NATIONAL TOXICS NETWORK

NATIONAL TOXICS NETWORK INC.
Australian IPEN Focal Group
International POPs Elimination Network
PO Box 173 Bangalow 2479 NSW Australia
ABN 61 118 160 280
Phone/Fax (Int) 612 66871900
http://www.oztoxics.org

OECD Workshop on PFCA and Precursors
Stockholm, November 2006

Abstract

Perfluorocarboxylic acids (PFCAs) and Precursors
- why international action is needed.

At the International Conference on Chemical Management in Dubai 2006, the international community endorsed the Strategic Approach to International Chemical Management. Building on this, the International POPs Elimination Network released its declaration for a Toxic Free Future. We committed *"to work for and achieve by the year 2020, a Toxics-Free Future, in which all chemicals are produced and used in ways that eliminate significant adverse effects on human health and the environment,"* and most importantly, *"where persistent organic pollutants (POPs) and chemicals of equivalent concern no longer pollute our local and global environments, and no longer contaminate our communities, our food, our bodies, or the bodies of our children and future generations."*

It is against these commitments we evaluate the assessment, use, management and final destruction of the perfluorocarboxylic acids (PFCAs) and their precursors. PFCAs' persistency and long-range transport via precursors has meant they are now widespread throughout the environment and in wildlife, far from sources of production. PFCAs are found in human blood demonstrating their potential for bioaccumulation and the increasing concentrations of long chain PFCAs, particularly in wildlife high on the foodchain strongly suggest biomagnification. The evidence that the levels of some

PFCAs have been doubling every 5 to 8 years in the highly vulnerable polar bear population is of major concern.

While for some PFCAs, there are known adverse health impacts, for example, perfluorooctanoate (PFOA) has shown to be tumourigenic and immunotoxic in laboratory animals, however for others, there is no toxicological or ecotox data available.

This lack of information highlights the four critical components of 'world's best practice' chemical regulatory policy; *'Precautionary Principle, No data - No market, Right to Know* and the *Substitution Principle.* This paper will review the PFCAs against these criteria.

As some of the PFCAs have already been found to exhibit the properties of persistent organic pollutants (POPs), the need for precaution and prevention is paramount, as is civil society's right to know. We consider that activities to identify substitutes for essential uses should be a requirement of their use and proactively supported.

PFCAs via their precursors are *"Poisons without Passports"* with no respect for territorial borders. Countries or even regions alone cannot respond effectively. PFCAs and their precursors, like their sister chemical perfluorooctanesulfonate (PFOS) need priority global action under the Stockholm Convention on Persistent Organic Pollutants 2001.

Introduction

The International POPs Elimination Network consists of over 400 organisations from 70 countries. Our aim is defined by our declaration for a Toxic Free Future. We share the 2020 goal developed by the World Summit on Sustainable Development (WSSD) which was reaffirmed through the SAICM process. We envisage a world where *persistent organic pollutants (POPs) and chemicals of equivalent concern no longer pollute our local and global environments, and no longer contaminate our communities, our food, our bodies, or the bodies of our children and future generations."*

We advocate four main principles of chemicals' policy reform to be applied in all chemical management activities; *Right to Know, No data - No market, Precautionary Principle* and the S*ubstitution Principle.* Using these principles, we assess the perfluorocarboxylic acids (PFCAs) and their precursors in their production, use, and final disposal stage.

