteria for bioaccumulation as defined in the CEPA 1999 *Persistence and Bioaccumulation Regulations*. A potential risk may occur through bioaccumulation and biomagnification of PFOS in wildlife.

The Government of Canada has recommended that PFOS, its salts and its precursors be added to the List of Toxic Substances in Schedule 1 under CEPA 1999. An Order was published in *Canada Gazette*, Part I proposing that *Perfluorooctane Sulfonate and its Salts and Certain Other Compounds Regulations* be put into force under CEPA 1999 to prohibit the manufacture, import, use and sale of PFOS, its salts and precursors.

## Need More Info?

More information can be found at  
[www.chemicalsubstances.gc.ca](http://www.chemicalsubstances.gc.ca)

Health Canada's State of the Science report for Perfluorooctane Sulfonate, its Salts and its Precursors  
[www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/existsub/pfos-spfo/index\\_e.html](http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/existsub/pfos-spfo/index_e.html)

Environment Canada, *Perfluorooctane Sulfonate (PFOS), Its Salts and Precursors: Risk Management Strategy*. June 2006.

[www.ec.gc.ca/CEPARRegistry/documents/part/PFOS/](http://www.ec.gc.ca/CEPARRegistry/documents/part/PFOS/)

Organisation for Economic Co-operation and Development (OECD), Perfluorooctane Sulfonate (PFOS) and related chemical products.

[www.oecd.org/document/58/0,2340,en\\_2649\\_34375\\_2384378\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/58/0,2340,en_2649_34375_2384378_1_1_1_1,00.html)

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