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CANADIAN ENVIRONMENTAL PROTECTION ACT, 1999

## **Perfluorooctane Sulfonate and its Salts and Certain Other Compounds Regulations**

P.C. 2008-974 May 29, 2008

Whereas, pursuant to subsection 332(1) ([see footnote a](#)) of the *Canadian Environmental Protection Act, 1999* ([see footnote b](#)), the Minister of the Environment published in the *Canada Gazette*, Part I, on December 16, 2006 a copy of the proposed *Perfluorooctane Sulfonate and its Salts and Certain Other Compounds Regulations*, substantially in the annexed form, and persons were given an opportunity to file comments with respect to the proposed Regulations or to file a notice of objection requesting that a board of review be established and stating the reasons for the objection;

Whereas, pursuant to subsection 93(3) of that Act, the National Advisory Committee has been given an opportunity to provide its advice under section 6 ([see footnote c](#)) of that Act;

And whereas, in the opinion of the Governor in Council, pursuant to subsection 93(4) of that Act, the proposed Regulations do not regulate an aspect of a substance that is regulated by or under any other Act of Parliament in a manner that provides, in the opinion of the Governor in Council, sufficient protection to the environment and

human health;

Therefore, Her Excellency the Governor General in Council, on the recommendation of the Minister of the Environment and the Minister of Health, pursuant to subsection 93(1) and section 319 of the *Canadian Environmental Protection Act, 1999* (see footnote d), hereby makes the annexed *Perfluorooctane Sulfonate and its Salts and Certain Other Compounds Regulations*.

## **PERFLUOROOCTANE SULFONATE AND ITS SALTS AND CERTAIN OTHER COMPOUNDS REGULATIONS**

### **APPLICATION**

1. Subject to sections 2 and 3, these Regulations apply to the following substances that are specified on the List of Toxic Substances in Schedule 1 to the *Canadian Environmental Protection Act, 1999*:

(a) perfluorooctane sulfonate and its salts; and

(b) compounds that contain one of the following groups:  $C_8F_{17}SO_2$ ,  $C_8F_{17}SO_3$  or  $C_8F_{17}SO_2N$ .

### **EXCEPTIONS**

2. These Regulations do not apply to any substance referred to in section 1 that is

(a) contained in a hazardous waste, hazardous recyclable material or non-hazardous waste to which Division 8 of Part 7 of the *Canadian Environmental Protection Act, 1999* applies;

(b) contained in a pest control product within the meaning of subsection 2(1) of the *Pest Control Products Act*; or

(c) present as a contaminant in a chemical feedstock used in a process from which there are no releases of the substance and provided that, in that process, the substance is destroyed or completely converted to a substance other than one referred to in section 1.

3. These Regulations do not apply to any substance referred to in section 1 or to any product containing such a substance that is for use

(a) in a laboratory for analysis;

(b) in scientific research; or

(c) as a laboratory analytical standard.

### **PROHIBITION AND PERMITTED ACTIVITIES**

4. Subject to sections 5 to 7, no person shall manufacture, use,

sell, offer for sale or import any substance referred to in section 00A0;1 or a product containing any such substance unless the substance is incidentally present.

5. (1) The manufacture, use, sale, offer for sale or import of the following products containing any substance referred to in section 00A0;1 is permitted:

(a) photoresists or anti-reflective coatings for photolithography processes; and

(b) photographic films, papers and printing plates.

(2) The use, sale, offer for sale or import of aviation hydraulic fluid containing any substance referred to in section 1 is permitted.

(3) The use of a substance referred to in section 00A0;1, or a product containing any such substance, as a fume suppressant in the following processes as well as their sale, offer for sale or import for that use, is permitted for a period of five years from the day on which these Regulations come into force:

(a) chromium electroplating, chromium anodizing and reverse etching;

(b) electroless nickel-polytetrafluoroethylene plating; and

(c) etching of plastic substrates prior to their metalization.

6. The use, sale or offer for sale of a product that is formed into a specific physical shape or design during its manufacture and that has, for its final use, a function or functions dependent in whole or in part on its shape or design is permitted if the product contains a substance referred to in section 00A0;1 and the product is manufactured or imported before the coming into force of these Regulations.

7. (1) The use of aqueous film forming foam containing any substance referred to in section 00A0;1 is permitted

(a) at any time, if the concentration of the substance is less than or equal to 0.5 ppm; or

(b) for a period of five years from the day on which these Regulations come into force, other than for testing or training purposes, if the concentration of the substance is greater than 0.5 ppm and the foam was manufactured or imported before the coming into force of these Regulations.

(2) Aqueous film forming foam containing any substance referred to in section 1 may be

(a) used in a military vessel deployed, before the day on which these Regulations come into force or within five years after that day, for a military operation; or

(b) used or imported in a military vessel or military fire fighting

vehicle contaminated during a foreign military operation occurring after the coming into force of these Regulations.

(3) For the purposes of subsection (2), 201C; military operation 201D; means any operation taken to protect national security, support humanitarian relief efforts, participate in multilateral military or peace-keeping activities under the auspices of international organizations or defend a member state of the North Atlantic Treaty Organization.

#### ANALYSIS BY ACCREDITED LABORATORY

**8.** The presence of any substance referred to in section 00A0;1 shall be determined by a laboratory that is accredited under the International Organization for Standardization standard ISO/IEC 00A0;17025:2005, entitled *General requirements for the competence of testing and calibration laboratories*, as amended from time to time, and whose accreditation includes the analysis of that substance within its scope of testing.

#### REPORTS

**9.** (1) Every person that imports a substance or product referred to in subsection 00A0;5(3) shall submit to the Minister a report containing the information set out in the schedule no later than March 00A0;31 of the calendar year following the calendar year during which the substance or product was imported.

(2) An importer that submits a request, in accordance with section 00A0;313 of the *Canadian Environmental Protection Act, 00A0;1999*, that information contained in the report be treated as confidential must include with that request the identification of the following:

(a) any information that constitutes a trade secret;

(b) any information the disclosure of which would likely cause material financial loss to, or prejudice the competitive position of, the importer, or result in material financial gain to a third party;

(c) any information the disclosure of which would likely interfere with contractual or other negotiations being conducted by the importer; and

(d) any financial, commercial, scientific or technical information that is confidential and is treated consistently in a confidential manner by the importer.

#### CERTIFICATION

**10.** (1) Any information required to be submitted to the Minister under these Regulations shall be submitted in a form determined by the Minister and accompanied by a certification, dated and signed by the person referred to in the applicable provisions, or the person 2019;s authorized representative, that the information is

accurate and complete.

(2) The certification may be submitted either in writing or in an electronic format that is compatible with the one that is used by the Minister and it shall bear the written or electronic signature, as the case may be, of the person or their authorized representative.

## RECORD KEEPING

**11.** (1) Every person that submits information to the Minister under these Regulations shall keep a record that includes a copy of that information, the certification and any documents supporting the information for a period of at least five years beginning on the date of the submission of the information.

(2) The record that is required to be kept by the person shall be kept at their principal place of business in Canada or at any other place in Canada where it can be inspected. If the record is kept at any place other than the person's principal place of business, the person shall provide the Minister with the civic address of the place where it is kept.

## COMING INTO FORCE

**12.** These Regulations come into force on the day on which they are registered.

## SCHEDULE

*(Subsection 9(1))*

## INFORMATION RELATED TO THE IMPORT OF CERTAIN FUME SUPPRESSANTS

### 1. Information respecting the importer:

(a) their name, the civic and postal addresses of their principal place of business and their e-mail address, if any, telephone number and fax number, if any; and

(b) the name, title, civic and postal addresses, e-mail address, if any, telephone number and fax number, if any, of their authorized representative, if any.