While much uncertainty surrounds the transport and impacts of the perfluorocarboxylic acids (PFCAs) and their precursors, environment non government organizations

(ENGOs) are already acutely aware of the link between chemical pollution and climate change. ENGOs have focused on the emissions of greenhouse gases from thermolysis of fluorinated polymers in industrial and consumer high-temperature applications. They heed the warning that continued use of fluoropolymers may exacerbate stratospheric ozone-depletion and global warming. [1]

By addressing the PFCAs in the framework of the four chemical management principles, stakeholders are able to help promote environmentally and socially sound chemicals management. This helps achieve not only the WSSD/SAICM 2020 goal but also ensuring that :

- the responsibility for chemical information and safety sits at top of the supply chain;
- stakeholders are able to access information from industry, government and international bodies, eg, OECD, HPV, SIDS;
- there is a reduction in the regulatory burden for developing and transitional countries as they don't have to manage or monitor toxic and or persistent chemicals;
- civil society avoids the costs of destruction and remediation of unwanted stockpiles;
- clean technology is facilitated and promoted; and
- the most problematic chemicals are removed from circulation.

The Right to Know Principle

Currently, it is very difficult for members of the public to ascertain which products have been manufactured or treated post production using PFCAs. This and the lack of adequate labeling has left many interested members of civil society disenfranchised, unable to participate in the discussion over PFCAs policy options and most importantly, unable to make informed consumer choices.

R*ight to know* is an essential principle of chemical management. It was enshrined in Agenda 21 and reiterated in the 'Bahia Declaration on Chemical Safety' at Forum III Intergovernmental Forum on Chemical Safety (IFCS) (Bahia, Brazil 2000) The declaration affirmed that an informed public is vital for effective chemical management and called on all governments to not only increase access to information in chemicals, but to recognise the community's right-to-know about chemicals in the environment and to recognise the community's right to participate meaningfully in decisions about chemical safety that affect them.

Right-to-know is called for in the Strategic Approach to International Chemical Management (SAICM) in order to ensure information about chemicals throughout their

[1] Ellis, D.A., Maybury, SA., Martin, JW & Muir, DC., 2001 Thermolysis of fluoropolymers as a potential source of halogenated organic acids in the Environment. *Nature* 412(6844):19-26.

life cycle, including chemicals in products, is available to all stakeholders. Information should be accessible, user friendly, adequate and appropriate to their needs.
Based on the SAICM Overarching Policy Strategy, appropriate information should encompass PFCA's effects on human health and the environment, their intrinsic properties, potential uses, protective measures and relevant regulations,[2] stressing that in this context, information relating to the health and safety of humans and the environment should not be regarded as confidential.[3] A further SAICM objective is to ensure that the available information is sufficient to adequately assess and manage chemicals safely throughout their life cycle.[4] This includes making available information on chemicals in products to all stakeholders.

Fluorotelomers are now used in a wide range of consumer products, including soil, stain and grease resistant coatings for carpets, textiles, leather, paper, including fast food packaging. They are also used in personal care and cleaning product, inks, paints and coatings, protection for stones and tiles, and in fire fighting foams. PFCAs use in the manufacture of fluoropolymers, which are in turn used to make products such as non stick coatings for cookware, architectural fabrics, chemical processing piping and vessels, automotive fuel systems, telecommunications and electronic wiring insulation and computer chip processing equipment, has meant that PFCAs have crept into every aspect of our lives.

Yet, their potential for release and their ultimate sinks remain largely unknown to civil society. While consumers may appreciate their properties such as fire resistance and oil, stain, grease, and water repellency, they remain unaware that residual unreacted intermediates can be left in commercial fluorotelomer based substances.[5] Consumers are also unaware that the majority of fluorochemicals used in carpet treatments will be released over the average carpet lifetime of nine years with large quantities escaping through general traffic, vacuuming and steam cleaning. These emissions contaminate air and importantly, wastewater streams, much of which is now either reused or recycled for drinking water. The fact that the washing of treated textiles releases the majority of fluorochemicals to wastewater over the garment's lifetime, would interest many conscientious individuals saving washing water for organic home gardens. The failure to provide adequate information also extends to the lack of data for total releases to soil, surface water and groundwater from the disposal in landfill of PFCA treated products such as rugs and carpets, furniture, fabrics, leather, paper packaging, construction waste and aerosol cans.

