Annex F Questionnaire (one per chemical)

Chemical name (as used by the POPS Review Committee (POPRC))

Perfluorooctane Sulfonate (PFOS), which as an anion, does not have a specific CAS number.

Explanatory note:
1. This chemical is undergoing a risk management evaluation. It has already satisfied the screening criteria set out in paragraph 4 (a) of Article 8 of the Convention. A risk profile has also been completed for this chemical in accordance with paragraph 6 of Article 8 and with Annex E to the Convention.

Introductory information

Name of the submitting Party/observer

NGO Observer: National Toxics Network on behalf of the International POPs Elimination Network (IPEN)

Contact details (name, telephone, e-mail) of the submitting Party/observer)

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Date of submission

8 February 2007

Additional Annex E information

(i) Production data, including quantity and location

(ii) Uses

When 3M stopped producing PFOS, the following uses continued to utilise existing stocks of PFOS-related substances. These included:

- metal plating;
- semi-conductors;
- photographic;
- aviation; and
- fire fighting foams stock.

PFOS-related substances have also been used in :

- carpets;
- leather/apparel;
- textiles/upholstery;
- paper and packaging;
- coatings and coating additives includng floor polishes and waxes;
- fluorosurfactants in the household and personal care and industrial cleaning (alkaline cleaners, floor polishes, denture cleaners, shampoos; and
- pesticides (baits against ants/ beetles).[1]

In 2004, according to the Danish EPA, the largest use areas of PFOS-based compounds appear to be:

- cleaning agents for glass cleaning;
- waxes and floor polishes;
- photographic industry;
- manufacturing of semiconductors; and
- metal surface treatment. [2]

Little is known about the manufacture of PFOS /PFOS related substances in China and India. [3]

(iii) Releases, such as discharges, losses and emissions

Explanatory note:

2. This information was requested for preparation of the risk profile in accordance with Annex E of the Convention. The POPRC would like to collect more information on these items. If you have additional or updated information, kindly provide it.

[1] D Brooke & A Footitt, ENVIRONMENTAL RISK EVALUATION REPORT: PERFLUOROOCTANESULPHONATE (PFOS) Environment Agency UK 2004; Available at http://www.environment-agency.gov.uk/ commondata/105385/pfos_rer_sept04_864557.pdf Also see OECD 2006 Survey on the manufacture, import and use of PFOS, PFAS, PFOA, PFCA and their related substances and products/mixtures containing these substances. Note this document is to be declassified and provided to the POP Review Committee.

[2] Danish Environmental Protection Agency Program for Cleaner Products, Environmental Project no. 1013, More environmentally friendly alternatives to PFOS-compounds and PFOA 2004 http://www.miljöindflydelse.dk

[3] This view was expressed at discussions that took place at the OECD Workshop on Perfluorocarboxylic acids (PFCAs) and Precursors, 20-22 November 2006

A. Efficacy and efficiency of possible control measures in meeting risk reduction goals (provide summary information and relevant references):

(i) Describe possible control measures

PFOS has recently been widely subjected to control measures similar to those outlined in Annex A of the Stockholm Convention: elimination of production, use, export, and import.[4]

(ii) Technical feasibility

The availability of alternatives for PFOS for most uses makes its substitution technically feasible.[5] A significant proportion of previous users of PFOS related substances have moved to other fluorochemical products (fluorinated telomers). While fluorinated telomers cannot degrade to PFOS under certain circumstances they may degrade to perfluorooctanoic acid (PFOA). Hence substitution with non-fluorochemicals is desirable. For example, a number of alternatives to the use of PFOS based fluorosurfactants in fire fighting foams are now available. [6]

Similarly, for the use of PFOS in the plating industry, which accounts for the highest releases to the environment, there are adequate alternatives. The use of PFOS in decorative plating can be substituted by replacing Cr (VI) with Cr (III) with significant operational cost savings after initial one-off costs. The use of PFOS as a mist suppressant in hard chromium plating and in plating onto plastics can be replaced by mechanical mist suppression options and improved ventilation extraction.[7]

(iii) Costs, including environmental and health costs

The phase-out of PFOS that has already occurred indicates that costs of alternatives have not inhibited PFOS substitution. Important points to consider when evaluating the costs of alternatives for any product include [8]:

- Alternatives with a higher initial purchase cost may actually be cheaper over the life of the product when durability and other factors are taken into account.
- Mass-production of alternatives can significantly lower their costs.