### 2. Information respecting the substance or product containing the substance:

(a) the name of the substance, alone or contained in a product;

(b) the total quantity of the substance, alone or contained in a product, imported by the importer in the calendar year for which the report is submitted, as well as the identification of that calendar year and the unit of measurement;

(c) the total quantity of the substance, alone or contained in a product, sold in Canada by the importer in the calendar year for which the report is submitted, as well as the identification of that calendar year

and the unit of measurement; and

(d) the identification of the process referred to in paragraphs 5(3)(a) to (c) of these Regulations for which the substance or product is proposed to be used, if known.

## **REGULATORY IMPACT ANALYSIS STATEMENT**

*(This statement is not part of the Regulations.)*

### ***Description***

The *Perfluorooctane Sulfonate and its Salts and Certain Other Compounds Regulations* (the Regulations) are made under subsection 93(1) and section 319 of the *Canadian Environmental Protection Act, 1999* (CEPA 1999). The purpose of the Regulations is to prevent the risks posed to Canada's environment from the use and release of perfluorooctane sulfonate, its salts and certain other compounds that contain the C<sub>8</sub>F<sub>17</sub>SO<sub>2</sub>, C<sub>8</sub>F<sub>17</sub>SO<sub>3</sub> or C<sub>8</sub>F<sub>17</sub>SO<sub>2</sub>N groups (PFOS) by those users (the user[s]) that either use the substance as such or use certain products containing the substance. The Regulations prohibit the manufacture, use, sale, offer for sale and import of PFOS, as well as products containing PFOS, other than a limited number of exemptions outlined in the Regulations.

The Regulations come into force on the day on which they are registered.

### **Background**

The Chemicals Management Plan ([see footnote 1](#)) (the Plan), announced in December 2006, is part of the federal government's comprehensive environmental agenda. The Plan will further strengthen the degree of protection for Canadians and their environment against chemicals that have not yet undergone scientific assessment. Through an exercise called categorization, 400,300 of 230,000 existing substances were identified as requiring further attention by the federal government. This attention will take the form of further assessment, supported by research and monitoring, and will lead to the management of these priority substances.

A key element of the Plan involves taking immediate action on five substance categories, including PFOS.

On July 1, 2006, the ministers of the Environment and of Health published their final decision on the screening assessment of PFOS in the *Canada Gazette*, Part I ([see footnote 2](#)), and proposed to recommend that PFOS be added to the List of Toxic Substances in Schedule 1 to CEPA 1999. On December 27, 2006, an order adding PFOS to the List of Toxic Substances to Schedule 1 of CEPA 1999 was published in the *Canada Gazette*, Part II ([see footnote 3](#)).

The screening assessment report concluded that PFOS meets the criteria set out in paragraph 64(a) ([see footnote 4](#)) of CEPA 1999.

However, the human health screening assessment report concluded that current levels of exposure for PFOS are below levels that might affect human health.

PFOS, its salts and certain other compounds belong to the larger class of fluorochemicals called perfluorinated alkyl (PFA) compounds, which contain carbons that are completely saturated by fluorine. It is the strength of the carbon-fluorine bonds that contributes to the extreme stability and unique properties of these perfluorochemicals.

### **Environmental objective**

The screening assessment report concluded that PFOS substances 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. Furthermore, the screening assessment report concluded that PFOS and its salts are persistent and that a potential risk may occur through bioaccumulation and biomagnification of PFOS in wildlife.

PFOS is present in the environment primarily as a result of human activity, such as its use in aqueous film-forming foams (AFFFs), in surfactants in the electroplating sector and in manufacturing products. PFOS has been detected in animals worldwide and, in Canada, has been detected in species such as fish, fish-eating birds and Arctic marine mammals far from known sources or manufacturing facilities.

Given the conclusions of the screening assessment report, PFOS, its salts and certain other compounds are being managed as a group under the provisions of CEPA 1999 with the objective of achieving the lowest level of releases to the environment that is technically and economically feasible.

### **Use profile**

PFOS substances are not manufactured in or exported from Canada, but in the past they were typically imported as raw chemicals and in products and formulations. An Environment Canada use pattern survey undertaken in 2000 ([see footnote 5](#)) indicated that from 1997 to 2000 an estimated 318 tonnes of PFOS substances were used in Canada. The primary uses of these substances were applications involving water, oil, soil and grease repellents for fabric, leather, packaging and rugs and carpets, for both domestic and commercial use, as well as additives in firefighting foams and paints and coatings.

Between 2000 and 2002, the primary international manufacturer of PFOS voluntarily phased out its production of PFOS. The use trend in Canada, therefore, significantly dropped after 2002.

Background information collected in support of these Regulations indicates that, since 2002, imports into Canada of PFOS as raw chemicals and in products or formulations have essentially ceased. This finding was confirmed by a use pattern survey published on January 15, 2005 ([see footnote 6](#)), under the authority of CEPA 1999. The survey targeted possible manufacturers, exporters and importers of PFOS in amounts exceeding 100 kg and in concentrations of

greater than 10 g/kg for the 2004 calendar year.

In summary, the survey results indicate that

- there are no manufacturers or exporters of PFOS in Canada;
- approximately three tonnes of PFOS were imported in 2004 for use as a surfactant in fume suppressants for the metal-plating sector; and
- with the exception of an estimated 300 tonnes stockpile of AFFFs, representing approximately three tonnes of PFOS used for firefighting, it is very likely that most inventories of PFOS in all other sectors have been depleted.

Based on these survey results, the use of PFOS in areas of concern is discussed below. It should be noted that, despite the voluntary phase-out of PFOS production and the current low level of PFOS imports, the potential could exist for PFOS and PFOS-containing manufactured products to be imported into Canada in greater quantities in the future. Regulatory action would remove this possibility.

#### *Metal-plating sector*

The chromium electroplating, anodizing and reverse-etching sector in Canada represents the largest user of PFOS fume suppressants in Canada. The gross domestic product (GDP) contributions in 2005 from the coating, engraving, heat treating and allied industries (which include chromium electroplating, chromium anodizing and reverse etching) were estimated to be \$1.1 billion (in 1997 constant dollars) with employment at approximately 13 000.

According to recently updated data gathered for an Environment Canada study ([see footnote 7](#)), this sector was estimated to consist of approximately 219 facilities, located in British Columbia (29), Alberta (23), Saskatchewan (7), Manitoba (13), Ontario (91), Quebec (48), New Brunswick (3) and Nova Scotia (5). About half of these facilities use fume suppressants containing PFOS.

PFOS-based surfactants are used in chromium electroplating, chromium anodizing, reverse etching, electroless nickel-polytetrafluoroethylene plating and in the etching of plastic substrates prior to metallization operations. PFOS may enter the environment via rinse water discharged into municipal sewer systems from these operations. PFOS is not removed from waste water in conventional treatment facilities and has been observed in effluent from primary and secondary waste water treatment facilities and in the sewage sludge generated by waste water treatment facilities. PFOS is also contained in the metal sludge that is sent off-site to hazardous waste or metal recycling facilities.