---

[2] SAICM Overarching Policy Strategy, para 15 (b) (i)
[3] SAICM Overarching Policy Strategy, para 15 (c)
[4] SAICM Overarching Policy Strategy, para 15 (a)
[5] See Environment Canada, National Office of Polution Prevention, Action Plan on Perfluorocarboxylic Acids and Precursors Available at < http://www.ec.gc.ca/nopp/DOCS/consult/PFCA/EN/actionPlan.cfm> *"Two of the four polymers (NSN# 12763 and NSN# 12798) are reported to contain residuals of up to 2% (data submitted by the notifier), some of which may be unreacted FTOH. No residuals were reported in the polymer NSN# 12863, however based on similar polymers some residual unreacted FTOH is probable. Release of all of this residual FTOH from the polymers is expected to occur over a relatively short period of time following application. For the substances notified under NSN# 13211 and 13395, the residual fluorinated starting materials, and intermediates and by-products are on the order of 3000 ppm (total) on a dry weight basis of polymer."*

The failure to implement right to know principles was epitomized in the unlabelled use of fluorotelomer chemicals in food packaging. While there had been growing concerns about the migration into food of persistent chemicals used in their packaging, manufacturers did not see fit to investigate and ensure fluorotelomer were not able to contaminated packaged foods. The study published by the U.S. Food and Drug Administration (FDA) in October 2005 demonstrated that the microwave popcorn bags had up to 4000 milligrams per kilogram (mg/kg) in the coating and could result in the serious contamination of the food contents, accounting for more than 20% of the average PFOA levels now measured in the blood of U.S. residents.[6]

Despite PFCAs being used in a very wide range of consumer products, civil society has been kept in the dark regarding their use, they impacts, their disposal and the threats they pose to vulnerable wildlife. Most importantly, people remain uninformed of the potential for their own contamination with perfluorochemicals or that of their children.

No Data, No Market

Related to the 'right to know' principle is that of 'no data, no market'. The current lack of information on the releases and impacts of PFCAs demonstrates the urgent need to apply this approach. "No data, no market' approach requires hazard, use and exposure data to be produced for all chemicals on the market and in products. The data must be sufficient to permit an informed evaluation of the safety of the chemical for human health and the environment. It is only when this is implemented, will there be sufficient information to ensure chemicals are adequately assessed and managed safely through their life cycle as defined by SAICM.

In the absence of data, many assumptions have been made for the PFCAs particularly for the longer chain PFCAs (>C9) as there are concerns over slower clearance rates from organisms and higher bioaccumulation potential. Studies are also required to investigate the degradation of fluorotelomer based substances and the liberation of fluorotelomer intermediates, as well as, biodegradation and atmospheric oxidation pathways.

The Canadian Action Plan for Perfluorocarboxylic Acids and Precursors, suggest that longer chain PFCAs exhibit properties of persistent organic pollutants (POPs) as there is evidence they are persistent, bioaccumulative, widespread throughout Arctic biota and based on data for PFOA, associated with adverse effects in laboratory animals.[7]

The Precautionary Principle

Clearly for civil society, this finding of the POPs properties of persistency, long range transport, bioaccumulation, and toxicity, combined with the many existing datagaps and

[6] *Science News* – November 16, 2005, "It's in the microwave popcorn, not the Teflon pan", Available at http://pubs.acs.org/journals/esthag/index.html
[7] Environment Canada, National Office of Pollution Prevention, Action Plan *for Assessment and Management* on Perfluorocarboxylic Acids and Precursors. Available at < http://www.ec.gc.ca/nopp/DOCS/consult/PFCA/EN/actionPlan.cfm**>**

the detection of these chemicals in remote and vulnerable wildlife should compel governments and industry to a take a precautionary approach.

Precaution needs to be based on a preventative and remedial approach rather than a risk management approach. It should consider the interest of following generations and achieve intergenerational equity by taking into account the effects of chemicals-related decisions on future generations, noting that many chemicals like the perfluorochemicals persist in the environment for generations, and may either singularly, or in combination disrupt the healthy development of the next generation of humans and wildlife.

