NGO comments on Draft Screening Assessment & Risk Management Scope Documents for Perfluorooctanoic Acid (PFOA), its Salts, and its Precursors, and Long-Chain (C9-C20) Perfluorocarboxylic Acids (PFCAs), their Salts, and their Precursors: A Response to *Canada Gazette Part I, Vol. 144, No. 44* — October 30, 2010

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Introduction

The Canadian Environmental Law Association (CELA) and Chemical Sensitivities Manitoba (CSM) are submitting the following comments in response to the *Canada Gazette,* Part I, Vol. 144, No. 44 – October 30, 2010 release of the draft screening assessment and risk management scope documents for long-chain (C9-C20) Perfluorooctanoic Acid (PFOA), their salts, and their precursors; and long-chain (C9-C20) perfluorocarboxylic acids (PFCAs), their salts, and their precursors.

It is proposed that long-chain (C9-C20) PFOA, its salts and precursors, long-chain (C9-C20) PFCAs, its salts and precursors are persistent in all media in the environment as set out in the *Persistence and Bioaccumulation Regulations*. [1,2] However long-chain PFOA, its salts and precursors are not considered bioaccumulative but C11, C12, C14 long-chain PFCAs and their salts meet the criteria for bioaccumulation as defined in the *Persistence and Bioaccumulation Regulations*. However, long-chain PFOA, its salts and precursors; long-chain PFCAs, its salts and precursors all have the potential to bioaccumulate and biomagnify in terrestrial and marine mammals. Also, the screening documents proposed that long-chain PFOA, its salts and precursors and long-chain PFCAs, and its salts and precursors, are all are entering or may be 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. It was therefore proposed that they meet one or more of the criteria in section 64 of CEPA 1999.

CELA and CSM (brief descriptions of our organizations are provided at the end of this submission) along with other Canadian environmental and health non-governmental organizations (NGOs) have submitted substantial comments on assessment results and proposed management options for substances in Batches 1 through 11 of the Industry Challenge, including the final assessments and draft risk management options for selected chemicals in Batch 1 to 9.

In these submissions, our organizations have identified several gaps and limitations in the risk based assessments and the proposed management instruments for specific chemicals and as a result, we have developed substantial recommendations to address the gaps and limitations that the government should consider for improving the current approach to the Chemicals Management Plan in Canada. These recommendations are intended to further strengthen and entrench the precautionary principle in the decision-making process and promote a high level of accountability to all users, manufacturers,

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[1] Environment Canada and Health Canada: Draft Screening Assessment Perfluorooctanoic acid, its salts and precursors. Accessed at: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=705376A7-1&offset=12&toc=show.

[2] Environment Canada and Health Canada: Draft Screening Ecological Assessment Report Long-chain (C9-C20) Perfluorocarboxylic acids, their salts and precursors. Accessed at: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=CB279C36-1.

importers and sellers of chemicals in Canada. Furthermore, these recommendations are designed to ensure the protection of human health and environment from toxic chemicals throughout their life cycle (including disposal and recycling practices).

In addition, we have also responded to the government's October 2010 'Publication of a Notice of Intent - Export controls for perfluorooctane sulfonate (PFOS) and lindane'.[3] Our response to the government's Notice of Intent included several recommendations that are intended to improve upon the proposed approach for measures for export control for PFOS. As PFOS, PFOA and PCFA are categorized as perfluorochemicals (PFCs), we have similar concerns for all of these chemicals. As a result, this document will address gaps and limitations that are common to both PFOA and PFOA, their salts and precursors as well as PFCs, in general.

For this document, we have referred to long-chain (C9-C20) perfluorooctanoic acid, its salts and precursors as PFOA and long-chain (C9 – C20) perfluorocarboxylic acids, their salts and precursors as long-chain PFCAs.

[3] Letter to The Honourable John Baird, Minister of the Environment and The Honourable Leona Aglukkaq, Minister of Health. Response to 'Publication of a Notice of Intent – Export controls for perfluorooctane sulfonate (PFOS) and lindane'. Dated November 8, 2010. Accessed at: http://www.cela.ca/sites/cela.ca/files/752%20--NoI%20for%20export%20control%20for%20PFOS%20and%20lindane%20%28Nov%202010%29.pdf.

Background

Table 1: Long-chain (C9 –C20) PFOA, its salts and precursors and Long-chain (C9-C20) PFCAs, their salts and precursors: Draft Screening Assessment Results, Quantity and Uses[4, 5]

Substance name CAS RN	Draft Screening Assessment Results	Quantity and Uses
PFOA, its salts and precursors 335-67-1	Proposed that PFOA, its salts and precursors meet one or more of the criteria in section 64 of CEPA 1999. They are entering or may be 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. Persistent in all media. Have the potential to bioaccumulate and biomagnify in terrestrial and marine mammals but it is not bioaccumative.	1997 - 2000: Imported into Canada - 600 000 kg of PFAs. Imports of PFOA and its salts were reported by one company. The import of PFOA and its salts (<1000 kg) represented a very small proportion of the PFAs imported and consisted almost exclusively of the ammonium salt. Uses: Ammonium salt of PFO (APFO) is used primarily as a commercial polymerization aid in the manufacture of fluoropolymers such as polytetrafluoroethylene and polyvinylidene fluoride used in the automotive, electronics, construction and aerospace industries. Fluoropolymers - used in of stain- and water-resistant coatings on textiles and carpet; hoses, cable and gaskets; non-stick coatings on cookware; and personal care products. Also used as a constituent in aqueous fluoropolymer dispersions, which are formulated into paints, photographic film additives and in the textile finishing industry. Aqueous fire-fighting foams may also contain APFO as a component.
Long-chain (C9-C20) PFCAs, their salts and precursors	Proposed that long-chain (C9-C20) PFCAs, their salts and precursors meet one or more of the criteria in section 64 of CEPA 1999.	2004 - perfluroalkyl and fluoroalkyl substances and long-chain (C9–C20) PFCAs were not manufactured or imported in Canada.

[4] Environment Canada and Health Canada. *Draft Screening Assessment Perfluorooctanoic acid, its salts and precursors.* Accessed at: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=705376A7-1&offset=12&toc=show-.

[5] Environment Canada and Health Canada. *Draft Ecological Screening Assessment Report Long-Chain (C9–C20) Perfluorocarboxylic Acids, their Salts and their Precursors*. Assessed at: http://www.ec.gc.ca/lcpe-cepa/CB279C36-CDCF-490C-AA11-1B4140864404/PFCAs_eng.pdf.

	C11, C12, C14 long-chain PFCAs and their salts meet the criteria for bioaccumulation. Long-chain (C9-C20) PFCAs, its salts and precursors are persistent.	2004 & 2005 - precursors to the long-chain (C9-C20) PFCAs imported into Canada. Uses: C9 PFCA is used in the production of fluoropolymers. They are precursors to chemicals such as fluorotelomers. Fluorotelomer- based substances are used to provide oil-, grease-, water- and stain-repellent properties to other substrates. They can be also used as monomers to generate polymeric fluorotelomer substances with the same characteristic properties.

Overarching Issues[6, 7]

Bioaccumulation

The evaluation of bioaccumulation for PFCAs and PFOAs as outlined in the draft screening assessment is questionable given the significant monitoring data collected on wildlife species in the Great Lakes ecosystem and in the northern ecosystem.

There are several issues that should also be considered in making a decision on the bioaccumulation factor of long-chain PFCAs and PFOAs, their salts and their precursors.