#### *Aqueous film-forming foams for firefighting*

With the voluntary phase-out in production by the largest international PFOS manufacturer between 2000 and 2002, PFOS-based AFFFs can no longer be purchased in Canada. Alternative non-PFOS-based AFFFs now dominate the marketplace. The average

useful service life of AFFFs can be in the order of 25 years or longer and existing PFOS-based AFFF stockpiles are estimated at 300 tonnes (representing approximately three tonnes of PFOS). Aqueous film-forming foams are used primarily for fighting fuel-related fires at military establishments, petroleum and petrochemical facilities, airports and municipalities and by first-responder organizations across Canada. Releases of PFOS may occur when PFOS-based AFFF is discharged during testing and training exercises, when used in fighting fuel fires, during accidental releases or when out-of-date PFOS-based AFFFs are retired and sent for disposal. These activities may result in the direct discharge of AFFFs to surface water, groundwater and land. Depending on the nature of the activity, it is not always possible to collect and pre-treat or contain waste AFFFs for proper disposal.

#### *Imported manufactured products*

PFOS may also be contained in imported manufactured products. As discussed above, the majority of past PFOS use was as water, oil, soil and grease repellents (e.g. on fabric, leather, paper, packaging, rugs and carpets) and as surfactants (e.g. coating additives). Prior to the phase-out of PFOS production by the largest manufacturer between 2000 and 2002, approximately 80% of Canadian imports of manufactured products containing PFOS were produced in the United States. The remaining 20% of the imports were mainly from Germany and East Asian countries, namely China and India. The risk of PFOS-containing substances being imported into Canada has significantly decreased since the United States and the European Union, which represent a major source of all Canadian imports of products that historically contain PFOS, restricted PFOS production, use and importation in their countries. However, the increasing growth of imports from Asia, especially apparel products such as clothing and outerwear, highlights a compliance concern associated with imported products that may contain PFOS.

#### **International actions on PFOS**

As detailed below, a number of countries and organizations have either put in place or are proposing management measures to control the manufacture, import, use and releases of PFOS and manufactured products containing PFOS.

#### *United States*

In 2002, the federal United States Environmental Protection Agency (U.S. EPA) adopted significant new use rules (SNURs) for 88 PFOS substances, which apply to new manufacturers and new uses of these substances. In addition, a SNUR for 183 perfluoroalkyl sulfonate substances was published in October 2007. The SNURs require manufacturers and importers to notify the U.S. EPA at least 90 days before the manufacture or import of these substances for any use other than certain specific, ongoing uses. This gives the U.S. EPA the necessary time to evaluate the intended new use and prohibit or limit the new activity, if necessary.

While the SNURs do not require current manufacturers to stop

manufacturing or selling the substances, the primary manufacturer in the United States voluntarily discontinued production between 2000 and 2002. Therefore, once existing stocks are depleted, the SNURs essentially restrict all manufacture and importation of PFOS unless destined for specific exempted uses. These specific use exemptions include

- use as an anti-erosion additive in fire-resistant phosphate ester aviation hydraulic fluids;
- use as a component of a photoresist substance, including a photo acid generator or surfactant, or as a component of an anti-reflective coating used in a photomicro lithography process to produce semiconductors or similar components of electronic or other miniaturized devices;
- use in coatings for surface tension, static discharge and adhesion control for analog and digital imaging films, papers and printing plates, or as a surfactant in mixtures used to process imaging films;
- use as an intermediate only to produce other chemical substances to be used solely for the three uses listed above;
- use as a fume or mist suppressant in metal finishing and plating baths; and
- use as a component of an etchant, including a surfactant or fume suppressant, used in the plating process to produce electronic devices.

#### *European Union*

The European Union (EU) published Directive 2006/122/EC on December 27, 2006. The Directive amends, for the thirtieth time, the EU legislation on dangerous substances and preparations (Council Directive 76/769/EEC). The Directive states that PFOS and related substances shall not be placed on the market

- in concentrations equal to or higher than 0.005% by mass as a substance or constituent of preparations;
- in semi-finished products or products, or parts thereof, at a level of 0.1% by mass; and
- in textiles or other coated materials in which the amount of PFOS will be equal to or higher than 1 00B5;g/m<sup>2</sup> of the coated material.

Exemptions to the above restrictions include

- photoresists or anti-reflective coatings for photolithography processes;
- photographic coatings applied to films, papers or printing plates;
- mist suppressants for non-decorative hard chromium (VI) plating and wetting agents for use in controlled electroplating systems where the amount of PFOS released to the environment is minimized by fully applying best available techniques; and
- hydraulic fluids for aviation.

In addition, stocks of PFOS-based AFFFs placed on the market

before December 27, 2006, may be used until June 27, 2011.

### *Australia*

In Australia, there has been a voluntary phase-out agreement for PFOS since 2000. Australia has issued three alerts concerning PFOS through its National Industrial Chemicals Notification and Assessment Scheme (NICNAS) ([see footnote 8](#)). The alerts issued are recommendations that contain information and advice on the use and handling of PFOS and perfluorinated chemicals.

The first alert called for the phase-out of water, oil, soil and grease repellent products containing PFOS by September 2002. As well, the use of PFOS for leather products was to be phased out by March 2003.

The second and third alerts, published in April 2003 and February 2007, recommended that

- PFOS (and related perfluoroalkyl sulfonate-based chemicals) be used only for essential uses for which there are no suitable alternatives;
- existing stocks of PFOS-based AFFFs not be used for training purposes;
- PFOS not be replaced by perfluorooctanoic acid (PFOA) as an alternative, as PFOA may have the same environmental and health concerns as PFOS;
- labels and material safety data sheets (MSDSs) include relevant details; and
- information on the safe use and handling be provided in the MSDSs from suppliers.

### *Norway*

The Norwegian Pollution Control Authority has adopted new legislation on PFOS in textiles, firefighting foams and impregnating agents. The new law came into force on July 1, 2007. Norway has laid down the same limits for the use of PFOS as the EU.

### *Stockholm Convention on Persistent Organic Pollutants*

The Stockholm Convention on Persistent Organic Pollutants (POPs) ([see footnote 9](#)) came into force in May 2004 and is an international legally binding agreement that has been ratified by 128 countries, including Canada. Under this Convention, Canada is bound to take action to prohibit the manufacture and import of the chemicals listed in annexes A and B of the Convention.

In 2005, Sweden proposed PFOS and 96 PFOS-related substances as candidates for the Stockholm Convention on Persistent Organic Pollutants (POPs). At the second meeting of the Persistent Organic Pollutants Review Committee (POPRC) in November 2006, it was decided that the screening criteria of the Convention had been fulfilled for PFOS and that an ad hoc working group under the Convention would be established to review the proposal further. A draft risk management evaluation was prepared for discussion at the

third meeting of the POPRC (November 2007) recommending listing PFOS under the Convention in order to eliminate or restrict production and use. It is expected that this recommendation will be put forward for decision at the 4th Conference of the Parties in May 2009.

*Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants*

The Convention on Long-Range Transboundary Air Pollution (LRTAP) ([see footnote 10](#)) came into force in 1983 and is an international legally binding agreement that has been ratified by 51 countries, including Canada. The Convention requires all parties to endeavour to limit and, as far as possible, gradually reduce and prevent air pollution, including long-range transboundary air pollution.

In December 2005, the parties to the United Nations Economic Commission for Europe (UNECE) LRTAP Convention<sup>2019;s</sup> Protocol on POPs agreed that PFOS met the criteria for POPs under the Protocol. The parties are currently exploring the possible addition of PFOS to the Protocol.