POPs Properties - Toxicity

While the toxicity of the PFCAs class of chemical is still largely unknown, PFOA has shown to have serious toxic effects. Labeled a "likely carcinogen" by the U.S. Environmental Protection Agency's Science Advisory Board, laboratory, experiments have shown that PFOA causes liver, testicular and pancreatic tumours in rats,[8] is immunotoxic in mice and a reproductive toxin in rats, causing increased mortality of rat pups. Japanese research had shown that PFOA can also alter the expression of over 500 genes, [9] while Chinese researchers investigating the genotoxic potential of PFOA in human liver cells (hepatoma HepG2 cells) in culture have demonstrated that PFOA exerts genotoxic effects on these cells, probably through oxidative DNA damage.[10] Nevertheless, there remains considerable uncertainty about the full impacts of PFCAs with some suggestions that intermediate breakdown products may be much more toxic to some forms of aquatic life than the degradation products.[11]

In reports of recent research, there is indication that some PFCAs inhibit the activity of the 'efflux transporters' that serve as a first line of cellular defense against xenobiotics in marine mussels. Since these 'efflux transporters' also exist in mammals, the study raises questions about the long-term consequences of exposure to these PFCAs [12].

POPs Properties - Bioaccumulation

PFCAs have been detected in human blood, [13] while PFOAs are known to cross the placenta and are regularly detected in breast milk and human blood.[14] The USEPA's

---

[8] PRELIMINARY RISK ASSESSMENT OF THE DEVELOPMENTAL TOXICITY ASSOCIATED WITH EXPOSURE TO PERFLUOROOCTANOIC ACID AND ITS SALTS, U.S. Environmental Protection Agency Office of Pollution Prevention and Toxics Risk Assessment Division, April 10, 2003

[9] Guruge KS, Yeung LW, Yamanaka N, Miyazaki S, Lam PK, Giesy JP, Jones PD, Yamashita N., Gene Expression Profiles in Rat Liver Treated With Perfluorooctanoic Acid (PFOA). *Toxicol Sci*. 2005 Oct 12; [Epub ahead of print]

[10] Yao X. & Zhong L., Genotoxic risk and oxidative DNA damage in HepG2 cells exposed to perfluorooctanoic acid. *Mutation Research/Genetic Toxicology and Environmental Mutagenesis* Volume 587, Issues 1-2 , 10 November 2005, Pages 38-44

[11] *Science News* – September 21, 2005, "Fluorinated compounds in the environment: More than PFOA"; The intermediate fluorotelomer carboxylic acids, which partition into water, are four orders of magnitude more toxic to the water flea (Daphnia magna) than PFCAs such as PFOA. While there are no studies on the toxicity of metabolites/precursors in mammals, it was stated the toxicity of the fluorotelomer aldehydes, an intermediate between FTOHs and PFCAs is 10,000 times more toxic to Daphnia magna than the C10 PFCA.

[12] Ibid

[13] DeSilva, A.O, S.A. Mabury. 2006. Isomer Distribution of Perfluorinatedcarboxylates in Human Blood – Potential Correlation to Source. *Environ. Sci. Technol.*

review of PFOA determined that the estimated exposure range for humans, based on rat studies, had already overlapped what the USEPA deem as unacceptable for toxic substances. [15]

PFCAs are now widespread in Arctic wildlife. They accumulate in the blood and liver of wildlife and in dolphins, have been shown to partition to liver, kidney and blood, and in polar bears, to liver. [16] Mammals feeding at higher trophic levels have greater concentrations of PFCAs than those at lower positions. PFOA or precursors have also been found in birds[17], fish,[18] other marine wildlife [19] including dolphins and turtles.[20]

Biomagnification factors (BMF) indicate that long-chain PFCAs can biomagnify through this marine food web and concentrations may increase by several factors between predator and prey. Long-chain PFCAs have been found to biomagnify in the bottlenose dolphin food web [21] and there is data confirming a trend of increasing concentrations of long chain PFCAs in Arctic biota feeding high on the foodchain (e.g. polar bears, seals), further suggesting biomagnification. Most worrying, is the evidence that for some PFCAs (C9 and C10), the concentrations found in the highly vulnerable polar bears have been doubling every 5 to 8 years.