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[4] Draft risk profile: perfluorooctane sulfonate (PFOS) UNEP/POPS/POPRC.2/11

[5] Danish Environmental Protection Agency Program for Cleaner Products, Environmental Project no. 1013, More environmentally friendly alternatives to PFOS-compounds and PFOA 2004 http://www.miljöindflydelse.dk

[6] PERFLUOROOCTANE SULFONATE (PFOS) Dossier prepared in support for a nomination of PFOS to the UN-ECE LRTAP Protocol and the Stockholm Convention Prepared by the Swedish Chemicals Inspectorate (KemI) and the Swedish EPA, Sweden August 2004

[7] EUROPEAN PARLIAMENT 2004 -2009 Session document FINAL A6-0251/2006 19.7.2006 REPORT on the proposal for a Directive of the European Parliament and of the Council relating to restrictions on the marketing and use of perfluorooctane sulfonates (amendment of Council Directive 76/769/EEC) Committee of Environment, Public Health & Food Safety

[8] Ackerman F, Massey R. The Economics of Phasing Out PVC, Global Development and Environment Institute, Tufts University, USA, May 2006 http://www.ase.tufts.edu/gdae/Pubs/rp/Economics_of_PVC_revised.pdf

- The costs of initiatives to protect health and the environment are frequently overestimated in advance and later decline rapidly after the regulation is implemented.

In addition, there are inherent problems with using cost-benefit analysis to evaluate risk reduction and regulatory decisions.[9] A fundamental problem is the difficulty of estimating the benefits attributed to a particular control measure. There is no meaningful way of assigning a dollar figure to human and environmental health. Efforts to do so usually place market values over social values. As summarized in a recent overview of the topic, "A cost-benefit analysis requires a number for each cost and benefit, no matter what the level of uncertainty may be. There is enormous pressure, in effect, to ignore all uncertainty and develop a single best estimate based on what is known today." Cost-benefit analysis is usually justified as a necessary screen in a world of competing priorities. However, as the authors point out, "…resources are of course ultimately limited, but there is no evidence that we have approached the limits of what is possible (or desirable) in health and environmental protection." Regarding employment implications of health and environmental initiatives, the authors comment that, "…virtually no job losses can be traced to environmental regulations. On the average 999 out of every 1000 major layoffs are not due to environmental policies." [10]

The POPRC has already concluded that PFOS, due to the characteristics of its components, is likely, as a result of long-range environmental transport and demonstrated toxicity in a range of non-human species, to cause significant adverse effects on human health or the environment, such that global action is warranted.[11] This indicates that elimination of PFOS production, use, export, and import with a listing in Annex A of the Stockholm Convention would benefit human health or the environment.

The Swedish PFOS Dossier prepared in support for a nomination of PFOS to the UN-ECE LRTAP Protocol and the Stockholm Convention states that in general, the benefits of identifying alternatives of substitutes for persistent organic pollutants, or of identifying process changes that decrease their use, include:

- Lower emission to the environment
- Lower worker exposure to the substance
- Products that do not contain the substance will not release the substance either during their use or during subsequent recycling or disposal [12]

These benefits must be viewed in the context that PFOS has no identified metabolic/ breakdown pathways and there is already substantial contamination of the environment and living organisms with PFOS. We make the case that any assessment of alternatives

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[9] Heinzerling L, Ackerman. Priceless: Human Health, the Environment and Limits of the Market. The New Press, P288, 2004