### **Regulations**

The Regulations prohibit the manufacture, use, sale, offer for sale and import of PFOS or manufactured products containing these substances, unless incidentally present. Some exemptions for specific uses are allowed, including

- the use of AFFFs manufactured or imported before the coming into force of the Regulations, at any time, if the PFOS concentration is less than or equal to 0.5 ppm;
- the use of PFOS-based AFFFs manufactured or imported before the coming into force of the Regulations at any concentration for a period of five years after the coming into force of the Regulations (but not for training or testing purposes);
- the use of PFOS-based AFFFs on military vessels that may be deployed within five years after the coming into force of the Regulations;
- the use of PFOS-based AFFFs on military vessels and firefighting vehicles that are contaminated during foreign operations occurring after the coming into force of the Regulations;
- the use of PFOS-based fume suppressants and sale, offer for sale and import for that use, for a period of five years after the coming into force of the Regulations for
  - chromium electroplating, chromium anodizing and reverse etching;
  - electroless nickel-polytetrafluoroethylene plating; and
  - etching of plastic substrates prior to their metallization;
- the manufacture, use, sale, offer for sale and import of
  - photoresists or anti-reflective coatings for photolithography processes; and
  - photographic films, papers and printing plates;

- the use, sale, offer for sale or import of aviation hydraulic fluid;
- the use, sale and offer for sale of manufactured products that were manufactured or imported before the coming into force of the Regulations; and
- use in laboratories for scientific research and laboratory analytical standards.

Importers of PFOS-based fume suppressants are required to submit annual reports detailing types, quantities, sales and end uses for the substances that are imported.

### *Alternatives*

A number of alternatives to prevent the risks posed to Canada's environment from the use and release of PFOS were considered and are discussed below.

### **Status quo**

The presence of PFOS in the environment is primarily due to human activity. Evidence indicates that the substance is harmful to wildlife and ecosystem health. In Canada, PFOS is not regulated in any jurisdiction and, therefore, action is required to prevent further increases of PFOS concentrations in the Canadian environment.

With the phase-out of PFOS production by the largest global manufacturer between 2000 and 2002, PFOS use has declined significantly in Canada. With the exception of the use of fume suppressants in the metal-plating sub-sector and the expected continued use of large existing stocks of PFOS-based AFFFs purchased prior to 2003, all other known uses of PFOS in Canada have been discontinued and all other existing stockpiles have been depleted. However, the potential for future import, sale, manufacture and use of PFOS in Canada, along with subsequent environmental releases, will continue to exist if the status quo is allowed to persist. Therefore, in order to prevent the re-entry of PFOS into Canada and subsequent PFOS releases to the environment, the status quo cannot be maintained.

### **Voluntary measures**

Since the phase-out of PFOS production by the largest global manufacturer between 2000 and 2002, PFOS use has declined significantly in Canada ([see footnote 11](#)). Existing inventories of PFOS-based AFFFs and the continued use of PFOS-based fume suppressants in chromium electroplating, as well as the possible presence of PFOS in imported manufactured products, are the main areas of continued concern. The use of voluntary measures like environmental performance agreements (EPAs) requires agreement by all stakeholders on the terms of the EPA to ensure their participation. Given the diverse characteristics of the stakeholders and the large numbers of AFFF users, electroplaters and possible importers of manufactured products containing PFOS, EPAs are not considered to be an effective tool for phasing out existing uses.

Other voluntary measures such as the Responsible Care Program ([see footnote 12](#)) and Environmental Leadership Initiatives were also not considered viable options, as they do not provide sufficient incentives to encourage existing PFOS users to shift away from the use of the substance.

In addition, voluntary tools cannot provide any certainty regarding the prevention of risks to Canada's environment from the use and release of PFOS. Voluntary measures do not ensure an effective reduction in environmental risks and would not guarantee a fair and level playing field. Therefore, the option of voluntary measures is not being considered any further.

### **Market-based instruments**

Market-based instruments, which include emission-trading programs, financial incentives, deposit-refund systems, environmental charges and other market-based tools, were given due consideration. Tradable units systems were considered neither effective nor practical, as the quantity of PFOS in use is small and establishing an elaborate system of tradeable permits would be an ineffective use of resources. The costs associated with establishing a trading regime for a five-year period prior to the prohibitions coming into force would be high. The efficiency gains from trading over a short time period would be outweighed by the cost of establishing the trading system. For imported manufactured products, manufacturers are outside Canada's jurisdiction and a trading system could not be enforced.

Similarly, deposit-refund systems were also considered an ineffective option as PFOS is released during the service life of the consumer product. In some cases, by the end of the product life, very small quantities of PFOS remain in the product matrix. Moreover, PFOS cannot be recovered from products and this makes a deposit-refund scheme inapplicable.

Other market-based tools were also given due consideration. PFOS uses in Canada, other than in AFFFs, are relatively rare and the cost of subsidies is not the most effective way of reducing PFOS use. Environmental charges were considered ineffective: the purpose is to achieve the lowest level of release to the environment that is technically and economically feasible from all release sources of PFOS, and the ability of a charge rate to achieve this effective prohibition would be highly uncertain. This is particularly the case in the metal-plating sub-sector, where some firms could continue to pay a charge in order to use the product. A charge rate could be implemented as a complementary tool in advance of a regulatory measure. However, the number of metal-plating and AFFF-using facilities is small; consequently, there could be a risk of high transaction costs. A charge is feasible for imported manufactured products containing PFOS, but the compliance costs associated with monitoring and verifying the content of PFOS in manufactured products in order to calculate the charge would likely be cost-prohibitive.

The use of economic instruments, therefore, does not present itself as

an effective option.

## **Regulations**

To prevent risk to the Canadian environment from PFOS use and release, regulatory measures were found to be the best option. Based on a review of the regulatory measures available under CEPA 1999, regulations respecting substances on the List of Toxic Substances were considered to be the most effective. Regulations are able to address the various aspects of substance life cycles, including manufacture, use, sale, offer for sale and import. Regulations can also prescribe emissions levels. In addition, exemptions for critical uses can be provided for specified time frames, especially regarding uses for which technically viable alternatives are not yet available. The regulatory measures prohibit the manufacture, use, sale, offer for sale and import of PFOS and specify the deadlines for the eventual elimination of most PFOS uses. These regulatory measures are a timely and efficient mechanism to prevent risk to Canada's environment from the use and release of PFOS.

## ***Benefits and costs***

The key assumptions used in the cost-benefit analysis include the following:

*Regulatory time frame:* The Regulations would come into force in 2008, with the exemption for AFFFs and the metal-plating sub-sector expiring five years later in 2013.

*Time span for analysis:* A 25-year time frame is selected to account for the life span of PFOS-containing AFFFs, as well as the service life of metal-plating equipment. Thus, the analysis time frame is 2008 to 2033.

*Cost-benefit perspective:* Only those costs and benefits that directly or indirectly affect Canadians are included in the analysis. All monetized costs and benefits are expressed in 2006 constant dollars.

*Discount rate:* A discount rate of 5.5% is used.

The specific costs and benefits of the Regulations are described below.

## **Costs to regulatees**

### *Aqueous film-forming foams*

The costs associated with prohibiting AFFFs will be incurred by both public- and private-sector entities, including airports, military facilities and refineries. These costs relate to the safe disposal of existing stocks of PFOS-based AFFFs, as well as the incremental cost of replacing the stock with alternatives. The regulatees may incur some additional costs for testing to ensure that the AFFF systems meet the prescribed threshold limit of 0.5 ppm. Testing costs for a single system may be as high as \$4,000. However, these costs may be lower as the industry may be able to get lower rates for multiple

systems. Since information is not available on the number of AFFF systems at all facilities, it is not possible to estimate these costs.