---

[14] Leo W. Y. Yeung, M. K. So, Guibin Jiang, Taniyasu, N. Yamashita, Maoyong Song, Yongning Wu, Jingguang Li, J. P. Giesy, K. S. Guruge, and Paul K. S. Lam, Perfluorooctanesulfonate and Related Fluorochemicals in Human Blood Samples from China. *Environ. Sci. Technol.,* Web Release Date: December 24, 2005; Calafat AM, Needham LL, Kuklenyik Z, Reidy JA, Tully JS, Aguilar-Villalobos M, Naeher LP., Perfluorinated chemicals in selected residents of the American continent. *Chemosphere*. 2005 Oct 4; Geary W. Olsen, Han-Yao Huang, Kathy J. Helzlsouer, Kristen J. Hansen, John L. Butenhoff and Jeffrey H. Mandel., Historical Comparison of Perfluorooctanesulfonate, Perfluorooctanoate, and Other Fluorochemicals in Human Blood. *Environ Health Perspect* 113:539–545 (2005); Koichi Inoue, Fumio Okada, Rie Ito, Shizue Kato, Seiko Sasaki, Sonomi Nakajima, Akiko Uno, Yasuaki Saijo, Fumihiro Sata, Yoshihiro Yoshimura, Reiko Kishi, and Hiroyuki Nakazawa, Perfluorooctane Sulfonate (PFOS) and Related Perfluorinated Compounds in Human Maternal and Cord Blood Samples: Assessment of PFOS Exposure in a Susceptible Population during Pregnancy. *Health Perspect* 112:1204–1207 (2004); Cariton Kubwabo, Natalia Vais and Frank M. Benoit, A pilot study on the determination of perfluorooctanesulfonate and other perfluorinated compounds in blood of Canadians. *Journal of Environmental Monitoring*, 2004, 6(6), 540 – 545.; Guruge KS, Taniyasu S, Yamashita N, Wijeratna S, Mohotti KM, Seneviratne HR, Kannan K, Yamanaka N, Miyazaki S., Perfluorinated organic compounds in human blood serum and seminal plasma: a study of urban and rural tea worker populations in Sri Lanka. *J Environ Monit*. 2005 Apr;7(4):371-7; Anna Kärrman, Jochen F Mueller, Fiona Harden, Leisa-Maree L Toms, Bert van Bavel, Gunilla Lindström. 2005 Perfluorinated compounds in serum from Australian urban and rural regions. *EMG - Fluorinated Compounds*

[15] PRELIMINARY RISK ASSESSMENT OF THE DEVELOPMENTAL TOXICITY ASSOCIATED WITH EXPOSURE TO PERFLUOROOCTANOIC ACID AND ITS SALTS, U.S. Environmental Protection Agency Office of Pollution Prevention and Toxics Risk Assessment Division, April 10, 2003

[16] Magali Houde, Trevor A.D. Bujas, Jeff Small, Randall S. Wells, Patricia A. Fair, Gregory D. Bossart , Keith R. Solomon, & Derak C.G.Muir, (2006) Biomagnification of Perfluoroalkyl Compounds in the Bottlenose Dolphin (*Tursiops truncatus*) Food Web, *Environmental Science & Technology,* Vol. 40, No. 13, pp4138- 4141;

[17] Verreault J, Houde M, Gabrielsen GW, Berger U, Haukas M, Letcher RJ, Muir DC., Perfluorinated alkyl substances in plasma, liver, brain, and eggs of glaucous gulls (Larus hyperboreus) from the Norwegian arctic. *Environ Sci Technol.* 2005 Oct 1;39(19):7439-45

[18] Jesus Olivero-Verbel, Lin Tao, Boris Johnson-Restrepo, Jorge Guette-Fernández, Rosa Baldiris-Avila, Indira O'byrne-Hoyos and Kurunthachalam Kannan., Perfluorooctanesulfonate and related fluorochemicals in biological samples from the north coast of Colombia. *Environmental Pollution*, Article in Press.