[10] Ackerman F, Massey R. The Economics of Phasing Out PVC, Global Development and Environment Institute, Tufts University, USA, May 2006
http://www.ase.tufts.edu/gdae/Pubs/rp/Economics_of_PVC_revised.pdf

[11] Risk profile on PFOS UNDP/POPS/POPRC.2/11

[12] PERFLUOROOCTANE SULFONATE (PFOS) Dossier prepared in support for a nomination of PFOS to the UN-ECE LRTAP Protocol and the Stockholm Convention Prepared by the Swedish Chemicals Inspectorate (KemI) and the Swedish EPA, Sweden August 2004

or structured cost benefit analysis must truly reflect the real costs of species threatened by the continuing use of a hazardous chemical.

Generally, costs of alternatives or substitutes will include research and development and actual costs associated with use of substitutes, which are sometimes hard to distinguish from normal costs related to product development.

"The annualised costs per company, in the Metal Plating industry, of adopting improved ventilation extraction/tank enclosure have been calculated as being of order of £3,400 per year (15 years at discount rate of 3.5%). Decorative platers are likely to switch to the use of Cr (III) to avoid these costs and take up the potential net financial benefits from moving to the Cr (III) process." [13]

Explanatory notes:
3. If relevant, provide information on uses for which there may be no suitable alternative or for which the analysis of socio-economic factors justify the inclusion of an exemption when considering listing decisions under the Convention. Detail the negative impacts on society that could result if no exemption were permitted.
4. "Risk reduction goals" could refer to targets or goals to reduce or eliminate releases from intentional production and use, unintentional production, stockpiles, wastes, and to reduce or avoid risks associated with long-range environment transport.
5. Provide the costs and benefits of implementing the control measure, including environmental and health costs and benefits.
6. Where relevant and possible "costs" should be expressed in US dollars per year.

B. Alternatives (products and processes) (provide summary information and relevant references):

In cosideration of alternatives to hazardous chemicals, civil society has a right under Agenda 21 and the Bahia Declaration on Chemical Safety 2000 to participate with equity in the decision making process about chemicals in the environment. As representatives of civil society, we have considered industry claims that they need to continue the use of extremely persistent toxic substances like PFOS because they have as yet not been able or been forced to develop alternatives. While this on the surface appears a reasonable argument, there are uses for which we believe consideration should be given as to whether they are essential uses other than in a commercial sense. We have too often heard the claim that industry has the commercial right to produce what ever it wishes and too often have been told by government they are not in the position to stop production. [14] The case for ongoing use of PFOS in electronic miniaturization is a good example of our concerns. Industry has claimed ongoing miniaturization is dependent on PFOS. An argument could be made that miniaturization should be 'slowed' until industry develop safer alternatives to the use of PFOS. While society may like the idea of smaller electronic devices, they have not been provided with information on the real cost of the development of miniaturization, that is, the

[13] PFOS Dossier 2004

[14] This argument was made by 3M and other industry bodies attending the OECD PFCA Workshop in Stockholm November 2006 in response to a suggestion that governments consider recommending the phase out of non essential uses of Perfluorocarboxylic Acids, based on their toxicity, long range transport, extreme persistence and biaccumulation.

contamination and health threats to themselves, their unborn children and their fellow vulnerable species with which they share the planet.

(i) Describe alternatives

Alternatives to PFOS include substitute chemicals and alternative techniques including non-chemical alternatives such as design or product changes. The following PFOS uses could be removed without any substantial cost to society:

- leather/apparel;
- textiles/upholstery;
- paper and packaging;
- coatings and coating additives includng floor polishes and waxes;
- fluorosurfactants in the household and personal care and industrial cleaning (alkaline cleaners, floor polishes, denture cleaners, shampoos;
- pesticides (baits against ants/ beetles);
- fire fighting foams; and
- metal plating.