Similarly, certain military vessels contaminated by PFOS-based AFFFs are exempt from the regulatory provisions. Military vessels deployed overseas for the purpose of national security, humanitarian relief, peacekeeping etc. may need to replenish their AFFF supplies from North Atlantic Treaty Organization (NATO) member countries. These NATO supplies of AFFFs may contain PFOS and, given the nature of the deployment, Canadian military vessels would need to accept the available AFFF supplies. This provision has been included in view of the extenuating circumstances for returning military vessels or firefighting vehicles being contaminated during overseas operations. The cost to the military, as a result of this exemption, is expected to be negligible and therefore has not been estimated.

The key cost assumptions include the following:

- The starting stock of PFOS-based AFFFs in 2006 is 300 tonnes, of which close to 1% or 2.83 tonnes consists of PFOS. This stock will not increase, as PFOS-based AFFFs have not been available since between 2002 and 2003. During the five-year exemption period, the stock of PFOS-based AFFFs is expected to decrease marginally at an annual rate in the order of 1% through use and accidental losses. It is also anticipated that users will dispose of their stock during the exemption period (2008 to 2013). This accelerated disposal is attributable to the Regulations. It is assumed that, during the exemption period, 5% of the stock will be sent annually for thermal destruction. This means that approximately 65 tonnes of AFFF foam containing 0.65 tonnes of PFOS will be disposed of in the 2008 to 2013 exemption period.
- Based on the regulatory schedule, regulatees would have to phase out their use of PFOS-based AFFFs by 2013. Since AFFF has a lifespan in the order of 25 years, it is reasonable to assume that the entire stock of PFOS-based AFFFs will be disposed of and replaced in 20 years (2013 to 2033) after the five-year exemption period (2008 to 2013). For the cost-benefit analysis, it is assumed that, with the prohibition in force, the remaining stock that has not been sent for thermal destruction will be disposed of at a constant rate starting in 2013 until it is entirely depleted in 2033.
- The average disposal costs (thermal destruction) are estimated to be \$1.65/kg. This is a standard cost for disposing of hazardous waste at a licensed disposal facility using thermal destruction.
- Based on the prices that are available to large-scale users, actual replacement costs for purchasing PFOS-free AFFFs have been estimated at between \$3.12 and \$3.85/kg, with an average cost of \$3.50/kg for concentrate.

Based on these assumptions, it is estimated that the Regulations would reduce the release of PFOS-based AFFFs into the environment in the order of 2.83 tonnes over the 2008 to 2033 period (see Table 1). The present value of the disposal and replacement costs experienced by airports, military facilities and refineries would be in the order of

approximately \$727,501 (in 2006 constant dollars) discounted at 5.5% over the 25-year time period.

**Table 1: Quantity of PFOS-based AFFF Disposed of (in tonnes) and the Associated Replacement and Disposal Costs (over 25 years at 5.5% in 2006 constant \$)**

	<b>Exemption Period 2008 to 2013</b>	<b>Prohibition Period 2013 to 2033</b>	<b>Entire Period 2008 to 2033</b>
<b>AFFF and PFOS inventories (tonnes)</b>			
AFFF quantities disposed of	65	218	283
PFOS contained in AFFFs	0.65	2.18	2.83
<b>Costs (net present value)</b>			
Cost of disposal	\$81,836	\$148,835	\$230,671
Cost of replacement	\$176,263	\$320,567	\$496,830
<b>Total cost</b>	<b>\$258,100</b>	<b>\$469,401</b>	<b>\$727,501</b>

#### *Metal plating*

Of the 219 metal-plating facilities in Canada, about 110 use fume suppressants and, of these latter facilities, approximately 100 use PFOS-based fume suppressants. Under the Regulations, these 100 facilities will either need to switch to non-PFOS-based fume suppressants or move to another control technology such as composite mesh pads or closed covers after the end of the five-year exemption (by 2013). While there are some alternative formulations of fume suppressants on the market that do not contain PFOS, the industry has been unable to develop formulations with the required performance characteristics to meet the range of technical specifications required in chromium electroplating, chromium anodizing and reverse etching, electroless nickel-polytetrafluoroethylene and etching of plastic prior to metallization. However, in most other PFOS-use areas, alternative formulations have emerged, as evidenced by the availability of PFOS-free alternatives in the market since the voluntary phase-out of PFOS between 2000 and 2002.

As a worst case scenario, if no drop-in fume suppressant substitutes become available, the metal-plating sector would have to move to an emission control technique such as composite mesh pads or closed

covers. Based on analysis conducted for the *Chromium Electroplating, Chromium Anodizing and Reverse Etching Regulations*, the incremental costs of moving from fume suppressants to composite mesh pads would vary according to firm size as indicated in Table 2. The distribution by firm size for the 100 metal platers that would need to upgrade to the new emission controls is also provided in Table 2. As indicated, the majority of facilities are in the medium category (52), followed by small (34) and large (14) ([see footnote 13](#)). This sector has been growing at an annual growth rate that varies between 0.8% and 1.4%, with an average of 1.1%. This range was used to forecast the number of firms subject to the Regulations over the 2008 to 2033 time period.

Costs, therefore, will be either zero if drop-in substitutes become available at no incremental cost, or else equivalent to the upgrade emission control technology costs provided in Table 2.

**Table 2: Incremental Cost per Facility for Upgrading to Improved Emission Controls(2006 constant \$)**

<b>Composite Mesh Pads (CMP)</b>		
<b>Firm size</b>	<b>Capital Cost</b>	<b>O&amp;M* Cost</b>
Small	\$46,499	\$2,981
Medium	\$96,320	\$10,965
Large	\$176,033	\$30,552

<b>PFOS-Based Fume Suppressants</b>		
<b>Firm size</b>	<b>Capital Cost</b>	<b>O&amp;M* Cost</b>
Small	\$0	\$1,822
Medium	\$0	\$6,011
Large	\$0	\$31,331

<b>Incremental Cost to Move to CMP</b>		
<b>Firm size</b>	<b>Capital Cost</b>	<b>O&amp;M* Cost</b>
Small	\$46,499	\$1,159
Medium	\$96,320	\$4,954

Large	\$176,033	(\$779)
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\* O&M refers to operation and maintenance.

Based on this range of possible costs, the anticipated costs of the Regulations by facility size are \$736,254 for 34 small facilities, \$2,984,716 for 52 medium ones and \$773,645 for 14 large ones. The estimated total compliance costs for facilities using PFOS-based fume suppressants is approximately \$4.5 million (discounted at 5.5% over 25 years). This would result in a reduction in PFOS releases of approximately 85.7 tonnes over the 2013 to 2033 period.

#### *Imported manufactured products*

Import prohibitions are not expected to create impacts in Canada, as the EU and the United States have put in place similar prohibitions on PFOS. Therefore, these impacts are not considered in this analysis. However, there is some concern that, without the prohibition in place, some items containing PFOS would enter Canada, as some countries have not banned PFOS use or manufacture. Therefore, some benefits (discussed below) can be attributed to the prohibitions being placed on imported manufactured products in the Regulations.

#### **Costs to the federal government**

The costs incurred by the federal government would result from enforcement and compliance promotion activities related to the Regulations. For imported manufactured products, enforcement and compliance promotion activities are likely to be moderate, as international actions are already being taken to restrict the use of PFOS. Enforcement activities would still be required to verify that no PFOS-containing products are imported into Canada.

#### *Enforcement activities*

Enforcement costs are estimated as follows: for the first year following the coming into force of the Regulations, a one-time amount of \$250,000 will be required for training enforcement officers. In addition, for the first year following the delivery of the training, the enforcement costs are estimated to require an annual budget of \$56,220, broken down as follows: \$37,750 for inspections (which includes operations and maintenance costs, transportation and sampling costs), \$14,330 for investigations and \$4,140 for measures to deal with alleged violations (including environmental protection compliance orders and injunctions).

For years 2 through 5, enforcement for each year is estimated to require an annual budget of \$74,316, broken down as follows: \$37,750 for inspections (which includes operations and maintenance costs, transportation and sampling costs), \$14,330 for investigations, \$4,140 for measures to deal with alleged violations (including environmental protection compliance orders and injunctions) and \$18,096 for prosecutions.

For subsequent years (years 6 to 25), enforcements is estimated to require an annual budget of \$5,552 for inspections (which includes

operations and maintenance costs, transportation and sampling costs), \$85,980 for six investigations and \$18,096 for prosecutions over the 25-year time frame.

#### *Compliance promotion activities*

For the first year following the coming into force of the Regulations, compliance promotion activities are estimated to cost \$128,000.

Activities could include mail-outs, information sessions, site visits, the development and distribution of compliance promotion material, the development of a website, presentations and trade shows, conferences and industry meetings, response to and tracking of inquiries, and contributions to the compliance promotion database.

Costs in years 2 through 5 are \$41,000, \$6,500, \$34,000 and \$6,500 respectively for a total five-year expenditure on compliance promotion activities of \$216,000. The increase in expenditures for year 4 is to increase compliance promotion activities in advance of the planned end of the five-year exemptions for the use of PFOS-based AFFFs and fume suppressants. Note that a higher level of effort for compliance promotion may be required if, following enforcement activities, compliance with the Regulations is found to be low.

The present value of federal government enforcement costs over the 25-year time frame is in the order of approximately \$570,450, while compliance promotion costs are approximately \$176,203 (2006 constant dollars at a 5.5% discount rate). Total government costs are, therefore, estimated to be approximately \$746,653 (2006 constant dollars at a 5.5% discount rate).

#### **Total cost of the Regulations**

The present value of total industry and government costs associated with the Regulations over the 25-year period are estimated to be approximately \$6.0 million (2006 dollars discounted at 5.5%).

#### **Benefits to Canadians**

The benefits of prohibiting PFOS include

- protection from PFOS exposure of wildlife and ecosystems, including those in remote areas such as the Canadian Arctic, as a result of a reduction in the use of PFOS; and
- protection of water supply sources through the avoidance of contamination of water sources as a result of the handling, release and use of PFOS. Costs associated with tapping alternate water sources are thus avoided.

Due to data limitations, not all of these benefits could be monetized and included in the analysis.

#### *Ecosystem benefits*

The scientific literature has determined that, at current exposure levels, PFOS could harm certain wildlife organisms (e.g., polar bears, fish-eating birds), including organisms found in remote areas such as

in the Canadian Arctic. The effects include growth inhibition of birds and aquatic invertebrates; liver and thyroid effects in mammals; lethality to fish and saltwater invertebrates; and changes in biodiversity. While PFOS is generally acknowledged to have the potential to cause serious, irreversible impacts (bioaccumulation and persistence), the current science is unable to accurately predict the ecological effects of these substances. The absence of specific impacts on the environment on which to model the economic value of reductions in current releases makes it difficult to quantify and monetize the benefits from the Regulations.

#### *Avoidance of costs for alternate water supplies*

PFOS has been detected in surface water and sediment, in waste water treatment plant effluent and sewage sludge and in landfill leachate. PFOS releases have been found to cause groundwater contamination, and PFOS has been detected in groundwater at least five years after its release. Among the indirect benefits, the Regulations would prevent environmental and possible health impacts associated with water supply contamination resulting from the handling, release and use of PFOS.

As stated earlier, there are approximately 3 tonnes of PFOS contained in the 300 tonnes of AFFF inventories at airports, military facilities and refineries. The use of PFOS-based AFFFs to fight actual fires and conduct training, as well as the risk of accidental releases, will continue to pose a threat as long as the inventories of PFOS-based AFFFs exist and their use remains uncontrolled. Although PFOS-based AFFFs have not been available on the market since 2003, the existing inventories of PFOS-based AFFFs continue to pose a risk over their service life (estimated to be 25 years) that could result in a major contamination event. Once the regulatory provisions for PFOS-based AFFFs come into effect in 2013, the risk of a contamination event would be significantly reduced. Although the incidence rate of PFOS contamination to groundwater or surface water supply areas is not known, for analytical purposes it can be assumed that two extreme contamination events involving fuel fires (e.g., refinery fires, plane crash) could occur every 25 years.

The avoided cost for alternate water supply sources is measured in terms of the probability of a contamination event at some point in the future, multiplied by the costs of alternate sources of water supplies. The probability is simply the annual probability that a water contamination event will occur.

To address this type of contamination, affected municipalities may be required to incur expenses for the short-term provision of alternate water supplies, engineering studies and new infrastructure. Existing studies have estimated that the cost of providing alternate sources of water supply is in the order of between \$2.2 and \$11 million, with a central value of \$6.6 million (see footnote 14). The potential benefit from avoided alternate water supply expenditures attributable to the Regulations is estimated to result in an average annual benefit of \$560,000 per year. It is recognized that this benefit is uncertain; however, the value can be used to approximate the benefits to be derived as a result of the Regulations. Estimated benefits to

Canadians are, therefore, approximately \$6.35 million (2006 constant dollars at a 5.5% discount rate).

## **Net benefit of the Regulations**

The total discounted cost to the private sector and the federal government is estimated at \$5.97 million, while benefits to Canadian society are estimated to be at least \$6.35 million. Overall, the present value of the Regulations is estimated to result in a net benefit to Canadian society of approximately \$384,410 (2006 constant dollars, discounted at 5.5% over a 25-year period). The benefits to Canadians do not include non-quantified benefits such as the value placed on ecosystem risk reduction associated with less PFOS use. The Regulations are estimated to reduce PFOS releases by at least 88.6 tonnes (85.7 tonnes from metal finishing and 2.87 tonnes from AFFFs) over the 25-year period.

As the benefits to the ecosystem could not be quantified due to data limitations and uncertainties, it is realistic to assume that the actual net benefit would be greater than the estimated \$384,410.

### ***Consultation***

Stakeholders were given the opportunity to comment during the 60-day public comment period following the July 1, 2006 publication in the *Canada Gazette*, Part I, of the proposed Order to add the substances to the List of Toxic Substances in Schedule 1 of CEPA 1999. The comments received were supportive of the proposal to add the substances to Schedule 1 of CEPA 1999.

The CEPA National Advisory Committee (CEPA NAC) and relevant federal government departments were consulted on the proposed Order as well as the proposed Risk Management Strategy (RMS) for PFOS. No concerns were raised by CEPA NAC.

Stakeholders were also consulted on the proposed RMS for PFOS through the posting of the RMS on Environment Canada's CEPA Registry Web site and a national mail-out to over 350 stakeholders. A total of 48 comments were received from industry representatives, industry associations, environmental non-governmental organizations and other government departments. While stakeholders were supportive of the proposed risk management approach, concern was raised about the approach, specifically the proposed exemption for imported manufactured products, as was originally stated in the strategy.

The comments and concerns related to the RMS, at the various stakeholder meetings and Environment Canada's response to these are detailed below.

### ***Aqueous film-forming foams***

Concern was raised on the proposed length of time allowed to phase out PFOS-based AFFF stockpiles. Some of the stakeholders advocated increasing the time frame while others proposed shortening

the allowed phase-out time. The phase-out time frames for AFFFs being proposed by stakeholders ranged from one to ten years. In addition, stakeholders called for the inclusion of a financial incentive program to assist smaller firms in the proper disposal of expended AFFFs; a requirement to develop a pollution prevention (P2) plan; and the development of best practices for the use, storage and disposal of AFFFs.