[19] Gregg T. Tomy, Wes Budakowski, Thor Halldorson, Paul A. Helm, Gary A. Stern, Ken Friesen, Karen Pepper, Sheryl A. Tittlemier and Aaron T. Fisk, Fluorinated Organic Compounds in an Eastern Arctic Marine Food Web, *Environ. Sci. Technol.,* 38 (24), 6475 -6481, 2004

[20] Houde M, Wells RS, Fair PA, Bossart GD, Hohn AA, Rowles TK, Sweeney JC, Solomon KR, Muir DC., Polyfluoroalkyl compounds in free-ranging bottlenose dolphins (Tursiops truncatus) from the Gulf of Mexico and the Atlantic Ocean. *Environ Sci Technol*. 2005 Sep 1;39(17):6591-8.; Jennifer M. Keller, Kurunthachalam Kannan, Sachi Taniyasu, Nobuyoshi Yamashita, Rusty D. Day, Michael D. Arendt, Al L. Segars and John R. Kucklick, Perfluorinated Compounds in the Plasma of Loggerhead and Kemp's Ridley Sea Turtles from the Southeastern Coast of the United States. *Environ. Sci. Technol.,* 39 (23), 9101 -9108, 2005

[21] Houde et al 2006. Also see by Martin, J. W.; Whittle, D. M.; Muir, D. C. G.; Mabury, S. A. Perfluoroalkyl contaminants in a food web from Lake Ontario.*Environ. Sci. Technol.* 2004, *38*, 5379-5385.

While manufacturers claim that "there are no human health effects known to be caused by PFOA," (Dupont May 2006), there is sufficient evidence to demonstrate the potential hazards of these substances to the environment, wildlife and human population. There is also evidence to suggest that the class of perfluorinated substances may demonstrate similar if not the same modes of actions, sites of toxic action, unique mode of bioaccumulation and modes of environmental transport. The need for an assessment of accumulative impacts is clearly evident.

POPs Properties – Persistency and Long Range transport

A further cause for precaution is the persistency of the PFCAs and their potential for long-range transport via precursors. The evidence gathered on the four fluorotelomer based substances targeted by Canada demonstrate that the formation of breakdown products occur at various stages in the lifecycle of the production and product life span. Given the vapour pressure and the estimated atmospheric lifetime, fluorotelomer based substances have the potential to undergo long range atmospheric transport to remote regions. Atmospheric degradation of the fluorotelomer alcohols, the volatile precursors to the perfluorocarboxylates can explain the presence of long-chain perfluorocarboxylic acids, including PFOA in Arctic animals far from the original source. The degree of conversion of fluorotelomer alcohols to PFCAs appears dependent upon NOx levels. The detection of high perfluorochemical concentrations in waste water treatment plant effluent suggests that these facilities are also sources of environmental contamination in the receiving waters. Studies focusing on PFOA suggest that there are no ready environmental degradation mechanism (eg hydrolysis, photolysis, or biodegradation.). PFOA has been detected in surface water, [22] oceans,[23] ambient air [24] and household dust.[25]

The current weight of evidence of the persistence, bioaccumulation and long range transport of PFCAs requires regulators and industry to take action now to cease the production and use of long chain PFCAs, before overwhelming evidence of toxicity is available. Children are already exposed to these substances and as industry finds more and more commercial uses for these long lived chemicals, their exposure can only increase. There has been no investigation into exposure levels of our vulnerable human sub population yet preventative and precautionary action is clearly called for.