PFOS Impregnation of Textiles, Leather and Carpets

For example, according to the Danish EPA review of alternatives, for water repellence a mixture of silicones and stearamidomethyl-pyridine-chloride can be used alone as an alternative to PFOS-related compounds or together with a combination of carbamide (urea) and melamin resin. [15] The report refers to new technology that makes it possible to produce carpets with dirt- and water-repellant properties using properties that can be built into the synthetic fibres (polypropylene), thereby, rendering the use of impregnating agents as unnecessary. The Norwegian mass flow analysis of PFAS substances states that currently no PFOS-related chemicals are used as impregnating agents for textiles, leather and carpets and that impregnating agents based on silicone can be used to impregnate textiles (leisurewear and sports wear) and leather (footware).

While the Swedish risk reduction strategy on PFOS-related compounds, notes that the PFOS alternatives used today in impregnating agents for textiles and leather include other highly fluorinated compounds like e.g. polytetrafluoroethylene (PTFE), which is produced by the use of PFOA, which in the light of current research is highly undesirable. In June 2003, the 3M Company replaced the PFOS-compound in their Scotchgard products for cleaners and stain protectors for carpets, leather, furniture, automotives, hard surfaces and other apparels by PFBS (perfluorobutane sulfonate).

The possible alternatives identified for impregnation of textiles, leather and carpets include:

- mixture of silicones and stearamidomethyl-pyridine-chloride;
- mixture of silicones and stearamidomethyl-pyridine chloride together with carbamide (urea) and melamin resin;
- perfluorobutane sulfonate based substances (PFBS);
- telomer-based polymers;
- silicone-based products;
- PTFE (polytetrafluoroethylene); and
- highly fluorinated compounds [16]

[15] Danish EPA Project no. 1013 2004

[16] Danish EPA Project no. 1013 2004

The treatment of fabrics with PFOS-related substances is no longer thought to take place in the UK, however, treated fabrics are in use at present and little is known about imported products. [17]

Paper treatment
PFOS-related substances have been used to treat a range of paper types and products. The main function is to impart grease, oil and water resistance.[18] PFOS-related compounds are used both in food contact applications (plates, food containers, bags, and wraps) and in non-food contact applications (folding cartons, containers, carbonless forms, and masking papers).

However, some producers of greaseproof paper in Norway state that they use no PFAS-related substances (i.e. no fluorotelomers or perfluorinated substances with shorter chains are used either). The Norwegian survey claims that no PFAS-substances are used in Norway within this area. None of the surveys mentioned in the Danish EPA report identified the used or available alternatives. According to DuPont telomer-based substances are used as alternatives to PFOS-compounds within this area, therefore possible alternatives identified for impregnation of paper and cardboard are telomer-based substances.[19] However, design and behaviour changes may significantly limit the paper and packaging treatment required.

Coatings, floor polishes / waxes, cleaners
A wide range of applications of fluorosurfactants in the household and personal care and industrial cleaning areas has been identified. Depending on which national survey is considered these include alkaline cleaners, floor polishes and waxes, dishwashing liquids, carwashes and polishes, denture cleaners and shampoos.[20] The widespread use of PFOS-related compounds as surfactants in these products lends itself to substantial substitution.

The alternatives identified for cleaning agents, waxes and floor polishes include:

- acrylates;
- different C_4-perfluorinated compounds (e.g. methyl nonafluorobutyl ether and methyl nonafluoroisobutyl ether);
- fluorinated polyethers; and
- telomer-based surfactants and polymers [21]

As well a shift to softer waxes eliminates the use of PFOS-compounds entirely. Domestic uses in shampoos, dental cleaners, dishwashing liquid all have alternatives evident in the wide range of products not reliant on fluoro based substances.