1) Since PFCAs and PFOAs are ionized surfactants they have a tendency to aggregate at the interface of a liquid-liquid system and not partition between the two liquid phases. Therefore, the use of log K_{ow} is not the most accurate method to determine bioaccumulation and as a result, experimental data rather than modeling should to be utilized. While this is recognized as a problematic factor for ionized surfactants, a modeled log K_{ow} value of 5 ± 0.5 was quoted in the draft assessment for PFOA. The draft assessment should specifically state if this value was ever considered when data was being reviewed to determine the possibility of bioaccumulation for PFOA. Based on the problems associated with determining log K_{ow} for ionized surfactants, we have assumed that the quoted log K_{ow} was not used in the determination of bioaccumulation for PFOA.

2) Persistence and bioaccumulation as set out by the *Persistence and Bioaccumulation Regulations,* CEPA *1999*, were intended to identify substances with the potential to bioaccumulate primarily in aquatic species (fish) only and for substances that preferentially partition to lipids. With these criteria, a critical toxicological endpoint such as the bioaccumulation of PFOA and PFCA which preferentially partition in the proteins of liver, blood and kidney in terrestrial and marine mammals is very problematic. We are concerned that this evidence has not been given the weighting it deserves when making a determination of bioaccumulation for these chemicals. Under the Toxic Substances Management Policy released in 1995, it was stated that expert opinion and a weight of evidence approach are also very important when considering how to interpret and apply the criteria. In this situation, the evidence of long-chain PFCAs and PFOAs, their salts and their precursors in some aquatic species, terrestrial and marine mammals, should provide assessors with sufficient evidence of the bioaccumulation potential of long chain PFCAs and PFOAs, their salts and their precursors.

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[6] Note: Issues addressed in this section are based on information from - Environment Canada and Health Canada. *Draft Screening Assessment Perfluorooctanoic acid, its salts and precursors*. Accessed at: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=705376A7-1.

[7] Note: Issues addressed in this section are based on information from - Environment Canada and Health Canada. *Draft Ecological Screening Assessment Report Long-Chain (C9–C20) Perfluorocarboxylic Acids, their Salts and their Precursors*. Assessed at: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=CB279C36-1.

For PFOA bioaccumulation studies, BCFs and BAFs were reviewed and most value were below the "5000" bioaccumulation criteria as stipulated in the *Persistence and Bioaccumulation Regulations* of CEPA 1999. The criteria upon which these regulations are based were developed over 10 years ago, as outlined in the 1995 Toxic Substances Management Policy (Canada 1995a) and the Toxic Substances Management Policy: Persistence and Bioaccumulation Criteria (Canada 1995b). As mentioned above, the criteria focused specifically on aquatic organisms (fish) and on neutral organic compounds. This is problematic for substances like PFOA which is not a neutral organic substance but rather an ionizable substance. The question then becomes, what is the most appropriate route to determine bioaccumulation for ionizable substances like PFOA that are not bioaccumulative in all aquatic species but there is considerable evidence to indicate the potential to bioaccumulate and biomagnify in terrestrial and marine mammals? While attempts were made to justify some rationale for determining that PFOA is not bioaccumulative through the use of BCF, BAF and BMF data, it is our conclusion that the explanation provided in the draft screening assessment was not sufficiently robust to come to proposed bioaccumulation conclusion for PFOA.

3) We recognize that substances that meet the criteria for the bioaccumulation factor (BAF) or the bioconcentration factor (BCF) > 5000 or log K_{ow} = 5 have significant potential for bioaccumulation at the organism level and biomagnify through the food web. However, it is possible there can be concerns regarding the ability of a substance to be bioaccumulative, even if regulatory criteria are not met. In the screening assessment of long-chain PFCAs and PFOAs, their salts and their precursors, the monitoring data collected on a range of wildlife species provide additional evidence to demonstrate support for the bioaccumulative potential of these substances. These findings should not be dismissed.

A regulatory approach that makes a determination about the fate of substance with a single measurement (i.e. aquatic ecosystem) can be very problematic and may not reflect the full scope of impacts of these substances to the environment. Since a weight of evidence approach is applied to make a determination of bioaccumulation for PFOA, we are concerned that the weight of evidence and the emphasis on biomagnification in aquatic species played a significant a role in the final decision of bioaccumulation for PFOA despite the availability of evidence of PFOA in higher tropic levels (mammals and terrestrial animals). We are uncertain if the low levels of PFOA detected in various species of fish were the primary reasons for concluding that PFOA is not bioaccumulative as prescribed by the bioaccumulation criteria in the *Persistence and Bioaccumulation Regulations,* CEPA 1999. It is important to know how the data for terrestrial mammals were considered in the determination of bioaccumulation given that many of the wildlife species for which data was available may rely on fish species for food sources.

4) In addition, we are also uncertain if the weight of evidence approach was applied by the assessors adequately to include careful consideration of all degradation or breakdown products, metabolism, and potential synergistic effects of other substances similar to long chain PFCAs or PFOAs, their salts and their precursors.

5) The potential for biotransformation of precursors to PFOA is of concern as biomagnification up to food chain is considered. Also, precursor biotransformation in the human body to PFOA is also a significant concern. As a result, our organizations are uncertain how data on these findings informed the decision of the bioaccumulation for PFOA.

6) Finally, we question when making bioaccumulation determinations for ionized surfactants like PFOA, what alternative analytical approaches are available. If they do exist, are they more accurate and relevant to this group of substances? Also, are there reliable alternatives to live animal testing and can they be used as standard procedures?

Based on the issues noted above, we are questioning the draft conclusions that PFOA, their salts and their precursors are not bioaccumulative as set out by the bioaccumulation criteria in the *Persistence and Bioaccumulation Regulations,* CEPA 1999. The presence of these substances in various wildlife species and in the environmental media appears to be in contradiction to the draft findings for bioaccumulation criteria set out in the regulations.

Recommendation: We do not support the finding that PFOA is not bioaccumulative according to the criteria outlined under the Persistence and Bioaccumulation Regulations.

Recommendation: We urge the government to find that <u>all</u> long chain (C9-C20) PFCAs, their salts and their precursors are bioaccumulative under the Persistence and Bioaccumulative Regulations based on evidence that C11, C12 and C14 chains are bioaccumulative.

Recommendation: We encourage the government to initiate a review of the Persistence and Bioaccumulation Regulations, with an aim to strengthen the criteria applied for persistence and include the consideration of bioaccumulation in terrestrial animals and mammals.

Recommendation: The government should acknowledge that certain substances such as those that are ionizable may not exhibit the bioaccumulative potential as required under the Persistence and Bioaccumulation Regulations. The Persistence and Bioaccumulation Regulations should be more encompassing and ensure that the determination of bioaccumulation potential for these types of substances can be undertaken.

Vulnerable populations

Despite the knowledge that there are no known sources of perfluoroalkyls (PFAs) in the arctic regions, this area continues to be a sink for the deposition of PFAs and other toxic substances that originate from different areas of Canada and the world. PFAs have been found in the environment and the biota in the Canadian Artic indicating that they

have potential for long range transport. Because of their presence in various wildlife species, there is concern that these chemicals have contaminated food sources and possibly even drinking water sources for the indigenous people in that area.

Unfortunately, the current management approach for toxic substances in Canada has not adequately addressed the impacts of many of these toxic substances that would ensure the complete protection of the northern environment and its population from toxic pollution. There are additional efforts being made to help in this regard. There has been an increase in biomonitoring of the population in these areas which offers another important tool that can provide a more accurate picture of total exposure to PFCs, including some of the precursors facing the northern communities. While we are aware of the presence of PFOA and PFCAs in urban settings, it is critical to adequately monitor the presence of these substances and their precursors in remote northern communities. The policy challenge facing the government in this regard is to ensure that the chemicals management framework in Canada effectively responds to the biomonitoring results in an expeditious manner that promotes prevention rather simply reacting to toxic pollution.