The SAICM recognizes the need to identify those chemicals and uses which pose unreasonable and unmanageable risks. The SAICM Overarching Policy Strategy (OPS) identifies groups of priority chemicals including the persistent, bioaccumulative and toxic

---

[22] Bryan Boulanger, John Vargo, Jerald L. Schnoor, and Keri C. Hornbuckle, Detection of Perfluorooctane Surfactants in Great Lakes Water. *Environ. Sci. Technol.,* 38 (15),4064 -4070, 2004

[23] Yamashita N, Kannan K, Taniyasu S, Horii Y, Petrick G, Gamo T., A global survey of perfluorinated acids in oceans. (National Institute of Advanced Industrial Science and Technology, Japan) *Mar Pollut Bull*. 2005 May 20; [Epub ahead of print]

[24] Barber, J, Berger, U, Jones, K, A study of fluorinated alkyl compounds in European air samples. SEATAC 2005. Available at http://abstracts.co.allenpress.com/pweb/setac2005

[25] Kubwabo C, Stewart B, Zhu J, Marro L., Occurrence of perfluorosulfonates and other perfluorochemicals in dust from selected homes in the city of Ottawa, Canada. *J Environ Monit*. 2005;7(11):1074-1078.

substances (PBTs); very persistent and very bioaccumulative substances; chemicals that are carcinogens or mutagens or that adversely affect the reproductive, endocrine, immune or nervous systems; persistent organic pollutants (POPs), mercury and other chemicals of global concern; chemicals produced or used in high volumes; those subject to widespread dispersive uses; and other chemicals of concern at the national level.[26] Many of these criteria apply to the PFCAs and their precursors, urging governments and industry to actively pursue alternatives and substitutes.

The Substitution Principle

The 'substitution principle' calls for the replacement of hazardous substances of concern by suitable alternative substances or technologies. SAICM acknowledges substitution is necessary to ensure full implementation of the SAICM *Risk Reduction* objectives.[27] The term "risk reduction" is defined in the OPS to include preventing, reducing, remediating, minimizing and eliminating risks. [28] SAICM calls for the acceleration of the development of safer alternatives or substitutes and for affordable sustainable technologies.[29] Substitution is also an aim of the EU program, REACH (Registration, Evaluation, Authorisation of Chemicals) for some hazardous chemicals.[30] However, Norway's domestic legislation goes even further and requires that if an enterprise finds it can replace a hazardous substance with a less hazardous alternative, it must use the substitute providing this does not cause unreasonable cost or inconvenience.[31]

Currently there are a few referenced efforts to identify and promote alternatives to fluorotelomer based substances and PFCAs, other than the European research program called PERFORCE. This project aims to facilitate the development of "an ecologically sound chemical replacement policy." Canadian NGOs have called on their Government to include a comprehensive section in their Action Plan promoting alternatives to PFCAs.

They list various tools, Canada has at its disposal to promote alternatives including the use of extended producers responsibility programs to address safe disposal methods for products containing PFCAs and percurors and labelling requirements targetting retailers and manufacturers of fluorotelomer based substances.

The use of extended producers' responsibility programs can provide incentives to industry to identify safe alternatives to fluorotelomer based substances or PFCAs. While some work is reported in the development of techniques to reduce fluorotelomer "residuals" in products, the elimination of "residuals" will not fully address the potential exposure pathway of emissions of PFCA precursors resulting from the degradation of fluorotelomer based substances.

[26] Footnote to SAICM Overarching Policy Strategy, para 14 (d)
[27] Especially SAICM Overarching Policy Strategy, paragraph 14 (d)(i)
[28] SAICM Overarching Policy Strategy, para 7.
[29] SAICM Overarching Policy Strategy, para 7 (d)
[30] See REACH legislation, Council of Europe, cited above, especially paragraph 65 of its preamble
[31] See: Norway Product Control Act, § 3a – requirement to apply the substitution principle: http://www.environment.no/templates/PageWithRightListing____2823.aspx

When assessing alternatives, the complete life cycle including disposal and destruction options must be taken into consideration. At a minimum, alternatives should not be carcinogenic, mutagenic, genotoxic, persistent, bioacumulative, neurotoxic, developmental and reproductive toxicant or a respiratory toxicant. While there has been some suggestions that alternatives could include short chain lengths of PFCAs as these are suspected of having different persistence and bioaccumulation, this may limit incentives to consider the full range of safer alternatives to PFCAs.

Conclusion

As ENGOS, we view the growing PFCA contamination of humans, biota and the global commons as a significant threat to the viability of already at risk, wildlife populations. We see the failure of governments and industry to provide adequate information to civil society on the persistence and suspected impacts of the PCFAs as one of the causal factors of the continued use of substances that in fact fulfill all the criteria of a persistent organic pollutant (POP). As such we argue that these are intergenerational contaminants, which cannot be adequately managed and therefore should be the target of a proactive precautionary approach.

For many in civil society the choice between stain resistance and the survival of sentinel species is clear. For others, they simply argue that our most vulnerable members of society, our children deserve safe products and a safe environment. PFCAs via their precursors are clearly *"Poisons without Passports",* showing no respect for territorial borders. Countries or even regions, alone cannot respond effectively. PFCAs and their precursors need priority global action under the Stockholm Convention on Persistent Organic Pollutants 2001.

What To Do

In order to protect our environment and all that live in it, governments and industry should take the following actions.

Governments must:

- work with other governments to nominate and support nomination of PFOA and the PFCAs as candidate chemicals for inclusion in the Stockholm Convention on POPs;
- immediately ban PFOA and any industrial chemicals that break down to PFOA or PFCAs in the environment or the human body;
- review all remaining perfluorochemicals and require the phase-out of those that are persistent or that break down into persistent perfluorochemicals;
- fully assess human health risks across the family of perfluorochemicals, considering the combined health effects of chemicals that exhibit common health harm and modes of action; and

- conduct long-term biomonitoring of perfluorochemicals in human blood and wildlife to assess trends in exposure.

Industry must:

- immediately phase out the use of PFOA and chemicals that break down to PFOA or PFCAs in the environment or the human body, including uses in Teflon, Stainmaster, and Zonyl paper protection products;
- develop and make public, analytical methods to detect all perfluorochemicals in the human body, and assist with biomonitoring studies;
- disclose the breakdown products and environmental persistence of all perfluorochemicals, including perfluoro- and polyfluoro- polymer and discontinue the manufacture of those that are persistent;
- fully disclose the perfluorochemicals ingredients of their products to the public; and
- be required to prove the safety of a new chemical before it is put on the market.

What Can The Community and Individuals Do?

- phase out or replace the use of Teflon and other non-stick cookware and equipment that is heated in your home and return your non stick cookware to the place of purchase. If this is not possible, organise/join with others to return it to known manufacturers, sellers or the regulators;
- when purchasing furniture or carpet, decline optional treatments for stain and dirt resistance, and find products that have not been pre-treated with chemicals by questioning the retailers;
- avoid buying clothing that has been coated for water, stain, or dirt repellency;
- minimise packaged food and greasy fast foods in your diet. These can be held in containers that are coated with perfluorochemicals to keep grease from soaking through the packaging; and
- avoid buying cosmetics and other personal care products with the phrase "fluoro" or "perfluoro" on the ingredient list. Among products that might contain perfluorochemicals are lotions, pressed powders, nail polish, and shaving cream.

Contact:

Dr Mariann Lloyd-Smith PhD (Law)
CoChair, International POPs Elimination Network
Senior Advisor, National Toxics Network Inc.
12 Craig St., East Ballina
New South Wales 2478 Australia
Tel : (612) 66815340
Mobile 0413 621557
Email: biomap@oztoxics.org
http://www.oztoxics.org