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[17] Brooke & Footitt, UK 2004

[18] Brooke & Footitt, UK 2004

[19] Danish EPA Project no. 1013 2004

[20] Brooke & Footitt, UK 2004

[21] Danish EPA Project no. 1013 2004

Fire Fighting Foams

Fire-fighting foams may represent the largest risk to the environment. In the UK PFOS is no longer used in the manufacture of fire fighting foams as alternatives are available including:

- silicone based surfactants;
- hydrocarbon based surfactants;
- fluorine-free fire fighting foams which us synthetic detergent foams (often used for forestry and high expansion applications), Protein foams (mainly used for training, but also some marine use) and other fluorine free-foams;
- other developing fire fighting foam technologies that avoid use of fluorine; and
- non-PFOS based fluorosurfactants (PFAS-compounds (telomers) with shorther chain length).[22]

In the UK alternatives are supported by firefighting organizations, which in 2005 called for immediate cessation of PFOS use and its safe disposal. It is argued that foams without fluorinated surfactants cannot reach the level of performance obtained with foams containing fluorinated surfactant compounds, however, the Danish EPA report one European foam producer indicating that it produces fluorine-free foams that perform as well during testing as PFOS based foams. The producer indicates that these foams are widely used in Australia, Singapore, New Zealand and other parts of the world. Falck Denmark imports and sells fire-fighting foams to the fire department of Copenhagen (Københavns Brandvæsen). According to Falck Denmark, no fluorinated compounds are present in the fire-fighting foams they import from Germany with all being based on either protein foam or synthetic foam.[23]

The PFOS-free fire-fighting foams used today are unlikely to be free from fluorinated compounds, but are based on PFAS-compounds with C6 or C4 chain length eg dodecafluoro-2-methylpentan-3-one (CF3-CF2-C(=O)-CF(CF3)2).

Metal Plating

There are adequate alternatives for the use of PFOS in the plating industry, which accounts for the highest releases to the environment. The use of PFOS in decorative plating can be substituted by replacing Cr (VI) with Cr (III) with significant operational cost savings after initial one-off costs. In the chromium(III) process no PFOS-chemicals are necessary. For hard chromium platers, the direct substitution of Cr (VI) is not currently a viable option as Cr (III) is not suitable for the deposition of thick chromium layers, as used in hard chrome applications. However, the use of PFOS as a mist suppressant in hard chromium plating and in plating onto plastics is being replaced by mechanical mist suppression options and improved ventilation extraction.[24]
Other chemical substitutes such as the nickel- tungsten-silicon carbide composites are in the research phase, and other substitutes such as electroless nickel coating can be used in specific applications.[25]

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[22] PFOS Dossier 2004. Also see Danish EPA Project no. 1013 2004

[23] Danish EPA Project no. 1013 2004

[24] EUROPEAN PARLIAMENT 2004 -2009 Session document FINAL A6-0251/2006 19.7.2006 REPORT on the proposal for a Directive of the European Parliament and of the Council relating to restrictions on the marketing and use of perfluorooctane sulfonates (amendment of Council Directive 76/769/EEC) Committee of Environment, Public Health & Food Safety

[25] PFOS Dossier 2004

The following are those uses for which a limited time and research driven exemption may be required.

Semiconductors
PFOS is used in the photomicrolithography process to produce semiconductors or similar components of electronic or other miniaturized devices. The PFOS-related compounds are not found in the semiconductor products, but are only used as processing chemicals.

PFOS is used both as a photoacid generator (PAG) to increase the sensitivity of photoresist to allow etching images smaller than wavelength of light and as a anti-reflective coating. This the industry reports results in approximately 54 kilograms of PFOS releases to wastewater stream from critical applications (10% of use) and 297 kilograms from non critical applications.[26] In some limited cases, resist suppliers can formulate chemically amplified resist without PFOS. [27] This is the case with photoresist designed for 248 nm wavelength. It is noted that the semiconductor industry makes many products with 436nm and 365nm photolithography for which further miniaturisation is no longer cost effective. These products do not require PFOS.

However, the semiconductor industry has introduced 193nm photolithography, which is expected to drive the next round of miniaturization, that is, 100nm technology node. This it is argued is not feasible without PFOS and no PFOS-free techniques are available yet.