Human exposure

The draft screening for both PFOA and long-chain PFCAs concluded that these substances were considered not to be a high priority for assessment of potential risks to human health, based upon the application of the simple exposure and hazard tools developed by Health Canada for categorization of substances on the Domestic Substances List. However, we are concerned about the cumulative effects of PFCs which these assessments have not attempted to address.

PFCs in consumer products, including clothing, are generally used for their stain and water resistance and non-stick properties. With PFCAs being detected in various different biological and environmental compartments there is still uncertainty as to the routes of exposures – is it through indirect exposure through precursor compounds or direct through PFCAs?

While we recognize that the research on the human health effects of PFC exposure are in their early stages, we are concerned that the government's approach regarding human effects is not sufficiently precautionary. There is the possibility of human carcinogenicity with PFOA and it has shown hormone disruption in animal testing. Health surveys of workers at fluorochemicals plants for DuPont and 3M indicated a range of health problems. DuPont Washington Works fluorochemical plant revealed a statistically significant excess of cancers of the buccal cavity and pharynx, kidney and other urinary cancers, and leukemia among the workers.[8] Also, a retrospective cohort mortality study was conducted by 3M at the Cottage Grove, Minnesota plant that produced PFOA. This study reviewed employee records for the 1947-1983 period and

[8] Credibility Gap: Toxic Chemicals in Food Packaging and DuPont's Greenwashing: New Scientific Research shows PFC-related Health Effects in People. Accessed at: http://www.ewg.org/node/26650.

found that occupational exposure to PFOA was associated with two-fold higher rate of death from prostate cancer (Gilliland 1993). Additional investigation at the plant also revealed that workers occupationally exposed to PFOA were found to have abnormal levels of reproductive hormones (higher levels of estradiol in workers with highest PFOA blood levels). Also, DuPont had known since the 1980s that PFOA can cross the placenta and cause developmental abnormalities in children of women exposed to this toxic chemical at work.[9]

Areas around the DuPont's Washington Works plant chemical plant (PFOA) in Parkersburg, West Virginia have shown high that 'normal' levels of PFOA in tap water therefore exposing residents to these higher levels of PFOA.[10, 11]

In a recent follow-up study where previous results showed elevated blood levels of PFCAs in ski wax technicians as compared to the general population, the objective was to determine concentrations of PFCAs, perfluorosulfonates (PFSAs), and FTOHs, precursor compounds that are known to degrade to PFCAs, in air collected in the breathing zone of ski wax technicians during their daily work routine. The results indicated that the daily exposure to 8:2 FTOH in air was 800 times higher than levels of PFOA. The study suggested that internal exposure of PFOA through biotransformation of 8:2 FTOH to PFOA and PFNA in humans.[12]

In two other studies, researchers detected measurable levels of airborne PFCs in ski workrooms but in one study, the concentrations were not as high as the levels in the technicians' blood.[13, 14] Upon further investigation, air samples were then tested for precursors that would breakdown to PFOA and PFNA and high concentrations of 8:2 FTOH were detected. The researchers concluded that biotransformation of the 8:2

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[9] Ibid.

[10] EWG Urges Drinking Water Standards for Teflon Chemical (May 2008). Accessed at: http://www.ewg.org/node/26602.

[11] Lewis & Clark Law School's Environmental Law on line – The Complementary Roles of Common Law Courts and Federal Agencies in Producing and Using Policy-Relevant Scientific Information (Issue 37:4). Accessed at: http://www.elawreview.org/elaw/374/the_complementary_roles_of_com.html.

[12] Nilsson H, Karrman A, Rotanda A, van Bavel B, Lindstrom G, Westberg H. Inhalation exposure to fluorotelomer alcohols yield perfluorocarboxylates in human blood? *Environmental Science & Technology* 2010 Oct 1; (44)19: 7717-22.

[13] Nilsson H, Karrman A, Rotanda A, van Bavel B, Lindstrom G, Westberg H. A time trend study of significantly elevated perfluorocarboxylate levels in human after using fluorinated ski wax. *Environmental Science & Technology* 2010 March 15; (44)6: 2150-5.

[14] Freberg BI, Haug LS, Olsen R, Hersson M, Thomsen C, Thorud S, Becher G, Molander P, Ellingsen DG. *Environmental Science & Technology* 2010 Oct 1; (44)19: 7723-8.

FTOH fumes that waxers inhaled day after day was the main source of the PFOA and PFNA found in their blood.[15]

While all this research may be in its infancy, the government should take an approach that is more precautionary to protect human health from the possible cumulative effects to PFCs.

Recommendation: The screening assessments should include consideration of the cumulative and synergistic impacts of PFCs in the assessment of long chain PFCAs and PFOAs, their salts and their precursors.

Recommendation: Adequate consideration for vulnerable populations, with particular focus for workers and people that rely on food sources that may be contaminated by PFCs and other toxic substances, should be considered in the screening assessments. Currently, occupational exposures are not addressed in these screening assessments nor have there been any responses to develop management measures that directly promote the protection of workers.

Waste disposal

The draft screening assessment provides some data on releases of PFOA from landfill sites across Canada and also presents information of releases of PFOAs from jurisdictions that do not manufacture PFOAs. The range of releases of PFOAs from landfills in Canada appears to fall within or exceed the range of PFOA released from the landfills from other jurisdictions (91.3-516 ng/L). These data are significant for demonstrating the presence of PFOAs in landfills but does not provide a complete picture of the PFOAs found in the waste stream. Most of the assessment conducted through the Chemicals Management Plan has failed to take into consideration the full scope of issues related to the disposal of waste and other processes related to the wastestream for chemicals. The continuing absence of consideration of waste disposal creates significant gaps in the assessment approach.

First, the assessment does not provide the data needed to demonstrate the contribution and quantity of consumer and industrial products that may contain PFOAs and what precursors may be contained in the products that could contribute to the amount of PFOAs released.

Furthermore, the issue of waste disposal extends beyond measuring PFOAs in landfills. It should include products that are sent directly towards other disposal methods such as incineration or recycling. These processes may contribute to the overall levels of PFCs in the air, water and land but most importantly, may also contribute to the formation of other toxic substances that are not highlighted in the assessment scope.

[15] Nilsson H, Karrman A, Rotanda A, van Bavel B, Lindstrom G, Westberg H. Inhalation exposure to fluorotelomer alcohols yield perfluorocarboxylates in human blood? *Environmental Science & Technology* 2010 Oct 1; (44)19: 7717-22.

Finally, the recycling processes may also pose a range of impacts to the environment and human health that have not been fully considered and investigated when completing assessments for groups of substances.

Recommendation: The screening assessment should include consideration of the waste stream for the chemical grouping being assessed such as waste disposal, treatment or any further recycling processes.

Recommendation: The screening assessment should identify and quantify all the breakdown products and degradation products that are produced throughout the lifecycle of PFOAs and long-chain PFCAs.

Specific Comments related to long-chain (C9 –C20) PFOA, its salts and precursors[16]

Based on the draft screening assessment report for PFOAs, the following issues were noted.

1) Scope of screening assessment included long-chain (C9-C20) PFOAs, their salts and their precursors.