After reviewing the comments, Environment Canada deemed five years to be an appropriate time period to phase out existing AFFF stocks. With the voluntary discontinuation of PFOS production by the global manufacturer between 2000 and 2002, users requiring new stocks have been able to purchase only PFOS-free products. Users would, therefore, have had approximately 13 years to complete the phase-out of the existing stocks from the time the major manufacturer announced discontinuing PFOS production to the time the proposed 5-year exemption period expires. In addition, replacement products are readily available at similar prices on the market. Moreover, the time frame is also consistent with the timelines being proposed in other jurisdictions.

With respect to the other concerns, Environment Canada is of the opinion that existing federal, provincial, territorial and municipal standards and protocols for fire response and prevention adequately define the operational use procedures for AFFFs. As well, the safe disposal of AFFFs is provided for under the existing federal and provincial hazardous waste regulations. The disposal costs for AFFFs would be similar to other hazardous waste material and as such do not warrant the development of an incentives or assistance program.

#### *Imported manufactured products*

The majority of the comments received did not support exempting imported manufactured products. A couple of comments called for developing complementary measures for managing imported manufactured products and developing better use pattern data on imported manufactured products.

Environment Canada considered the comments and decided not to exempt imported manufactured products in the proposed Regulations. As described above, the global production and use data indicates that PFOS use is declining and alternatives to PFOS are readily available. The areas where the substance is still being used are for critical uses for which no viable alternative is available yet. Therefore, with viable alternatives available at similar costs and exemptions for critical uses, Environment Canada did not consider it necessary to develop other complementary measures or to provide exemptions for imported manufactured products containing PFOS. Given the declining production and use of PFOS, it was determined that complementary measures would not be an efficient use of resources.

#### *Critical use exemptions*

Comments were also received on the critical use exemptions being provided for under the proposed Regulations. Stakeholders voiced the concern that these exemptions should be justified on the basis of a

specific set of criteria and supporting documentation. Moreover, the critical use exemptions should be time-limited.

The critical use exemptions provided for under the proposed Regulations are for the use of existing stocks of PFOS-based AFFFs and the import and use of PFOS-based surfactants in chromium plating for a period of five years. After taking into consideration the technical aspects, Environment Canada has determined that a period of five years is sufficient to manage the existing stocks of AFFFs as well as to identify alternatives for the specialized manufacturing operations. With the voluntary phase-out of PFOS by the major manufacturer between 2000 and 2002, PFOS-based AFFFs have not been available and all AFFF is now PFOS-free. The five-year phase-out period is considered essential to allow facilities to replace PFOS-based AFFFs with alternative PFOS-free firefighting foams. Similarly, the phase-out period for PFOS-based surfactants is required to allow the sector to develop alternatives. Similar exemptions are also proposed in other jurisdictions.

#### *Perfluorooctane sulfonate releases*

A number of stakeholders were concerned about the issue of PFOS releases from landfills as well as the efficiency of waste water treatment facilities to remove PFOS.

With the voluntary phase-out of PFOS by the global manufacturer between 2000 and 2002, it is assumed that the use of PFOS in manufactured products has steadily been declining. This decline is likely to have a positive impact on future releases of PFOS from landfills and waste water treatment facilities. Moreover, the proposed Regulations intend to prohibit the import, sale, manufacture and use of PFOS substances, including manufactured products. This measure is expected to reduce the future stream of PFOS releases.

#### *General comments*

Several comments were received on some of the more general aspects of the proposed Regulations, as specified in the risk management strategy. Stakeholders identified the following issues:

- management of additional new PFOS-type substances;
- impact of international actions on domestic initiatives to manage PFOS;
- identification of safe alternatives to PFOS;
- virtual elimination of PFOS substances;
- provision of evidence to show why the weight-of-evidence approach was used with respect to bioaccumulation; and
- identification by Chemical Abstracts Service numbers of the substances that will be subject to the proposed risk management actions.

The concerns expressed by stakeholders have been taken into consideration while drafting the proposed Regulations.

#### *Comments following pre-publication of the proposed Regulations in*

The proposed Regulations were published in the *Canada Gazette*, Part I, on December 16, 2006, for a 60-day comment period that ended on February 14, 2007. Comments were received from five stakeholders and, overall, the comments are supportive of the Regulations. The comments and concerns raised by the stakeholders and the federal government's responses to them are detailed below.

*Aqueous film-forming foams*

Comments were received with respect to firefighting foams. Concern was raised about potential contamination by small quantities of PFOS of reservoirs or systems that formerly used PFOS-based AFFFs and are now using non-PFOS alternatives.

A study was undertaken by Environment Canada to establish the validity of the concern. The study concluded that it is possible for reservoirs or systems to be contaminated by PFOS even after conversion to PFOS-free AFFFs. Furthermore, the study found that it may not be technically possible to completely decontaminate these reservoirs or systems. As a result, an exemption has been added to the Regulations allowing for the use of PFOS-containing AFFFs at concentrations at or below 0.5 ppm.

Other comments received relate largely to circumstances surrounding the use of PFOS in military operations. These include the use of PFOS-based AFFFs in remote northern military operations, deployed or deploying military vessels and contamination of military vessels and firefighting equipment while operating abroad.

An exemption has been added to the Regulations for military vessels and firefighting equipment. These exemptions address extenuating circumstances when, for reasons of national security, it would be impossible for deployed or deploying Canadian Navy vessels to be converted to non-PFOS AFFFs within the five-year period specified. It is also possible for military vessels and firefighting equipment to become contaminated when replenishing their AFFF stocks from other NATO member countries during foreign operations. Therefore, an exemption has been added for military vessels or firefighting equipment returning to Canada that may have been contaminated with PFOS-based AFFFs while operating outside of Canada.

A stakeholder also expressed concerns about record-keeping and reporting requirements to demonstrate that an AFFF system is PFOS-free.

The reporting and record-keeping requirements apply to those persons who are importing PFOS-based fume suppressants for use by the metal-plating industry. These requirements do not apply to users or importers of PFOS-based AFFFs or for the purpose of demonstrating that an AFFF system is PFOS-free. Therefore, no changes have been made with respect to reporting and record-keeping requirements within the Regulations.

### *Aviation hydraulic fluids*

Comments were received in which stakeholders requested the inclusion of an exemption for the use of PFOS in aviation hydraulic fluid formulations in order to maintain consistency with actions taken in other jurisdictions.

Current aviation hydraulic fluids formulations do not contain any substances that meet the criteria set out in section 1 of the Regulations. There is only one facility in the world that produces this formulation. In the event of a supply disruption (e.g., plant shutdown), aviation hydraulic fluid formulations containing PFOS would need to be used. These fluids are used in a closed-loop system with many safeguards in place to contain the formulations and minimize the potential for the release of PFOS into the environment. Therefore, in order to ensure safe operation of commercial and military aircrafts, Environment Canada has included an exemption in the Regulations allowing for the use of PFOS in aviation hydraulic fluid formulations.

### *Semiconductors and similar components*

Clarification was sought by stakeholders on what was covered by the exemption on semiconductors or similar components of electronic or other miniaturized devices. It was pointed out that the European Union directive exempts PFOS use in 201C;photoresist or anti-reflective coatings for photolithography processes201D; rather than for 201C;semiconductor or similar components of electronic or other miniaturized devices.201D;

The purpose of the exemption was to allow the use of PFOS in an application that was considered critical and for which no alternatives are currently available. To clarify this intent, Environment Canada has revised the Regulations to ensure that the intended critical use exemptions are clearly stated.

### *General comments*

One stakeholder felt that the Regulations should include a threshold concentration in the definition of PFOS to clarify issues related to hazardous waste disposal, cleanup standards for contaminated sites and minimum acceptable concentrations for potable water.

The purpose of the Regulations is to prevent the risks posed from the use and release of PFOS, its salts and its precursors. Therefore, the Regulations do not apply to rehabilitation of contaminated sites or provide minimum acceptable concentrations for water, air or soil. In addition, the Regulations do not apply to PFOS, its salts and its precursors that are contained in hazardous waste, hazardous recyclable material or non-hazardous waste to which Division 8 of Part 7 of CEPA 1999 applies.

Another stakeholder comment related to the stakeholder2019;s view that the PFOS Regulations should apply to future applications or new uses of chemicals from the larger group of perfluorochemicals.

These Regulations target the use and release of PFOS, its salts and its precursors. With respect to the larger group of perfluorochemicals, Environment Canada and Health Canada have developed an action plan entitled *Perfluorinated Carboxylic Acids (PFCAs) and Precursors: An Action Plan for Assessment and Management* ([see footnote 15](#)). The action plan provides a broader perspective on the Department's approach to PFCAs and their precursors. The listing on Schedule 1 of CEPA 1999 covers all substances on the Domestic Substance List falling within the definition of PFOS, its salts and compounds. Any other substance meeting the criteria within the *New Substances Notification Regulations* would be subject to an assessment by the New Substances Program.

One comment indicated that the Regulations should include a comprehensive list of substances that fall within the definition of PFOS, its salts and its precursors.

While there are many partial lists of substances that meet the criteria of the Regulations, a comprehensive list is not currently available. However, Environment Canada will provide an up-to-date non-exhaustive list of PFOS substances in its compliance promotion materials.

A comment was received with respect to the Regulations, including a limit value for tolerance of impurities, or traces of PFOS that might be inadvertently present in preparations and products.

In order to address concerns related to the presence of PFOS as an impurity or a trace contaminant, Environment Canada has made changes to the Regulations to exempt situations where PFOS is incidentally present.

### ***Compliance and enforcement***

Since the Regulations are made under CEPA 1999, enforcement officers will, when verifying compliance with the Regulations, apply the Compliance and Enforcement Policy implemented under the Act. The Policy also sets out the range of possible responses to violations, including warnings, directions, environmental protection compliance orders, ticketing, ministerial orders, injunctions, prosecution and alternative environmental protection measures (which are an alternative to a court trial after the laying of charges for a CEPA 1999 violation). In addition, the Policy spells out when Environment Canada will resort to civil suits by the Crown for costs recovery.

When, following an inspection or an investigation, an enforcement officer discovers an alleged violation, the officer will choose the appropriate enforcement action based on the following factors:

- *Nature of the alleged violation*: This includes consideration of the damage, the intent of the alleged violator, whether it is a repeat violation and whether an attempt has been made to conceal information or otherwise subvert the objectives and requirements of the Act.
- *Effectiveness in achieving the desired result with the alleged violator*: The desired result is compliance within the shortest

possible time and with no further repetition of the violation. Factors to be considered include the violator's history of compliance with the Act, willingness to co-operate with enforcement officers and evidence of corrective action already taken.

- *Consistency*: Enforcement officers will consider how similar situations have been handled in determining the measures to be taken to enforce the Act.

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### [Footnote a](#)

S.C. 2004, c. 15, s. 31

### [Footnote b](#)

S.C. 1999, c. 33

### [Footnote c](#)

S.C. 2002, c. 7, s. 124

### [Footnote d](#)

S.C. 1999, c. 33

### [Footnote 1](#)

For further information, visit the Web site at  
[http://www.chemicalsubstanceschimiques.gc.ca/plan/index\\_e.html](http://www.chemicalsubstanceschimiques.gc.ca/plan/index_e.html).

### [Footnote 2](#)

The screening assessment involves a scientific evaluation of available information for a substance to determine whether the substance meets the definition of 201C;toxic201D; as set out in section 64 of CEPA 1999. The Screening Assessment Report for this substance is available on the CEPA Registry Web site at

[http://www.ec.gc.ca/CEPARRegistry/subs\\_list/assessments.cfm](http://www.ec.gc.ca/CEPARRegistry/subs_list/assessments.cfm).

#### [Footnote 3](#)

The proposed order for this substance is available on the CEPA Registry Web site at [http://www.ec.gc.ca/Ceparegistry/documents/orders/g2-14026\\_o1.pdf](http://www.ec.gc.ca/Ceparegistry/documents/orders/g2-14026_o1.pdf).

#### [Footnote 4](#)

As per section 64(a) of CEPA 1999, PFOS was found to be toxic because it was entering 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.

#### [Footnote 5](#)

The notice under section 71(1)(b) of CEPA 1999 published on June 10, 2000, is available on the CEPA Registry Web site at [http://www.ec.gc.ca/Ceparegistry/documents/notices/g1-3424\\_n3.pdf](http://www.ec.gc.ca/Ceparegistry/documents/notices/g1-3424_n3.pdf).

#### [Footnote 6](#)

The notice under section 71(1)(b) of CEPA 1999 published on January 15, 2005, is available on the CEPA Registry Web site at [http://www.ec.gc.ca/Ceparegistry/documents/notices/g1-13903\\_n1.pdf](http://www.ec.gc.ca/Ceparegistry/documents/notices/g1-13903_n1.pdf).

#### [Footnote 7](#)

Gardner Pinfold Consulting Economist, The Economic Implications of the Proposed Regulations to Control Hexavalent Chromium in the Electroplating and Anodizing Sector (2003).

#### [Footnote 8](#)

The NICNAS assesses all chemicals new to Australia and assesses chemicals already used in response to concerns about their safety on health and environmental grounds. All importers or manufacturers of industrial chemicals for commercial purposes are legally required to register with NICNAS and must notify NICNAS so that new chemicals can be fully assessed.

#### [Footnote 9](#)

For further information, visit the Web site at <http://www.pops.int/>.

#### [Footnote 10](#)

For further information, visit the Web site at [http://www.unece.org/env/lrtap/pops\\_h1.htm](http://www.unece.org/env/lrtap/pops_h1.htm).

#### [Footnote 11](#)

The notice under section 71(1)(b) of CEPA 1999 published on June 10, 2000, is available on the CEPA Registry Web site at [http://www.ec.gc.ca/Ceparegistry/documents/notices/g1-3424\\_n3.pdf](http://www.ec.gc.ca/Ceparegistry/documents/notices/g1-3424_n3.pdf)

#### [Footnote 12](#)

Responsible Care is the chemical industry's global voluntary initiative under which companies, through their national associations,

work together to continuously improve their health, safety and environmental performance, and to communicate with stakeholders about their products and processes Web site address: <http://www.responsiblecare.org/page.asp?p=6406&l=1>).

[Footnote 13](#)

Categorization is based on the number of plating tanks in a facility. Facilities with one tank are classified as small; with two to four tanks as medium; and with more than five tanks as large.

[Footnote 14](#)

Raven Beck Environmental Ltd., Survey of Tetrachloroethylene and Trichloroethylene Occurrences in Canadian Groundwater (March 1995).

[Footnote 15](#)

Further information on the action plan is available at <http://www.ec.gc.ca/nopp/DOCS/rpt/PFCA/en/actionPlan.cfm>. 