While the semiconductor industry has committed in its voluntary WSC/SEMI Agreement for PFOS (2006)[28] to end all non critical uses and emissions by May 2007-2009, it does not commit to ceasing all PFOS emissions rather simply to "Evaluate potential PFOS wastewater discharge control technologies" and to "Work towards PFOS substitutes for critical applications" with no time limitations.

An important issue is highlighted by this voluntary commitment, that is, the decision to increase miniaturization based on ongoing use of PFOS is a commercial decision based on the tolerance of governments (and an unaware community) of ongoing PFOS emissions to wastewater and the environment. The suggestion that this use is both critical and essential is clearly open for challenge.

Photographic Industry
In the photographic industry PFOS-related compounds are used in the manufacturing process of film, photo paper and plates. The PFOS-related compounds function as dirt rejecters and friction control agents. Furthermore, they reduce surface tension and static electricity. [29]

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[26] SemiConductor Industry Association/EECA ESIA/SEMI Presentation, " PFOS Management Options: SemiConductor Industry Perspectives, LRTAP POPs Task Force, Tallinn, Estonia, May 29the -June 1st 2006

[27] PFOS Dossier 2004

[28] WSC/SEMI Agreement for PFOS (May 11 2006) Voluntary Semiconductor Industry Commitment

[29] Danish EPA Project no. 1013 2004

Since 2000, PFOS and PFOS related substances have been elimination in the following photographic uses:

- defoamer used in the production of processing chemicals for films, papers, and printing plates;
- photo acid generators in photolithographic processing solutions used in the manufacture of printing plates; and
- surfactants in photolithographic processing solutions used in the manufacture of printing plates. [30]

The PFOS-related compounds have been replaced with alternatives based on telomer products and chemicals with short perfluorinated chains such as C_3 and C_4, as well as non-fluorinated hydrocarbon surfactants and silicones. [31]

It is claimed that there are currently no alternatives to PFOS related substances in the following applications:

- surfactants for mixtures used in coatings applied to films, papers, and printing plates;
- electrostatic charge control agents for mixtures used in coatings applied to films, papers, and printing plates;
- friction control and dirt repellent agent for mixtures used in coatings applied to films papers, and printing plates; and
- adhesion control agents for mixtures used in coatings.[32]

However, with the introduction of digital technology, there has been a significant decline in the market for photography products.[33] According to a Swedish survey, the use of PFOS-related compounds in developers for photo films is no longer relevant. In Denmark between 0.2% and 1.1% of the total use of PFOS-related compounds registered in the Danish Product Register is due to the use of photo developers.[34] The overall amount of PFOS-related substance in film used in the EU is 750 kg per year. [35]

Possible alternatives identified for PFOS use in the photographic industry include:

- hydrocarbon surfactants;
- silicone products;
- telomer-based products; and
- C_3 and C_4 perfluorinated compounds.

Canada has proposed exemptions for the import of semiconductor devices and photographic materials that contain PFOS given that exemptions for the use of PFOS in the process to manufacture these articles has been granted in other jurisdictions,

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[30] PFOS Dossier 2004. Also see D Brooke & A Footitt, ENVIRONMENTAL RISK EVALUATION REPORT: PERFLUOROOCTANESULPHONATE (PFOS) Environment Agency UK 2004

[31] Danish EPA Project no. 1013 2004

[32] UK Stage 4 Final Report, Perfluorooctane Sulphonate: Risk Reduction Strategy and Analysis of Advantages and Drawbacks, RPA in association with BRE Environment, March 2004

[33] PFOS Dossier 2004

[34] Danish EPA Project no. 1013 2004

[35] Brooke & Footitt, UK 2004

including the United Sates and the European Union, and given that alternatives to PFOS for these uses are currently not available. These items are not manufactured in Canada however they are imported into Canada. [36]

Aviation

Hydraulic oils with a content of perfluorinated compounds are used in both civil and military airplanes all over the world. A specific compound is used in the hydraulic oil – the potassium salt of perfluoroethyl cyclohexyl sulfonate (CAS-no. 67584-42-3). Per definition, this compound is not a PFOS-related compound, but is a part of the large PFAS group (perfluoroalkyl substances). The total global market for fluorinated compounds in aircraft hydraulic fluids is about 2.2 tonnes per year.