Long-chain (C9-C20) PFOA compounds are not on the Domestic Substances List (DSL) and as a result, were not subject to categorization under the *Canadian Environmental Protection Act, 1999* (Canada 1999). In the draft assessment, precursors to PFOA were considered on the basis of their contribution to the total presence of PFOA and its salts. These included the ammonium salt, CAS RN 3825-26-1, and the precursors, CAS RN 53515-73-4, CAS RN 678-39-7, CAS RN 65530-61-2, and CAS RN 70969-47-0, as they were all found to meet the ecological categorization criteria for persistence, bioaccumulation potential and inherent toxicity to non-human organisms.

None of these substances were considered to be a high priority for assessment of potential risks to human health, based upon the application of the simple exposure and hazard tools developed by Health Canada for categorization of substances on the Domestic Substances List. The finding that these substances were not considered high priority on the basis of human health is a great concern to our organizations as the quality of the human health assessment conducted may be affected. Indeed, the data collection conducted by the government did not place additional emphasis on the need to collect additional human health impacts from the PFOAs, their salts and their precursors since the data collection was completed for the categorization process.

2) PFOA has been detected widely in Canada.

[16] Note: The issues addressed in this section are based on information from - Environment Canada and Health Canada: Draft Screening Assessment Perfluorooctanoic acid, its salts and precursors. Accessed at: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=705376A7-1.

In particular, the data presented in the draft screening assessment includes many data detecting measurable levels of PFOA in remote northern areas of Canada as well as in landfill leachates, soil, air, water and in human blood. Furthermore, PFOAs have also been detected in the effluent of sewage treatment plants (STPs) entering the Great Lakes.

3) Determination of bioaccumulation for PFOAs should consider additional factors.

Since PFOAs are ionized substances, they are expected to partition to liver and blood and as a result, most field measurements for these substances have focused on those individual organs and tissues. Research has also shown that polar bears, which occupy the highest trophic level in the Canadian Arctic, have higher levels of PFOA than all other Arctic organisms examined. However, other arctic organisms (ringed seals) and aquatic species (beluga whales, Pacific herring, Arctic cod) have also been measured for PFOAs and trophic magnification factors (TMF) or biomagnification factors (BMF). The TMFs and BMFs determined for these arctic organisms varied widely and are possibly influenced by the differences in their food webs. While the screening assessment noted that the measures for TMFs and BMFs may note the differences found in the food webs of these organisms, they may not determine the bioaccumulation potential for PFOA.

Nevertheless, we note the importance of using these measures to inform the decisions by government on bioaccumulation for PFOAs. The values take into account the ecosystems in which the organism habitates. These measures also consider organisms beyond fish species or the aquatic environment to make a determination on bioaccumulation. It should also be noted that these observations gain more importance when comparing the PFOA levels between higher trophic organisms such as the polar bear or caribou to that of the fish species such as trout and cod. The significant levels detected in the mammals suggest that the sources of PFAOs are more extensive and cannot be accounted for based on the concentrations measured in liver and kidney tissues of the fish species which provide source of food for the mammals. This would suggest that a better method for measuring bioaccumulation is required to improve the estimated values generated.

Although there are high concentrations of PFOA in the water of the Great Lakes, it was not detected in invertebrates or fish. However, PFOA has been detected in higher trophic levels such as the polar bear, caribou and walrus. The PFOA measured in biota in the Canadian Arctic, not close to release sources, gives rise to considerable concern for remote northern communities because of the biomagnification potential of PFCAs, including PFOA, in the food chain. This is further complicated by the fact that the mechanism for transport of PFOA and its metabolites to the Artic are not clear because of the lack of adequate monitoring data on concentrations of various precursors in air, water, effluents and sediments in Canada.

There was speculation as to the interpretation of bioaccumulation when measured to consider bioconcentration, bioaccumulation or biomagnification factors (BCFs, BAFs,

BMFs), as these may indicate either direct toxicity in organisms as a result of accumulated PFOA or indirect toxicity in organisms that consume prey containing PFOA (via food chain transfer).

Although the mechanisms of toxic action of PFOA are not well understood, it is important to note toxicological effects such as hepatotoxicity and feminization of male fish, as they have been reported in a variety of species. PFOA and fluorotelomer alcholos (FTOHs) have been shown to demonstrate estrogenic activities and that exposure to a combination of 17ß-estradiol and PFOA or FTOHs produces anti-estrogenic effects.

We have great concern as there is limited information on the toxicology of PFOA precursors, the potential for combined or synergistic effects with PFOA, and the toxicology and potential for combined or synergistic effects of PFOA with other perfluoroalkyl acids. With variability in analytical results between individual laboratories, this raises more concern as to the confidence level in the data collected.

4) Persistence and Bioaccumulation Regulations, 2000 narrow scope for determination of bioaccumulation of PFOAs.

The screening document reviewed data to indicate that PFOA may not be bioaccumulative in aquatic species but may be considered to bioaccumulate and biomagnify in terrestrial and marine mammals.

In general, the BCFs and BAFs for PFOA are below the “5000” bioaccumulation criterion stipulated in the *Persistence and Bioaccumulation Regulations* of CEPA 1999. As previously mentioned, the criteria in these regulations do not account for the bioaccumulation of PFOA that is preferentially partitioning to the liver, blood and kidney in terrestrial and marine mammals but rather places emphasis on the aquatic species. This is seen as a significant issue in these regulations even though the Toxic Substances Management Policy (Canada 1995a) states that expert opinion and a weight of evidence approach are also very important when considering how to interpret and apply the criteria. It is our view, that the matter deserves additional consideration by policy makers to assess the comprehensiveness of the current bioaccumulation criteria outlined in the Persistence and Bioaccumulation Regulations, 2000, which places emphasis on the aquatic species.

5) Evidence of long range atmospheric transport potential for PFOAs.

The presence and the significant levels measured for PFOAs in the Canadian Arctic also may provide evidence for the long-range transport of either PFOA (e.g., via ocean currents) or volatile precursors to PFOA through the atmosphere. The draft screening assessment report speculated that the presence of PFOA in biota in remote regions is that a precursor (e.g., FTOHs) is emitted to the atmosphere and ultimately degrades to yield PFOA through biotic and abiotic degradation. However, there were no definite explanations provided for the presence of PFOAs in the Canadian Arctic.

6) PFOAs detected in various food items and consumer products in Canada

The draft screening assessment for PFOA indicated that PFOAs have been detected in microwave popcorn, raw and cooked fish (Ontario) and some native foods (seal, duck, caribou) - the latter from Nunavut.

PFOA and 8:2 FTOH have been detected in off-gassing from all four tested brands of new non-stick cooking pans heated at normal cooking temperatures and PFOA was detected in cooking oil following heating under normal cooking conditions in new non-stick pans. 8:2 FTOH has shown estrogenic properties. In materials likely to be treated with fluorochemicals, tested samples also showed the presence of PFOA.

With its diverse use in consumer products, it is very difficult for humans to avoid exposure to PFOA and its precursors. Exposure to PFOA and not its precursors, through consumer products was classified as a high-exposure exposure. Some scenarios contributing to this high-exposure were oral exposure to treated carpet, migration from treated paper into food and inhalation during treatment of clothing. We are uncertain if the latter referred to occupational exposure of PFOA during the application of PFOA on clothes as opposed to the inhalation of PFOA by consumers as a result of the compound being used on clothing. Some clarify is required for that statement. However, it is expected that the number of consumer products that are treated with or incorporate PFOA and other perfluorinated compounds will be quite extensive. Nevertheless, the data detecting measureable levels of PFOAs and FTOH in consumer products suggest that the impetus to switch to products that do not result in the offgasing or migration of such chemicals should already be in place.

7) Biomonitoring data for Canadians and health impacts from PFOAs.

Although biomonitoring data for PFOA in Canada are limited, the results from the recent Health Measure Survey conducted by Statistics Canada released in August 2009 are consistent with data for US populations. PFOA has been measured in the blood of adult Canadians and in the cord blood of newborns. In human serum, PFOA data provide some concept of aggregate exposure from multiple sources and exposure routes.[17] The PFOA draft screening assessment indicated that serum levels also significantly reduces uncertainties associated with interspecies and intraspecies differences in pharmacokinetics. Also, two recent studies (one cross-sectional study in the United States and one cohort study in Denmark) have given limited suggestions of a weak association between gestational exposure to PFOA and reduced birth weight.

From the draft screening assessment, it is also important to note the following:

From the draft risk assessment: “the US EPA stated that ’there is strong evidence to conclude that the liver toxicity and liver adenomas that are observed in rats following exposure to PFOA result from a PPARa-agonist mode of action,’ which is unlikely to

[17] Also see: Health Canada. *Report on Human Biomonitoring of Environmental Chemicals in Canada: Results of the Canadian Health Measures Survey Cycle 1 (2007-2009).* August 2010.

occur in humans. They also concluded that although the LCTs and PACTs may be relevant to humans, they probably do not represent a significant cancer hazard due to quantitative differences in receptor expression and other toxicodynamic factors (US EPA 2005). However, the Science Advisory Board (US) reviewed the US EPA's risk assessment and concluded that there may be other modes of action for liver tumours and that as the modes of action for LCTs and PACTs are unknown, they should be considered relevant to humans (US EPA 2006b)."

However, the Canadian government's draft screening assessment concluded that there is uncertainty regarding the mode of action for tumour induction but as the available database for genotoxicity suggests that PFOA is not mutagenic, the margins of exposure (MOEs) based on non-neoplastic effects in the most sensitive species are considered protective of any potential carcinogenic effects in humans. There is concern that this is not sufficiently protective in light of the statement above from the US Science Advisory Board.

Canada has been part of the international efforts to reduce global facility emissions and product content of PFOA and related chemicals. These measures are expected to reduce PFOA exposure in Canada but unfortunately, there is no biomonitoring data to confirm reduction in exposure. However, in the United States, two recent biomonitoring studies have shown declining human serum levels for PFOA.

8) Persistence of PFOAs.

The conclusion of the draft screening assessment for PFOA indicated that PFOA is not bioaccumulative but it is persistent. The data supporting the persistence of PFOA are well documented in the draft screening results.

9) Finding under section 64 of CEPA, 1999.

The draft screening assessment concluded that PFOA, their salts and their precursors do not constitute a danger to human life or health. However, it is proposed that PFOA, its salts and its precursors are 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. Therefore, it is proposed that PFOA, its salts and its precursors meet one or more of the criteria set out in section 64 of CEPA 1999.

It is our view that the finding of toxicity under CEPA for PFOAs, their salts and their precursors is appropriate. However, the same questions remain with respect to the quality of the human health assessment conducted in this screening assessment as well as the determination of bioaccumulation potential for these chemicals. The uncertainties that continue to exist on these two matters may lead to less protective measures on PFOAs.

Specific comments related to long-chain (C9-C20) PFCAs, their salts and precursors[18]

Based on the draft screening assessment for long-chain (C9-C20) PFCAs, we have noted the following issues.

1) Scope of screening assessment for long-chain PFCAs.

Long-chain (C9-C20) PFCAs are not on the Domestic Substances List (DSL) and as a result, were not subject to the categorization provisions of the *Canadian Environmental Protection Act, 1999* (Canada 1999). However, some of the 90 identified precursors to long chain (C9 – C20) PFCAs are on the DSL and have been subject to categorization. In the draft ecological assessment for PFCAs, theirs salts and precursors, the government considered precursors to these substances that would transform or degrade to a C9–C20 PFCA given similar use applications and similarities in their physical-chemical properties and structures.

The government's decision for an ecological screening assessment of the long-chain (C9-C20) perfluorocarboxylic acids and fourteen precursors that were proposed to meet the categorization criteria under section 73 of the Canadian Environmental Protection Act 1999 (CEPA 1999) was influenced by the fact that some of the precursors to the long-chain (C9-C20) PFCAs are structurally similar to the four fluorotelomer-based substances prohibited by the Minister of the Environment under the authority of section 84 of the CEPA 1999.

The precursors: CAS RN 65530-63-4, CAS RN 65530-71-4,CAS RN 65530-72-5, CAS RN 65530-74-7, CAS RN 68391-08-2, CAS RN 68412-68-0, CAS RN 115592-83-1, CAS RN 65530-61-2, CAS RN 70969-47-0, CAS RN 65530-66-7, CAS RN 65605-58-5, CAS RN 65605-70-1, CAS RN 65636-35-3, CAS RN 68239-43-0, and CAS RN 110053-43-5, were all found to meet the ecological categorization criteria set out for categorization: persistence, and/or bioaccumulation potential and inherent toxicity to non-human organisms.

However, these substances were not found to be a high priority for assessment of potential risks to human health, based upon application of the simple exposure and hazard tools developed by Health Canada for categorization of substances on the Domestic Substances List. Similar to the comments made on PFOAs, their salts and their precursors, we have expressed our concern that the finding that these substances are not considered high priority for risk to human health would have significant implications for the human health assessment conducted on these substances. Based on the draft screening assessment, it appears that data on these substances were

[18] Note; The issues addressed in this section are based on information from - Environment Canada and Health Canada. *Draft Ecological Screening Assessment Report: Long-Chain (C9–C20) Perfluorocarboxylic Acids, their Salts and their Precursors*. Assessed at: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=CB279C36-1.

collected up to November 2009. However, the surveys conducted under section 71 of CEPA 1999 in 2000 and 2004 focused on the manufacture, import, and uses of perfluoroalkyls/fluoroalkyls in Canada, while information from toxicological studies submitted by industry under section 70 of CEPA 1999.[19] It is unclear whether the information gathered up to November 2009 as well as through the surveys conducted included any evidence of impacts to human health. In fact, the government draft screening assessment only focuses on the ecological aspects. The absence of the health assessment is considered a significant weakness in the assessment process and should be considered incomplete.

Given the focus on the ecological assessment for long-chain PFCAs, it appears that no additional focus was exerted to require submission or generation of data on impacts to human health beyond that already obtained during categorization.

The screening assessment emphasized that the long-chain PFCA grouping was defined using expert judgment, chemical structures and the biodegradation estimation modeling. Using these approaches, structures were analyzed for their potential to degrade to long-chain PFCAs.

The 2004 industry survey of perfluoroalkyl and fluoroalkyl substances indicated that long-chain PFCAs were not reported to be manufactured or imported in Canada but several of the 90 identified precursors have been imported into Canada. Long-chain PFCAs are rarely used intentionally in products but commercially, precursors such as fluorotelomers, are used. Some of these fluorotelomers have been prohibited in Canada but such a prohibition does not include products that contain these fluorotelomer based substances.

Using information from member countries, including Canada, the Organization for Economic Co-operation and Development (OECD) has prepared a document entitled, *Preliminary Lists of PFOS, PFAS, PFOA and Related Compounds That May Degrade to PFCA* (OECD 2007), to assist the OECD in its risk management activities for perfluorinated compounds. The list includes substances that can potentially break down to PFCAs. Fluoropolymers such as polytetrafluoroethylene, were considered stable and thus not included as a PFCA precursor in the OECD list. The long chain PFCA precursors included in the OECD list are included in the scope of the draft screening assessment for long chain PFCAs.

Recommendation: The government should release the human health assessment for long-chain PFCAs, regardless of its finding that the chemicals in the grouping were not considered high priority to human health.

Recommendation: All precursors to long-chain PFCAs should be included in the scope of the screening assessment, including those identified by the OECD process.

[19] Environment Canada. *Draft Ecological Screening Assessment Report: Long-Chain (C9-C20) Perfluorocarboxylic Acids, their Salts and their Precursors*. October 2010. pg. 1.

2) Detection of long-chain PFCAs in the Canadian environment.

To date, empirical evidence has indicated that some long-chain PFCAs are bioaccumulative, persistent, have long-range transport potential (via precursors) and also have a widespread presence in the Canadian environment - the arctic regions and in the Great Lakes regions. There is also a disturbing trend towards increasing concentrations in Arctic wildlife.

Wildlife and Fish Species

Although there are no available data on the direct release of long-chain PFCAs to the Canadian environment, there is empirical evidence available regarding the degradation of fluorotelomer-based polymers into long-chain PFCAs. This was evident by the presence of FTOH metabolites in biota. In the arctic regions, liver samples in polar bears from southeastern Hudson Bay and eastern Greenland had at least 99% linear PFCA isomers. Linear FTOHs generally degrade to linear PFCAs which would be evident as the source of PFCAs originating from telomerization as opposed to electrochemical fluorination - a process that would produce about 20% branched isomers.

Evidence was also available for the Great Lakes basin with samples from lake trout. These samples demonstrated a decline of C11 and C13 PFCA isomers between 1993 and 2004. However, up to year 2004, there was increased presence of linear isomers in Lake Ontario suggested the PFCA was probably as a result of telomerization. [20]

In addition, C9-C15 PFCAs were measured in the liver of seals, foxes, fish, polar bears, Greenland shark, narwhals, beluga whales and birds either in the Canadian Arctic or the Great Lakes region with the highest concentrations of C9-C15 PFCAs in polar bears followed by Greenland shark, narwhals and beluga whales. Worldwide, levels of C9-C15 have been reported in ringed, fur and harbour seals, dolphins (i.e. white-sided, bottlenose, white-beaked, Franciscana, humpback), finless porpoises, glaucous gulls, sperm whale, beavers, Amur tigers, wild rats and several species of birds (little egret, little ringed plover, parrotbills, black-crowned herons). The highest concentration was detected in the white-beaked dolphin.

While we note the presence of long-chain PFCAs in the Canadian Arctic and in animals from that region as well as the Great Lakes region, it is just as crucial to note the increasing trends of these substances in polar bears, ringed seals and birds. Some of the significant results included data from 1992 to 2005, with the mean concentrations of C9 and C10 PFCA in the livers of Baikal seals being 1.2 to 1.7-fold higher, and from 1972 to 2002, a mean doubling times for concentrations in polar bear livers from the Arctic ranged from 5.8 to 9.1 years for C9 to C11.

[20] Ibid., pg. 10.

There may be some dispute as to whether chronic exposure to perfluorinated compounds is associated with liver lesions in polar bears. However, the lesions were similar to those produced by perfluorinated compounds under laboratory conditions.

From BMF and trophic magnification factors (TMFs) data for PFCAs (C9-C14) data in Lake Ontario, there is evidence to suggest trophic magnification over the whole food web. This was also evident for the dolphin food web, where TMFs also indicated trophic magnification.

The draft screening assessment for long-chain PFCA concluded that while there are no bioaccumulation studies for long-chain PFCAs greater than C14 there is still the potential for long-chain PFCAs greater than C14 to bioaccumulate or biomagnify in marine and/or terrestrial species.

While there is evidence that there is the potential for PFAs, including long-chain PFCAs, to cause hepatotoxicity, just as critical is the potential for chain PFCAs to cause affect endocrine function, for example in rainbow trout. It was also observed that C9-C10 PFCAs are chemical sensitizers for the marine mussel, *Mytilus californianus*, in that it allows normally excluded toxic substances to accumulate in the marine mussel. C12 and C14 PFCAs increased the mitochondrial membrane potential in the freshwater alga, *Scenedesmus obliquus*, indicating damage to the mitochondrial function.

*Water bodies and sediment*s

Long-chain PFCAs have been measured in the Canadian aquatic environment with C9-C12 PFCAs also measured in sediment from the Canadian Arctic. Recent sampling (2005 and 2006) of polar ice caps from three areas in the High Artic indicated the presence of C9-C11 PFCAs.

Long-chain PFCAs have also been measured in Canadian urban aquatic compartments with evidence to suggest indirect input sources, e.g., wastewater treatment plants (WWTPs). Long-chain PFCAs were not released from WWTPs with simple primary treatment but those with secondary treatment revealed increased concentrations of long-chain PFCAs. It was suggested that rapid biological or chemical degradation of precursors during secondary treatment therefore resulting in the increased presence of long-chain PFCAs. Precursors such as FTCAs and FTOH degradation products have been measured in influent and primary treatment samples, but not in secondary treatment waters. As the FTCAs are only found in primary treatment samples, this suggests that the conversion of FTOHs to long-chain PFCAs is incomplete, whereas the absence of FTCAs and presence of C9 to C11 PFCAs in secondary samples suggests complete conversion.

The presence of selected long-chain PFCAs in wastewater effluent also suggest that the current treatment processes in place in many jurisdictions may not be adequate to address the precursors of long-chain PFCAs.

Recommendation: The type of water treatment plants may influence the degradation process for the precursors for long-chain PFCA. As such, treatment plants should not be considered effective control measures to prevent the formation of long-chain PFCAs. Rather, a preventative approach should be adopted in consideration of measures to address long- chain PFCAs.

3) Evidence of long range transport potential.

The presence of long-chain PFCAs in the Canadian Arctic indicates the long-range transport either of long-chain PFCAs possibly via ocean currents or of volatile precursors to long-chain PFCAs such as FTOHs via atmospheric transport or both. The screening assessment has not utilized models to determine long range transport potential as have been applied in screening assessments of other substances under the Chemicals Management Plan.

However, we are pleased to see the government support the findings of the growing evidence and trends that environmental concentrations of PFCAs are on the rise for various Canadian arctic species (e.g. polar bear, ringed seals, northern fulmars and thick billed murres). Furthermore, PFCAs are considered bioaccumulative in fish, piscivorous birds and mammals.

Recommendation: The conclusion of the screening assessment for long- chain PFCA should confirm that these chemicals have long range potential since this information will influence the type of management measures necessary to prevent the formation of long-chain PFCAs.

4) Long-chain PFCAs in consumer products.

Various products may contain fluorinated polymers or other related fluorochemicals. Several long-chain PFCAs have been detected in US residential homes that had carpeted floors, pre-treated carpet, and commercial carpet-care liquids. Other products that contain fluorotelomer products which are sources of selected long-chain PFCAs include floor waxes and stone/tile/wood sealants, treated home textile, upholstery and apparel and household carpet and foams. Several studies were conducted to test for FTOH and PFCAs for indoor air and house dusts from homes in the US and in Canada. The US studies showed measures of PFCAs and FTOH. In Canada levels of FTOH in indoor dust were measured. Air samples for FTOH were not completed due to technical difficulties. It was further documented that PFCAs may also be released from other articles of clothing – all weather clothing, cookware and food contact materials.

Recommendation: The use of fluorochemicals or fluorinated polymers in various consumer products such as carpets, textiles, upholstery, clothing, and food contact materials and cookware should be prohibited as this may contribute to the formation of long-chain PFCAs.

5) Finding of toxicity under section 64 of CEPA 1999.

The draft ecological screening assessment for long-chain PFCAs proposed that long-chain perfluorocarboxylic acids, their salts and their precursors are entering or may be 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. It is also proposed that long-chain PFCAs and their salts meet the criteria for persistence as set out in the *Persistence and Bioaccumulation Regulations.* Although there is scientific evidence that long-chain PFCAs and their salts accumulate and biomagnify in terrestrial and marine mammals, only C11, C12 and C14 long-chain PFCAs and their salts meet the numeric criteria for bioaccumulation as defined in the *Persistence and Bioaccumulation Regulations.* As a result, it was proposed that long-chain (C9-C20) perfluorocarboxylic acids, their salts, and their precursors meet one or more of the criteria in section 64 of CEPA 1999.

Recommendation: We support the finding that long-chain PFCAs, their salts and their precursors are toxic under CEPA 1999.

Recommendation: We support that finding that long-chain PFCAs, their salts and their precursors meet the criteria for persistence and bioaccumulation as outlined in the Persistence and Bioaccumulation Regulations. As such, management of long-chain PFCAs, their salts and their precursors should be virtual elimination.

Preliminary comments on draft risk management measures for PFCAs and PFOAs[21, 22]

The draft scope management document outlines several actions to be considered by the government if long-chain PFCAs and PFOAs are found to meet the criteria set out in section 64 of CEPA 1999. Additionally, if these substances are found to be persistent and bioaccumulative according to the Persistence and Bioaccumulation Regulations, virtual elimination is proposed.

Our comments to specific proposed actions are as follows:

[21] Note: The issues addressed in this section are based on information from - Environment Canada and Health Canada. *Draft Screening Assessment Perfluorooctanoic acid, its salts and precursors*. Accessed at: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=705376A7-1.

[22] Note: The issues addressed in this section are based on information from - Environment Canada and Health Canada. *Draft Ecological Screening Assessment Report Long-Chain (C9–C20) Perfluorocarboxylic Acids, their Salts and their Precursors*. Assessed at: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=CB279C36-1.

- *Listing on Toxic Substances List (Schedule 1) under CEPA 1999 for PFCAs and PFOAs*

Based the draft screening assessment results, long-chain PFCAs and PFOAs, their salts and precursors are considered toxic under CEPA 1999. Therefore, these substances should be added to Schedule 1 of CEPA to initiate the development of management measures for these substances. All substances belonging to these groups of substances should be considered toxic and included in the Schedule 1 of CEPA 1999.

Recommendation: We support the listing of long-chain PFCAs and PFOAs, its salts and its precursors to the Toxic Substances List (Schedule 1).

- *Prohibitions for Certain Toxic Substances Regulations, 2005*

The Prohibition for Certain Toxic Substances Regulations has been expanded recently (announced in Canada Gazette dated October 13, 2010) to include four fluorotelomer based substances that are considered precursors to long chain PFCAs.[23] While we consider this listing to be substantial in its efforts to prevent the formation of long-chain PFCAs in Canada, there are substantial limitations that continue to contribute to the presence of long-chain PFCAs in Canada. One such limitation is the exclusion of certain items containing fluorotelomer based substances. The quantities of these items in Canada have not been provided so we do not have an estimate of the potential quantity of fluorotelomer based substances that may be present in these items. Another limitation is the exclusion of disposal streams for products that may contain these fluorotelomer- based substances. Each of these streams perpetuates the formation of PFCAs in Canada.

In order to create a regulatory framework in Canada that effectively addresses long-chain PFCAs in Canada, a substantial update to the scope of the Prohibition of Certain Toxic Substances is required. This effort would require an expansion to include a specific listing of all long-chain PFCAs, their salts and precursors. In addition, the regulation should also cover any export activity of products containing these substances as well as exports of any stockpiles of these substances. By expanding the scope of the prohibition, substantial efforts would have to be directed at the full lifecycle of these substances from their manufacture to use to their sale, import, export and disposal stream. Industry accountability should be required throughout the supply chain to produce the necessary progress to prevent the formation of long-chain PFCAs, its salts and its precursors. The absence of these elements will continue to perpetuate the contributions by Canada to the formation of long-chain PFCAs to the global environment.

[23] Environment Canada and Health Canada. *Risk Management Scope for Perfluorooctanoic Acid (PFOA), its Salts, and its Precursors, and Long-Chain (C9-C20) Perfluorocarboxylic Acids (PFCAs), their Salts, and their Precursors*. October 30, 2010. pg. 5.

The proposed measures for long-chain PFCAs and PFOAs include a regulatory component that aim for a prohibition through regulations for long-chain PFOAs, its salts and precursors and long-chain PFCAs, its salts and precursors. We are pleased to see the reference to include export of these substances in the prohibition measures. However, there has been no consideration of disposal methods in these proposals.

In addition, the proposal for prohibition of these substances indicates that prohibition will be achieved "where substitutes are economically and technically feasible."[24] It is our view that the goal for prohibition is severely weakened with this qualifier and in effect, there is the possibility that there may be little or no change to the use of these substances. This provides the affected industries with significant loopholes that will perpetuate the presence of PFCAs and PFOA in Canada.

While we acknowledge the importance of finding substitutes to toxic chemicals, the goals of prohibition should not be predicated on the existence of such substitutes. The goal for prohibition, alone, should send the appropriate regulatory signal for the need to change. We consider the inclusion of substitutes under the stated conditions to be a significant weakness in the proposal for prohibition. It leaves the affected industry to continue its current process without the appropriate regulatory triggers for making changes in its industrial and manufacturing process through the use of safe substitution. While we appreciate that cost is an important factor in substitution, the projected cost to the environment and human health as a result of continuing releases and formation of long-chain PFCAs and PFOA, their salts and precursors have not been considered. These costs are just as important as the cost to industry when safe substitution is required.

Recommendation: We support the intent to prohibit long-chain PFCAs, its salts and precursors and PFOAs, its salts and precursors through the use of regulations.

Recommendation: We do not support the achievement of prohibition of long-chained PFCAs and PFOAs only "where substitutes are economically and technically feasible." Toxicological data have indicated the need to replace these substances with safer alternatives.

Recommendation: The measures to prohibit should not be made cumbersome and should address the full cycle of the substances. Therefore, the prohibition should include manufacture, use, offer for sale, import, export and disposal of long-chain PFOA, its salts, and precursors, and long –chain PFCAs, its salts and precursors, including in products or waste stockpiles.

- *Explicit measures to protect populations and ecosystems*

The general intent of the proposed measures to prohibit long-chain PFCAs, PFOAs, their salts and precursors is supported. However, we have provided comments on the

[24] Ibid.

limitations of the proposed measures as they relate to available substitutes as well as the absence of any proposed action for disposal and recycling methods. Given the amount of data already available outlining the presence of these toxic chemicals in various wildlife species (e.g. polar bear and seals, fish species) and the ecosystem, with particular focus on data collected in the colder northern ecosystems, the Great Lakes ecosystem (for example, effluents from wastewater treatment plants), and the biomonitoring data collected through the Canadian Health Measure Survey,[25] it is worthy to include an explicit acknowledgement of the management measures under consideration (i.e., regulations) to reference vulnerable populations (human health and wildlife species) and vulnerable ecosystems (e.g., northern ecosystem and Great Lakes ecosystem).

The inclusion of vulnerable populations is very important given that these chemicals are detected in various wildlife species that communities, particularly in the north, may rely on for their food sources and livelihoods. Similarly, acknowledgement that these toxic chemicals are being detected in unique ecosystems such as the Great Lakes ecosystem and the northern ecosystems places additional emphasis on the need to prevent the use and formation of these toxic substances. It should be acknowledged at the current approach to rely on control technology, particularly in the treatment of wastewater, is inadequate and therefore, additional focus should be directed to the use of these chemicals in industrial and manufacturing processes with an aim towards elimination.

Recommendation: Include explicit acknowledgement and action plans for the protection of vulnerable populations and ecosystems in regulatory measures for long-chain PFCAs and PFOAs, their salts and their precursors.

- *Environmental Performance Agreement Respecting PFCAs and their Precursors in Perfluorochemical Products Sold in Canada*

The development of the Environmental Performance Agreement (EPA) for PFCAs initiated substantial comments from environmental and health non-government organizations when originally discussed in a stakeholder workshop organized in 2009. These concerns focused on the relevant use of EPAs that targeted voluntary efforts to achieve reductions of PFCAS in products rather that the use of regulations to achieve the same reductions. Further, the negotiations on the elements of these EPAs did not include a role for non-industry stakeholders who questioned the transparency and accountability of the development of the process as well as the process itself.

Finally, the voluntary foundation of EPAs, including the targets for reduction and elimination of PFCAs in products lacks real accountability in the framework from industry as well as the government. It is unclear how the government plans to proceed should the deadlines and targets set out in the EPAs, particularly for the phase out of PFCAs in 2015 in products, are not achieved successfully by industry.

[25] Also see: Health Canada. *Report on Human Biomonitoring of Environmental Chemicals in Canada: Results of the Canadian Health Measures Survey Cycle 1 (2007-2009).* August 2010.

EPAs are not suitable for achieving the ultimate phase out and elimination of toxic substances unless specific action plans for these toxic substances include a regulatory framework necessary to outline accountability and timelines for achieving these targets. Any further consideration of voluntary measures to address PFOAs and PFCAs, based on current data and conclusions would be inappropriate and will not lead to additional measures that would protect the environment or human health. In fact, such consideration would be considered an impediment to the process.

Recommendation: We urge the federal government to exclude the use of voluntary measures, including EPAs, to achieve the phase out and elimination of PFCAs and PFOAs. Management measures should only focus on regulatory-based measures to ensure the protection of the environment and human health.

- *Inclusion of Waste and Disposal Measures for Long-chain PFOAs, its salts and Precursors and Long-Chain PFCAs, its salts and its Precursors*

The draft risk management scope document noted that additional information on the use and products containing long-chain PFOAs, long-chain PFCAs, their salts and their precursors are required.[26] While we acknowledge a better understanding on the scope of products that may contain these substances and how they are disposed of at the end of their life, it should not prevent the government from outlining the necessary elementary steps needed to address the waste stream, in the current risk management scope document. The risk management document does not include any intent to manage this stream at this time. We find this a significant gap in the approach.

Any lack of information from industry should not be used to validate any delay efforts to outline an effective strategy to deal with the waste stream of these substances. In fact, recent international focus under the Stockholm Convention on Persistent Organic Pollutants to address waste disposal methods for various POPs including a few brominated flame retardants and PFOS, demonstrated that the consideration of the disposal streams and potential recycling processes that are being used for products that contain toxic substances is needed at the front end of the discussion. Disposal practices that may include incineration may contribute to the additional formation and release of other toxic substances. Further consideration is also required In the case of recycling, additional toxic substances within this general chemical family and possibly other toxic substances, could be released or formed.

The current risk management scope should be strengthened to address disposal methods and potential recycling practices that would include products that contain long-chain PFCAs, PFOAs, their salts and precursors. We do not wish to see the continuing presence of toxic substances such as PFOAs and PFCAs in final products that are the result of recycling processes. The risk management scope should ensure that in

[26]Environment Canada and Health Canada. *Risk Management Scope for Perfluorooctanoic Acid (PFOA), its Salts, and its Precursors, and Long-Chain (C9-C20) Perfluorocarboxylic Acids (PFCAs), their salts and their Precursors.* October 30, 2010. pg. 8.

disposal and recycling streams, the prevention of the formation of PFOAs and PFCAs is achieved.

Recommendation: The risk management scope document should be strengthened to include the government's proposals to address waste disposal and recycling of products and waste stockpiles that contain long-chain PFCAs and PFOAs, their salts and their precursors. The absence of information about these sources should not be used as reason for inaction in the prohibition of these toxic substances.

- *Substitutes*

As noted in a previous section, the proposed prohibitions of long-chain PFCAs, PFOAs, their salts and their precursors is significantly weakened as it is based on the availability of substitutes that are economically and technically feasible. The role of substitutes in achieving prohibition of toxic chemicals is significant and economics should not be the major driving force. Also, the absence of substitutes at the present time should not be used as justification for not setting out a goal for prohibition, phase out or elimination of these toxic substances. It is our view that establishing a strong goal with the scope for elimination will initiate the necessary triggers for industry to find alternative processes or safe substitutes that will enable them to achieve the regulatory goals. Towards this end, government should ensure that the necessary compliance and enforcement elements are in place to measure the success towards these goals.

All efforts should be taken to identify those industries that have possible safe substitutes that can replace long-chain PFCAs and PFOAs. This would require that improved communication systems are in place together with the regulatory measures for these toxic substances as they are implemented in Canada as well as well as in other jurisdictions. Furthermore, any substitutes considered for these substances should be subjected to a thorough assessment to ensure the safety of these substitutes on the environment and human health. Assessment on substitutes should be more hazard-based rather than risk based so that the focus would be primarily on the hazard properties and less emphasis on exposure potential from these substitutes. Such an assessment would be in keeping with a precautionary approach.

In addition, the government should provide some assistance in the area of finding substitutes for toxic substances. For example, one element of the risk management efforts should investigate and invest in identifying the role of green chemistry in finding substitutes for toxic substances such as long-chain PFCAs and PFOAs, their salts and precursors. The Centre for Excellence in Kingston, Ontario, Canada, has received federal funds and this may be an appropriate area for investing in these efforts.

Recommendation: The government should investigate and invest how green chemistry is able to assist in identifying and implementing substitutes for toxic substances such as long-chain PFCAs and PFOAs, their salts and precursors.

Recommendation: An assessment of substitutes should be undertaken which should be hazard based rather than risk based so as to ensure that substitutes do not pose any harm to the environment or human health.

- *PFOAs, its salts and precursors*

Additional note and emphasis are added with respect to the measures taken on PFOA, its salts and its precursors as some of its precursors may also be precursors to long chain PFCAs.[27] It is important that the measure taken on PFOAs seek the eventual elimination, phase out and prohibition of these substances because of their potential contribution to the formation of other perfluorinated acids such as long chain PFCAs.

Brief Description for CELA and CSM

CELA (www.cela.ca) is a non-profit, public interest organization established in 1970 to use existing laws to protect the environment and to advocate for environmental law reform. It is also a legal aid clinic that provides legal services to citizens or citizens' groups who are otherwise unable to afford legal assistance. In addition, CELA also undertakes substantive environmental policy and legislation reform activities in the areas of access to justice, pollution and health, water sustainability and land use issues since its inception. Under its pollution and health program, CELA has been actively involved in matters that promote the prevention and elimination of toxic chemicals addressed in the *Canadian Environmental Protection Act*, including the categorization process and implementation of the CMP.

Chemical Sensitivities Manitoba (CSM), a volunteer organization, was founded in 1997 by four individuals who saw the need to address the affects of toxic chemicals on human health and the possible link between the onset of chemical sensitivities and chemical exposure and, in particular, chronic low-level exposure. CSM raises awareness of the presence of toxic chemicals in the home and the environment and strongly advocates for the safe substitution of these toxic substances.

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[27] Environment Canada and Health Canada. *Draft Screening Assessment Pefluorooctanoic Acid, its Salts, and its Precursors*. October 2010. pg. 4.