As yet, no alternatives have been identified. However, a change in the formulation of the hydraulic oils seems to be an alternative solution. This would require comprehensive testing and approval from the airplane manufacturers, which may take as long as 10 year.[37] This could be accommodated with a time and conditions based exemption to the listing of PFOS on Annex A.

Assessing alternatives

The Danish EPA Review of alternatives finds that substitutes are available for many PFOS applications at relatively low extra cost. The substitution of alternatives for POPs provokes a deeper question about methods to evaluate and compare the hazards of various substances.

For an overarching approach to the topic of alternatives assessment, the Lowell Center for Sustainable Production has developed an Alternatives Assessment Framework with the goal of, “Creating an open source framework for the relatively quick assessment of safer and more socially just alternatives to chemicals, materials, and products of concern.” [38] The Framework discusses goals, guiding principles, decision making rules, comparative and design assessment, and types of evaluation. Since the Framework is designed to be an open source tool, the Lowell Center encourages companies, NGOs, and governments to use, adapt, and expand on it.

(ii) Technical feasibility

All the alternatives described above are technically feasible and have been used in commercial applications.

(iii) Costs, including environmental and health costs

(iv) Efficacy

(v) Availability

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[36] Danish EPA Project no. 1013 2004

[37] Danish EPA Project no. 1013 2004 Also see D Brooke & A Footitt, ENVIRONMENTAL RISK EVALUATION REPORT: PERFLUOROOCTANESULPHONATE (PFOS) Environment Agency UK 2004

[38] Rossi M, Tickner J, Geiser K. Alternatives Assessment Framework, Lowell Center for Sustainable Production, Version 1.0, July 2006
http://www.chemicalspolicy.org/downloads/FinalAltsAssess06_000.pdf

Many of the alternatives described here are available since many are already in commercial use.

(vi) Accessibility

Many of the alternatives described here are accessible since many are already in commercial use.

Explanatory notes:
7. Provide a brief description of the alternative product or process and, if appropriate, the sector(s), use(s) or user(s) for which it would be relevant.
8. If several alternatives could be envisaged for the chemical under consideration, including non-chemical alternatives, provide information under this section for each alternative.
9. Specify for each proposed alternative whether it has actually been implemented (and give details), whether it has only reached the trial stage (again, with details) or whether it is just a proposal.
10. The evaluation of the efficacy should include any information on the performance, benefits, costs, and limitations of potential alternatives.
11. Specify if the information provided is connected to the specific needs and circumstances of developing countries.
12. The evaluation of the risk of the alternative should include any information on whether the proposed alternative has been thoroughly tested or evaluated in order to avoid inadvertently increasing risks to human health and the environment. The evaluation should include any information on potential risks associated with untested alternatives and any increased risk over the life-cycle of the alternative, including manufacture, distribution, use, maintenance and disposal.
13. If the alternative has not been tried or tested, information on projected impacts may also be useful.
14.Information or comments on improving the availability and accessibility of alternatives may also be useful.

C. Positive and/or negative impacts on society of implementing possible control measures (provide summary information and relevant references):

(i) Health, including public, environmental and occupational health

The elimination of the production, use, export, and import of PFOS and PFOS related substances through a listing in Annex A of the Stockholm Convention would positively impact human health and the environment by decreasing emissions of a substance that warrants global action. As outlined in the Risk Profile, PFOS has widely contaminated the environment including humans and food and displays reproductive toxicity. The positive impact may be greatest for vulnerable groups such as pregnant women, embryos and infants due to the reproductive toxicity of PFOS. If PFOS production and use is not eliminated, then levels in the environment including humans and animals will continue to rise, even in locations distant from production and use.

(ii) Agriculture, including aquaculture and forestry

(iii) Biota (biodiversity)

As stated in the PFOS Risk Profile, higher trophic level mammals may be at risk at current environmental concentrations of PFOS. As PFOS has no known metabolic pathways, PFOS contamination has the potential to have an immediate or long-term harmful effect on the environment and its biodiversity.

(iv) Economic aspects

(v) Movement towards sustainable development

Reduction and elimination of PFOS is consistent with sustainable development plans that seek to reduce emissions of toxic chemicals. A relevant global plan is the Strategic Approach to International Chemicals Management (SAICM) that emerged from the World Summit on Sustainable Development.[39] Over 100 health and environment ministers agreed to the SAICM, which was adopted at a high-level meeting in Dubai in February 2006.[40] SAICM makes the essential link between chemical safety, sustainable development, and poverty reduction.[41] The Global Plan of Action of SAICM contains specific measures to support risk reduction that include prioritizing safe and effective alternatives for persistent, bioaccumulative, and toxic substances. The Overarching Policy Strategy of SAICM includes POPs as a class of chemicals to be prioritized for halting production and use and substitution with safer substitutes.

(vi) Social costs

Explanatory notes:
15. Socio-economic considerations could include:

- Any information on the impact (if any), costs and benefits to the local, national and regional economy, including the manufacturing sector and industrial and other users (e.g., capital costs and benefits associated with the transition to the alternatives); and impacts on agriculture and forestry;
- Any information on the impact (if any) on the wider society, associated with the transition to alternatives, including the negative and positive impacts on public, environmental, and occupational health. Consideration should also be given to the positive and negative impacts on the natural environment and biodiversity.
- Information should be provided on how control measures fit within national sustainable development strategies and plans.

D. Waste and disposal implications (in particular, obsolete stocks of pesticides and clean-up of contaminated sites) (provide summary information and relevant references):

The large use of PFOS in consumer products has implications for municipal waste and disposal along with attention to production stockpiles. A listing of PFOS in Annex A would subject wastes products or articles containing the substance to Article 6 of the Stockholm Convention and require that they be disposed, "…in a safe, efficient and environmentally sound manner." [42]

(i) Technical feasibility

(ii) Costs

Explanatory note:
16. Specify if the information provided is connected to the specific needs and circumstances of developing countries.

E. Access to information and public education (provide summary information and relevant references):

[39] http://www.chem.unep.ch/saicm/
[40] UNEP Press Release, New Global Chemicals Strategy Given Green Light by Governments, 7 February 2006 http://www.chem.unep.ch/saicm/iccm_sec.htm
[41] http://www.chem.unep.ch/saicm/SAICM%20texts/SAICM%20documents.htm
[42] Stockholm Convention on Persistent Organic Pollutants, Article 6

Explanatory note:
17. Please provide details here of access to information and public education with respect to both control measures and alternatives.

F. Status of control and monitoring capacity (provide summary information and relevant references):

Listing PFOS in Annex A would be the most cost effective option in countries that lack the needed infrastructure to adequately monitor production and uses of PFOS. Monitoring may require extensive resources and infrastructure that the country does not have.

Explanatory note:
18. With regard to control capacity, the information required is on legislative and institutional frameworks for the chemical under consideration and their enforcement. With regard to monitoring capacity, the information required is on the technical and institutional infrastructure for the environmental monitoring and biomonitoring of the chemical under consideration, not monitoring capacity for alternatives.

G. Any national or regional control actions already taken, including information on alternatives, and other relevant risk management information:

Prohibitions

Explanatory notes:
19. Actions or measures taken could include prohibitions, phase-outs, restrictions, cleanup of contaminated sites, waste disposal, economic incentives, and other non-legally binding initiatives.
20. Information could include details on whether these control actions have been cost-effective in providing the desired benefits and have had a measurable impact on reducing levels in the environment and contributed to risk reduction.

H. Other relevant information for the risk management evaluation:

Explanatory notes:
21. The above list of items is only indicative. Any other relevant information for the risk management evaluation should also be provided.

I. Other information requested by the POPRC: