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Original transmission by email

Dear Jacqueline Gonçalves, Jacinthe David and Greg Carreau:

Re: Response to Updated Draft State of Per- and Polyfluoroalkyl Substances (PFAS) Report

For your consideration, the following comments and recommendations are submitted by the Canadian Environmental Law Association (CELA), Clean Production Action, Health and Environment Justice Support (HEJSupport), Citizens' Network on Waste Management and Northwatch in response to the *Updated Draft State of Per- and Polyfluoroalkyl Substances (PFAS) Report (Updated Draft PFAS report)* and *Revised risk management scope for per- and polyfluoroalkyl substances (PFAS) (Revised risk management for PFAS)* released for public comment on July 13 2024.[1,2]

[1] Government of Canada. Updated Draft State of Per- and Polyfluoroalkyl Substances (PFAS) Report. Canada Gazette, Part I, Volume 158, Number 28: GOVERNMENT NOTICES, July 13 2024.
[2] Environment and Climate Change Canada and Health Canada. Revised risk management scope for per- and polyfluoroalkyl substances (PFAS). July 2024.

Our organizations provided comments in response to the Draft *State of Per- and Polyfluoroalkyl Substances (PFAS) Report (Draft PFAS Report, May 2023)* released in May 2023[3]. Many of our comments and recommendations submitted in the initial PFAS Report, May 2023 remain relevant. We are taking this opportunity to build upon some of the issues raised in our May 2023 submission and identify new issues and recommendations pertaining to the Updated Draft PFAS report for your consideration.

1. CEPA Section 64: Updated Draft PFAS Report

We are pleased to see that the findings in the Updated Draft PFAS Report remains unchanged from the Draft PFAS Report, (May 2023) with an overall conclusion that PFAS as a class meets the criteria set out in section 64 (a) and 64 (c).[4] However, the draft's recommendation that fluoropolymers be excluded from the PFAS class needs to be re-examined in an expeditious process. We are pleased to see that the Government acknowledges that fluoropolymers are included in the definition of PFAS. The Government's statement that 'PFAS meeting the definition of fluoropolymers are not addressed within this report and are planned for consideration in a separate assessment" is confusing.

Recommendation 1: We support the conclusion of the Updated Draft PFAS Report that PFAS as a class meets section 64 (a) and (c) in CEPA.

2. Definition of PFAS as a class

The Updated Draft PFAS Report has maintained the use of the 2021 OECD definition for the class of PFAS.

> *The OECD (2021) definition for PFAS, which is "fluorinated substances that contain at least one fully fluorinated methyl or methylene carbon atom (without any H/Cl/Br/I atom attached to it), i.e. with a few noted exceptions, any chemical with at least a perfluorinated methyl group (–CF3) or a perfluorinated methylene group (–CF2–) is a PFAS.*[5]

Recommendation 2: We support the use of the 2021 OECD definition for PFAS.

3. Why it is relevant to keep fluoropolymers in the Updated Draft State of PFAS and Revised risk management scope for per- and polyfluoroalkyl substances

The Updated Draft State of PFAS Report is inadequate with its explanation to exclude fluoropolymers from the scope of the report despite the report's affirmation of the 2021 OECD definition for the class of

[3] See: Response to the Draft State of PFAS Report and Risk Management Scope Document July 19, 2023. 30 Non-governmental organizations. Online at https://cela.ca/submission-response-to-the-draft-state-of-pfas-report-and-risk-management-scope-document/

[4] Government of Canada. Updated Draft State of Per- and Polyfluoroalkyl Substances (PFAS) Report. Canada Gazette, Part I, Volume 158, Number 28: GOVERNMENT NOTICES, July 13 2024.

[5] Environment and Climate Change Canada and Health Canada. Updated Draft State of Per- and Polyfluoroalkyl Substances (PFAS) Report (July 2024), pg 12.

PFAS. The Government of Canada should ensure Canada's approach to assess the class of PFAS should not delay an assessment of fluoropolymers and the opportunities to transition to PFAS-free alternatives.

3.1 Lack of timelines defined for additional work on Fluoropolymers

The absence of fluoropolymers in the Updated Draft PFAS Report leaves the work on the class of PFAS incomplete. Furthermore, no timelines were presented by the departments to complete the work on fluoropolymers. The exclusion of consideration of the PFAS involved in the production of fluoropolymers and the known releases of PFAS throughout their lifecycle will result in a management regime that is inadequate to protect the health of Canadians and the environment.

It is necessary to ensure this work is completed with a tight timeline and substantial application of the precautionary principle. It is well known that there will be gaps in knowledge of fluoropolymers, but this should not be a rationale for inaction, considering they are part of the class of PFAS.

Recommendation 3: The examination of fluoropolymers should be completed within a year and provide a comprehensive review of PFAS use and releases throughout the lifecycle of fluoropolymers. The approach should include the time required to develop and implement precautionary measures that will halt the ongoing use and release of fluoropolymers and hasten substitution to PFAS-free alternatives.

3.2 Fluoropolymers must be included for PFAS prohibition and a safe PFAS-free substitution-based approach to risk management.

The Updated State of PFAS Report states there is evidence to suggest that fluoropolymers may have significantly different exposure and hazard profiles when compared with other PFAS in the class and that they will be considered in a separate assessment. However, the Government also acknowledges that PFAS can also be released to the environment through consumer use and disposal methods of PFAS-containing products.

The lifecycle of fluoropolymers creates PFAS pollution from production, through use to disposal. We understand that full data is lacking and strong lobbying from the fluoropolymer manufacturers has pressured delay, but the precautionary approach and scientific evidence justify immediate action to set a clear timeline for their prohibition.

Beginning with a life cycle approach, the production of fluoropolymers is problematic. A 2020 study[6] points out that fluoropolymer producers switched out the long-chain PFAS in polymer production with shorter chain replacements with similar physical and chemical properties. During the synthesis of fluoropolymers, incomplete polymerization will result in residual and smaller 'polymers' which are not bound to the polymers and may be released to air, upon heating during manufacturing and processing, and to water through wastewater streams.

A 2023 study summarizes how a wide array of additional fluorinated organic substances are used, formed and emitted to air and water during the production of fluoropolymers. The authors note large

[6] Rainer Lohmann et al. Are Fluoropolymers Really of Low Concern for Human and Environmental Health and Separate from Other PFAS? Environ. Sci. Technol. 2020, 54, 20, 12820–12828. 2020. ttps://doi.org/10.1021/acs.est.0c03244

uncertainties remain regarding the emissions of polymerization by-products, chain transfer agents and fluorinated solvents. But the study concludes that, based on the available data, it is clear that the emissions from fluoropolymer production plants to air and water are still significant and that the production of fluoropolymers continues to introduce persistent substances to the environment.[7]

When it comes to the use of fluoropolymers, we have known for decades that thermal breakdown of fluoropolymers will occur. Polymer fume fever is an under recognized flu-like illness associated with inhaling the thermal degradation by-products of fluorocarbons. Overheating coated nonstick (Teflon®) cookware represents the most common avenue of exposure, although occupational exposures related to improper ventilation or poor hand hygiene after handling the raw material also represent a persistent risk. Patients with polymer fume fever display fever, chest tightness, and a dry cough a few hours after exposure.[8]

Applying fluoropolymers as coatings can generate PFAS. Research shows that fluoropolymer fabric coating facilities can be sources of complex mixtures of PFAS air emissions.[9]

The thermal breakdown, or thermolysis, of fluoropolymers occurs widely because fluoropolymers are used in a wide variety of thermal applications, especially in areas of harmful chemical and high thermal stress, such as cookware, ovens, industrial and car engines, heat exchanger and high-temperature circuits.[10]

Although fluoropolymers themselves are not easily degraded, they can decompose at high temperatures to produce highly persistent and very mobile Trifluoroacetic acids (TFA) and other compounds. TFA was identified as a product of thermal decomposition (360-382°C) of several fluoropolymers – a known cause of TFA in rainwater. Indeed in 1999, fluoropolymers thermolysis was known to explain 40% of TFA wet deposition in Europe and over 80% of TFA observed in the rainwater of Toronto.[11] TFA has now been measured as the dominant PFAS in Germany's drinking water.[12] This is a major problem. In fact, global TFA concentrations are rapidly increasing in rainwater, groundwater, ocean water, human blood, vegetation and indoor and outdoor dust. TFA is the most widely detected PFAS in house dust posing a direct exposure route to people, children and babies. TFA is now commonly found in bottled

[7] Joost Dalmijn et al. (2023). Emission inventory of PFASs and other fluorinated organic substances for the fluoropolymer production industry in Europe. Environmental Science Processes & Impacts. Royal Society of Chemistry. DOI: 10.1039/d3em00426k

[8] Matthew S. Correia et al. Polymer Fume Fever. National Library of Medicine. https://www.ncbi.nlm.nih.gov/books/NBK594276/

[9] Characterization of PFAS air emissions from thermal application of fluoropolymer dispersions on fabrics Wickersham et al. 2023. https://doi.org/10.1080/10962247.2023.2192009

[10] Jia'nan Cui et al. The contribution of fluoropolymer thermolysis to trifluoroacetic acid (TFA) in environmental media. Chemosphere. 2019 doi: 10.1016/j.chemosphere.2019.01.174

[11] Jia'nan Cui et al. The contribution of fluoropolymer thermolysis to trifluoroacetic acid (TFA) in environmental media. Chemosphere. 2019 doi: 10.1016/j.chemosphere.2019.01.174

[12] Isabelle J. Neuwald et al. Ultra-Short-Chain PFASs in the Sources of German Drinking Water: Prevalent, Overlooked, Difficult to Remove, and Unregulated. Environ. Sci. Technol. 2022, 56, 10, 6380–6390. May 4, 2022. https://doi.org/10.1021/acs.est.1c07949

water, human blood, urine and breast milk.[13] No other substance has been found in so many environmental media, in these high concentrations and with such a fast increase.

TFA is highly persistent with no known half-life, so the more TFA is produced from the thermal degradation of fluoropolymers, the more TFA will build up in the environment for generations to come. The bad news is that TFA will be extremely difficult to remove using standard filtration and remediation technologies.[14] In Europe, the estimated costs to even attempt to remove TFA would run to 200 billion euros per year for industrial wastewater and 38 billion euros per year for drinking water.[15] We note the Updated Draft State of PFAS Report provides no assessment of the cost to clean up Canadian drinking water from TFA and a wide range of other PFAS contaminants.

3.3 Fluoropolymers are not 'polymers of low concern'

The PFAS industry has claimed that fluoropolymers should not be grouped with other PFAS because they meet the Organization for Economic Cooperation and Development (OECD) criteria for "polymers of low concern".[16] However, in an updated statement, the OECD explains that since their draft criteria were established in 1990, no further work was conducted and the criteria were never finalized. Since then, new information, data and considerations have emerged leading them to advise that 'the regulatory schemes of individual countries should be consulted.'[17] The fluoropolymer industry may consider their products of low concern, but this is not the public view of the OECD. Nor should it be the public view of the Government of Canada.

Further support includes a 2023 study by Lohmann and Letcher at Rhode Island University indicated that the lack of consideration of the lifecycle of fluoropolymers and the use of PFAS in the production of fluoropolymer can be a significant source of PFAS releases. The investigators noted:

> *The extreme stability of fluoropolymers has raised concerns with respect to associated plastic pollution. Fluoropolymer producers are interested in having fluoropolymers treated as "polymers of low concern (PLC)", due to their stability and seemingly low environmental impact; it is the use of fluorinated polymer processing aids that has caused widespread contamination at the production and manufacturing sites. Regardless, compared to many non-polymeric PFAS, fluoropolymers, PFPEs and SCFPs have received comparatively little attention*

[13] Guomao Zheng. Elevated Levels of Ultrashort- and Short-Chain Perfluoroalkyl Acids in US Homes and People. Environ Sci Technol. 2023 Oct 24; 57(42): 15782–15793. doi: 10.1021/acs.est.2c06715

[14] Behringer et al, Final Report Persistent degradation products of halogenated blowing agents in the environment type, environmental concentrations and fate with particular regard to new halogenated substitutes with low global warming potential, German Environment Agency, 2021, at: https://www.umweltbundesamt.de/sites/default/files/medien/5750/publikationen/2021-05-06_texte_73-2021_persistent_degradation_products.pdf, p. 119. and Scheurer M, Nödler K, Freeling F, Janda J, Happel O, Riegel M, Müller U,Storck FR, Fleig M, Lange FT, Brunsch A, Brauch HJ, "Small, mobile, persistent: Trifluoroacetate in the water cycle - Overlooked sources, pathways, and consequences for drinking water supply,"Water Resources, 2017 Dec 1;126:460-471 at: https://pubmed.ncbi.nlm.nih.gov/28992593/.

[15] SETAC Europe 2022 Keynote- Hans Peter H. Arp: Reducing Pollution of PMT Substances to Protect Water. https://www.youtube.com/watch?v=s6_O6MBpE8k&t=1648s

[16] Fluoropolymers Product Group. FAQ. https://fluoropolymers.eu/faq/

[17] OECD. Polymers of Low Concern. https://www.oecd.org/env/ehs/oecddefinitionofpolymer.htm

from environmental scientists and regulators, despite their manifold industrial uses and high volumes.[18]

Another study by Lohman et al. noted:

Further, there is no scientific basis to separate and subsequently remove fluoropolymers from discussions of other PFAS as a class or in terms of their impacts on human or environmental health. The conclusion that all fluoropolymers are of low concern, simply based on tests on limited substances of four types of fluoropolymers, ignores major emissions linked to their production and large uncertainties regarding their safe end-of-life treatment. In addition, there is only very limited information on the compositions, grades, etc. of the fluoropolymer products on the market.[19]

3.4 There is no cost effective or safe way to deal with fluoropolymers at end of life

The PFAS industry maintains that fluoropolymers, in particular, can be safely handled by separation and incineration at end of life.[20] There are concerns with this industry claim since there is no national or global requirements to disclose fluoropolymers in consumer products. Neither consumers nor recyclers are aware of fluoropolymers presence in products or the waste. Fluoropolymers will enter the waste systems depending on how they are used such as in electronics, cookware, or automobiles. Fluoropolymers applied to metal articles such as nonstick frying pans, might end up in metal recycling streams, leading to their uncontrolled breakdown in metal smelters at high temperatures. Landfilling of fluoropolymers leads to contamination of leachates with PFAS and can contribute to releases of plastics and microplastics. Even with an exceptional chemical and thermal stability, fluoropolymer particles will be disintegrated into microplastics by weathering and physical stress, which enables further dispersion and increased bioavailability.[21] The European Chemicals Agency, in their draft PFAS Restriction report, notes that municipal waste incinerators are not likely to destroy PFAS and are not a feasible option for large quantities of fluorinated compounds. More recently, new evidence has emerged on the generation of PFAS in incinerators. Municipal waste can contain significant amounts of material contaminated with PFAS and/or other fluorinated compounds, which can lead to PFAS emissions and release during incineration. PFOS and PFOA were measured in air emissions from a variety of Waste to Energy plants across Europe. Other studies have concluded that the flue gas could be a significant source of PFAS

[18] Lohmann, R. and Letcher, R.J. The universe of fluorinated polymers and polymeric substances: The universe of fluorinated polymers and polymeric substances and potential environmental impacts and concerns and potential environmental impacts and concerns. (2023). University of Rhode Island DigitalCommons@URI

[19] Lohmann, R., Cousins, I.T., DeWitt, J.C., Glüge, J., Goldenman, G., Herzke, D., Lindstrom, A.B., Miller, M.F., Ng, C.A., Patton, S., Scheringer, M., Trier, X., and Wang, Z., Are Fluoropolymers Really of Low Concern for Human and Environmental Health and Separate from Other PFAS? (2020), Environmental Science & Technology 2020 54 (20), 12820-12828, DOI: 10.1021/acs.est.0c03244

[20] What happens when fluoropolymers reach the end of their lifespan?. Fluoropolymer Product Group. FAQ. https://fluoropolymers.eu/faq/

[21] Rainer Lohmann et al. Are Fluoropolymers Really of Low Concern for Human and Environmental Health and Separate from Other PFAS? Environ. Sci. Technol. 2020, 54, 20, 12820–12828. 2020. ttps://doi.org/10.1021/acs.est.0c03244

emissions from waste incinerators while PFAS in fly ash and bottom ash present ongoing PFAS releases.[22]

Wastewater treatments plants that may receive landfill leachate cannot destroy PFAS with the added problem that the treatment process can generate higher PFAS concentrations in the effluent.[23] Furthermore, because fluoropolymers are typically contaminated by other substances and fillers, the recycling of fluoropolymers in consumer articles is very difficult which negates efforts to achieve a circular economy.[24]

To delay regulation on fluoropolymers, PFAS producers maintain that fluoropolymers are essential for green technology and climate mitigation. The Fluoropolymers Product Group state that fluoropolymers are necessary for renewable energy installations, such as hydrogen and PV panels and lithium-ion batteries.[25] But analysis by the European NGO, Chemsec, points out that only about eight per cent of the total production volume of the fluoropolymer market in the European Union goes towards the often-cited examples of renewable energy, semiconductors and pharmaceuticals.[26] A comparable study for Canada would anticipate a similar result.

Companies are future proofing their business by transitioning to PFAS-free materials in refrigeration, heat pumps, air conditioning, food packaging, firefighting foam, electronics, cookware, apparel, furniture and fabrics, cleaners and degreasers, and coatings.[27,28, 29] Company transitions to PFAS-free materials for semiconductors,[30] hydrogen production[31] and EV batteries[32] demonstrates how companies are reducing both their chemical and carbon footprint with more innovation to come[33] while it is noted that PFAS-free lithium batteries for energy storage have been in existence for over a decade.[34]

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[22] Nikola Jelínek,et al. Waste Incineration and the Environment. Arnika – Toxics and Waste Programme / IPEN / TFA / CREPD / CEJAD. September 2024.
https://www.researchgate.net/publication/383692205_Waste_Incineration_and_the_Environment

[23] ANNEX XV RESTRICTION REPORT – Per- and polyfluoroalkyl substances (PFASs) ECHA. Page 42.

[24] Rainer Lohmann et al. op cit.

[25] Fluoropolymers Product Group. Op cit.

[26] The top 12 PFAS producers in the world and the staggering societal costs of PFAS pollution. 25 May 2023. Chemsec. https://chemsec.org/reports/the-top-12-pfas-producers-in-the-world-and-the-staggering-societal-costs-of-pfas-pollution/

[27] Natural Refrigerants: State of the Industry. Commercial and Industrial Refrigeration in Europe, North America and Japan. 2022 Edition. Atmosphere. https://atmosphere.cool/marketreport-2022/

[28] PFAS-free Central. Green Science Policy Institute. https://pfascentral.org/pfas-free-products/

[29] GreenScreen Certified. https://www.greenscreenchemicals.org/certified

[30] Sharma et al (2023) Safer and effective alternatives to perfluoroalkyl-based surfactants in etching solutions for the semiconductor industry. Journal of Cleaner Production, 415, 137879. https://doi.org/10.1016/j.jclepro.2023.137879

[31] (Hydrogen production) Fraunhofer IAP, July 2023. Novel anion-conducting membranes for electrolysis. https://www.iap.fraunhofer.de/en/press_releases/2023/novel-anion-conducting-membranes-for-electrolysis.html

[32] The GM-Backed Company Ridding EV Batteries of Harmful 'Forever Chemicals' - Nanoramic Laboratories' CEO Eric Kish. Aug 21 2023. https://www.autofutures.tv/topics/the-gm-backed-company-ridding-ev-batteries-of-harmful--forever-chemicals----nanoramic-laboratories--/s/89553c6d-b997-4bc5-9db9-08c2cbd09689

[33] Implementation of bio-material as sustainable binder system for PFAS free lithium-ion battery industry. Vinnova. https://www.vinnova.se/en/p/implementation-of-bio-material-as-sustainable-binder-system-for-pfas-free-lithium-ion-battery-industry/

[34] Leclanché ready for PFAS restrictions in Europe thanks to its water-based cell production. 20.10.2023. https://www.hellenicshippingnews.com/leclanche-ready-for-pfas-restrictions-in-europe-thanks-to-its-water-based-cell-production/

Industry front-runners recognize the importance of regulation in their efforts to remove substances of concern from their product line. Apple, a leader in materials innovation, is methodically phasing out all PFAS in their global supply chain, and leveraging the time-limited status of the exemptions to expedite research into alternatives. This includes phasing out fluoropolymers, which is the highest use volume in their products, because Apple felt it important to broaden their scope to consider the manufacturing of fluoropolymers.[35] The launch of the Safer Chemistry Impact Fund with seed investments from Apple and Google was established to speed innovation for healthier substances in global supply chains.[36]

In December 2022, 3M announced they would discontinue manufacturing all fluoropolymers, fluorinated fluids, and PFAS-based additive products by the end of 2025, stating 'they are committing to innovate toward a world less dependent upon PFAS.'[37]

Brands, retailers and investors require regulatory certainty to reduce business and financial risks, and incentivize innovation. [38, 39] For all these reasons, the Government of Canada must include fluoropolymers in a class- based approach to PFAS prohibition.

Recommendation 4: The Revised risk management scope for per- and polyfluoroalkyl substances needs stronger language on informed substitution and the priority of prevention measures to move the economy to PFAS-free alternatives that must include alternatives to fluoropolymers.

4. Revised risk management scope for per- and polyfluoroalkyl substances (PFAS)

The Revised risk management scope for PFAS outlines that "the Ministers propose, from the measures set out in subsection 77(2) of the Act, to recommend that the class of PFAS, excluding fluoropolymers as defined in the Updated Draft State of PFAS Report, be added to Part 2 in Schedule 1 to CEPA."[40] In this approach, "the Ministers shall give priority to pollution prevention, and this could include regulatory or non-regulatory measures, such as prohibition if warranted."[41] The proposed listing to Part 2 of Schedule 1 of CEPA will not sufficiently address the impacts associated with the class of PFAS. The 2023 amendments to CEPA indicate that it is only substances in Part 1 of Schedule 1 to which the

[35] Apple's commitment to phasing out per- and polyfluoroalkyl substances (PFAS) November 2022. https://www.apple.com/environment/pdf/Apple_PFAS_Commitment_November-2022.pdf
[36] Safer Chemistry Impact Fund launches to eliminate the use of hazardous chemicals. Feb 28, 2024. https://www.saferchemistryimpactfund.org/news/safer-chemistry-impact-fund-launches
[37] 3M to Exit PFAS Manufacturing by the End of 2025. 3M News Center. Dec. 20, 2022 https://news.3m.com/2022-12-20-3M-to-Exit-PFAS-Manufacturing-by-the-End-of-2025
[38] Study on the Impacts of REACH Authorisation. Final Report Nov 2017. European Commission. https://ec.europa.eu/docsroom/documents/26847
[39] Why investors should support the transition to safe and sustainable chemicals. BNP Paribas Asset Management. Feb 27, 2024. https://viewpoint.bnpparibas-am.com/why-investors-should-support-the-transition-to-safe-and-sustainable-chemicals/
[40] Environment and Climate Change Canada and Health Canada. Revised risk management scope for per- and polyfluoroalkyl substances (PFAS). July 2024. Online: https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/revised-risk-management-scope-per-polyfluoroalkyl-substances.html
[41] Environment and Climate Change Canada and Health Canada. Revised risk management scope for per- and polyfluoroalkyl substances (PFAS). July 2024. Online: https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/revised-risk-management-scope-per-polyfluoroalkyl-substances.html

government may give priority to prohibition. Since the government proposes to place all PFAS chemicals in Part 2 of Schedule 1, the government's commitment to prohibition of PFAS "if warranted", appears inconsistent with, if not contrary to, the 2023 amendments to the Act. Furthermore, at least one PFAS chemical class is already in Part 1, so the government should explain how it concluded that all PFAS it studied in the 2024 report only merit placement in Part 2.

In addition, the exclusion of fluoropolymers in this approach may exacerbate the problems already associated with the existing class of PFAS in Canada. A more forward approach to use the scope of tools under CEPA focused on prevention and elimination of the class of PFAS should be considered in light of the fact that it is difficult to reverse the impacts already observed by the class of PFAS. The use of regulatory measures would be a better approach to signal the need to avoid the use of PFAS and explore safer alternatives. This approach could also better consider the applications of exemptions for use of certain PFAS for essential applications but these should only be considered on a case by case basis rather than blanket exemptions permitted and after a full consultation with providers of PFAS-free substitutes is done. Listing the class of PFAS under Part 2 of CEPA will not achieve prevention and elimination. In fact, in the review of CEPA in 2022, it was clear that the government often treated the pollution prevention provisions under CEPA as a way to apply pollution abatement approaches not prevention, when the authority was used at all. A focus on pollution abatement does not seem like the right approach to substances that are "forever chemicals" and may pose cancer and other health impacts to the population. Furthermore, listing the class of PFAS to Part 2 would make it challenging to impose or advance adoption of PFAS free alternatives since the amendments to CEPA focuses on only those substances in Part 1 of Schedule 1 to be candidates for substitution or alternatives analysis. Based on the current proposal, it is unlikely that, if the entire class of PFAS chemicals are placed in Part 2 (with use of pollution prevention notices), an expeditious transition to safer alternatives for these "forever chemicals" will be delayed unnecessarily.

Recommendation 5: We support listing the class of PFAS to Schedule 1 for regulation and prohibition. However, we do not support listing the class of PFAS to Part 2 of Schedule 1 of CEPA which would result in applying pollution abatement measures such as pollution prevention notices and other non-regulatory approaches that would continue the use of some PFAS. Listing of the class of PFAS to Part 1 would apply true preventative measures for this class of chemicals and incentivize a rapid transition to PFAS-free alternatives.

Recommendation 6: The risk management approach should include regulating PFAS in all consumer products manufactured and imported into Canada. The search for alternatives must ensure full participation of the providers of PFAS-free substitutes and public dissemination of the consultation results.

Recommendation 7: If the Government of Canada pursues certain exemptions for PFAS and the continued use of some PFAS, then substantial public engagement is required in the process to support community right to know and community right to participate in decisions that will affect them. There are significant implications for specific communities and citizens when decisions on continued use are permitted. Socioeconomic factors for taking regulatory exemptions should consider the impacts to vulnerable populations and the environment rather than the economic gains for affected industry.

4.1 Disclosure and traceability

The Revised risk management scope document does not propose to improve the disclosure and traceability for products containing PFAS. Indeed, to support efforts to identify products using these substances, it is important Canada develops binding disclosure and labelling requirements to ensure information about PFAS in consumer products is available throughout the entire product life cycle and have a mechanism for tracing individual materials and products containing PFAS. Such requirements should be a necessary element and precondition for an effective product circular economy that is free from harmful chemicals.

Recommendation 8: Develop full public disclosure requirements and mechanisms to trace consumer products containing PFAS as part of an effective product circular economy free of harmful chemicals.

4.2 Firefighting foam containing PFAS should be prohibited

As stated in the Risk Management Scope for PFAS, we support and urge the Government of Canada to adopt a regulatory instrument under CEPA to prohibit all PFAS not currently regulated in firefighting foam. The use of PFAS in firefighting foam is a significant source of PFAS release to the environment and a direct threat to firefighters' health and the communities that live in contaminated zones, where there is a particular impact on sources of drinking water and surrounding soil.

PFAS-free firefighting foams are readily available and have proved highly efficient in dealing with petroleum-based fires, both domestically and in military uses. For example, a wide range of GreenScreen Certified Firefighting Foams that meet rigorous standards for the absence of PFAS, are available on the international market.[42] Even the US Military has changed their specifications for firefighting foams. On January 12, 2023 the U.S. Department of Defense (DOD) released a revised military specification ("mil spec") for the purchase and use of firefighting foam free of PFAS. More than a dozen states including California, Illinois, New York, and Washington have passed restrictions on PFAS in firefighting foam, and this announcement from the DOD will spur wider expansion of the use of PFAS-free firefighting foams.[43]

Recommendation 9: We support regulating class of PFAS in AFFF with the focus on prohibition.

4.3 Pesticides

We note the lack of inclusion of PFAS use in pesticides in the draft State of PFAS Report. Yet PFAS are intentionally being added to pesticides in part to increase the stability of pesticide ingredients and improve pesticides' ability to kill living organisms.[44] It is difficult to determine the pesticide products

[42] List of GreenScreen Certified Firefighting Foams. https://www.greenscreenchemicals.org/certified/products/category/firefighting

[43] Regulatory demands for PFAS-free firefighting foam products are on the rise - but are the alternatives safer? GreenScreen Certified® meets this demand and more. https://www.greenscreenchemicals.org/resources/entry/pfas-free-foam-blog-20230214

[44] Nathan Donley et al. Forever Pesticides: A Growing Source of PFAS Contamination in the Environment. Environmental Health Perspectives. Volume 132, Issue 7. CID: 075003

that contain PFAS. It is imperative that PFAS in pesticide products are effectively tracked in the existing registration process. Furthermore, based on the conclusion by the departments on the toxicity of the class of PFAS, the Pest Control Products Act should take necessary measure to address the use of PFAS.

Recommendation 10: The draft State of PFAS Report must address the use of PFAS in pesticides and ensure the Pest Control Products Act sets clear timelines in response to the finding of toxic under CEPA for the class of PFAS.

4.4 PFAS Impacts to Communities – Cumulative effects and vulnerable populations

The Updated Draft State of PFAS Report provides a comprehensive documentation of health impacts associated with PFAS including elevated risk to specific groups such as women of reproductive age, developing fetuses and children, workers, and Indigenous communities. Current approaches through regulations have not been able to effectively mitigate the impacts of PFAS as a class since current regulations specifically focus on long chain PFAS including PFOS, PFOA and LC-PFCAs. That is why a prohibition on all uses of PFAS with a clear timeline for implementation is essential.

Furthermore, the consideration of cumulative impacts from mixtures containing PFAS and the wide range of sources of PFAS releases should be determined and carefully considered in decisions for management approaches under CEPA. These efforts could be hindered because of data gaps in the class of PFAS which will underestimate the impacts to affected groups. The survey section 71 notice on PFAS will fill in some of the information needed by the government. But if there is no specific requirements to generate data specific to cumulative impacts, these gaps could increase PFAS impacts on vulnerable populations.

Recommendation 11: Require analysis of cumulative impacts from mixtures containing PFAS and estimate their impacts to vulnerable populations.

4.4.1 North Bay

This lack of coordination between the provinces and the federal government was recently illustrated in a permitting process – or the lack thereof – for a new facility to process and use fluoropolymers in North Bay, Ontario.

The City of North Bay's drinking water supply, Trout Lake, is contaminated with PFAS from Department of Natural Defence (DND) activities upstream, as are several private drinking water wells in the vicinity of the Canadian Forces Base.

Sampling conducted by the provincial Environment ministry beginning in 2013 had identified PFAS in Lee's Creek and Trout Lake and "historical data" dates back to 1998 and 1999 for several of the current sampling locations, and to 2009 for at least one more site, all of which identified the presence of PFAS then and continue to show exceedances, including of Health Canada's drinking water screening values. The public was not notified of the PFAS contamination until 2017, and communication with the public has been limited in the period following.

https://doi.org/10.1289/EHP13954. 24 July 2024

The Ontario Fish Eating Guide restricts consumption of fish from Lee's Creek to ZERO. Lee's Creek drains into Trout Lake, approximately 700 metres away from the intake for the municipal water supply in Delaney Bay.

The City of North Bay's water supply (serving approximately 50,000 people) is contaminated with PFAS, which the water treatment plant is currently not capable of removing. Private homes also take water from Trout Lake. While limited remediation is in early stages at the contaminated properties, there has been no selection or application of PFAS treatment technologies at the City's drinking water plant.

A new industrial source of PFAS was introduced in 2023, with the arrival of the International Plastics Company (IPC). IPC self-describes as specializing in the production and distribution of finished and semi-finished products in PTFE and is part of the Italian-based Guarniflon Group, who have operations in India, Louisiana and – most recently – North Bay. Operations in North Bay include a distribution centre, custom-cutting of PFTE blocks, and a process for the production (through compression) and sintering of PFTE blocks.

The plant is operating in close proximity to the same portion of Trout Lake that has been most heavily impacted by PFAS contamination for DND properties. Prior to opening, local environmental and conservation groups met with the company and with the local office of the provincial environmental ministry, raising questions about the potential for PFAS / PFTE releases, including through the air emissions, dust, or potentially poor industrial hygiene practices.

Local expectations were that a permit to discharge to air would be posted to the provincial Environmental Registry and that there would be an opportunity for public comment, including on technical specifications – including those related to monitoring and emissions control – prior to a permit being issued. These expectations were confirmed by Ministry of the Environment representatives. In addition, company representatives committed to providing emissions monitoring results from a similar operation in Italy. Neither of these expectations were met.

In response to a public inquiry in March 2024, the local Ministry of the Environment disclosed that the company had been diverted from permitting process – including the public comment period – and instead had followed the process for "Environmental Activity and Sector Registrations" (EASRs) which the ministry spokesperson described as being "designed for companies with less complex operations and processes".

In addition to the potential for dispersion through poor industrial hygiene practices, the products being sintered at IPC are known to decompose at high temperatures, and the substances released are gaseous, harmful to birds and in humans the harmful fumes can cause flu symptoms such as fever, headache and shivers, colloquially known as "polymer smoke fever".

The community will be further impacted by PFAS because of the absence of a provincial permitting process that would examine and regulate air emissions and the failure of the federal government to appropriately recognize and regulate fluoropolymers. This will particularly apply to neighbourhoods like the one nestled between a contaminant source from an unregulated or under-regulated plastics plant and a PFAS impacted water body such as North Bay's Trout Lake.

The impacted North Bay community demonstrates the problem with a lack of effective coordination and cooperation between provincial and federal jurisdictions to deal with PFAS.

Recommendation 12: Ensure that the Revised risk management scope of PFAS includes details on how the Provinces/Territories comply with measures to address the class of PFAS (for example in drinking water, air releases, facility operations use and releases of PFAS).

4.5 F-gases as replacements for ozone depleting substances

We support the conclusion that HFOs and HCFOs are within the PFAS class as detailed in the Updated Draft PFAS Report (Section 3.3) The use of refrigerants and blowing agents using these F-gases with lower global warming potential may have reduced climate impacts but the inconvenient truth is that F-gases are creating widespread, persistent and growing global PFAS contamination.

F-gases are used in many applications including the electricity grid for insulation, in refrigeration, air conditioning, heat pumps, and even cars. Other uses include blowing agents in insulating foam, fire suppressants, and propellants and European data shows that of these uses, 75% are used in refrigeration, air conditioning and heat transfer fluids. F-gases are also used in the production of fluoropolymers.

F-gases are a significant climate issue, because they trap heat in the Earth's atmosphere. The global warming potential of F-gases range from a factor of 24,300 to 675 times worse than CO2 over a 100-year period.[45] F-gases constitute the largest proportion of PFAS by quantity and emissions in Europe, accounting for 63% of all PFAS emissions.[46] Data for Canada is absent in the draft State of PFAS Report. Emissions to the air occur through leaks, fugitive emissions and in use, such as in blowing agents or propellants.

The story of F-gases is a story of regrettable substitution. F-gases were introduced as ozone-friendly replacements in response to the 1987 Montreal Protocol agreement to phase out CFCs due to their destructive effect on earth's stratospheric ozone layer. In response to the CFC restriction, the chemical industry introduced hydrochlorofluorocarbon (HCFCs) and hydrofluorocarbons (HFCs) as replacements. These gases have lower ozone depleting potential but high global warming potential. As a result, the parties to the Montreal Protocol agreed to phase out HCFCs by 2020 and in 2016, the international community agreed to targets for the elimination of HFCs.

As alarm bells rang about the global warming potential of HFCs, the chemical industry produced the next F-gas generation (HFOs) with low global warming potential, and they have been steadily growing in use from 6% to 24% of total fluorinated gas volumes between 2016 and 2019.[47] PFAS producers

[45] About F-gases. European Commission. https://climate.ec.europa.eu/eu-action/fluorinated-greenhouse-gases/about-f-gases_en

[46] ANNEX XV RESTRICTION REPORT – Per- and polyfluoroalkyl substances (PFASs). Table 1. Estimated annual emissions from the use phase for PFAS manufacture and major PFAS use sectors in 2020. ECHA.

[47] New EU regulation on refrigerant gases can accelerate the PFAS pollution crisis. Chemsec Press Release. 11 Mar 2024. https://chemsec.org/new-eu-regulation-on-refrigerant-gases-can-accelerate-the-pfas-pollution-crisis/

claim that the use of F-gases in refrigeration is safe and can be responsibly manufactured and used with strict emissions control.[48]

But the inconvenient truth is that F-gases are creating widespread, persistent and growing global PFAS contamination. When these gases are released into the air they degrade to trifluoroacetic acid (TFA), a highly persistent and mobile PFAS, as acknowledged in the Updated Draft State of PFAS Report. TFA concentrations are now rapidly increasing in rainwater, groundwater, ocean water, human blood, urine, vegetation and indoor and outdoor dust. TFA is the most widely detected PFAS in house dust posing a direct exposure route to people, children and babies. TFA is now commonly found in bottled water, human blood, urine and breast milk.[49] No other substance has been found in so many environmental media, in these high concentrations and with such a fast increase. TFA is highly persistent with no known degradation half life, so the more TFA is produced from F-gas degradation, the more it will build up in the environment for generations to come.

TFA was recently measured as the dominant PFAS in Germany's drinking water.[50] The bad news is that TFA will be extremely difficult to remove using standard filtration and remediation technologies.[51] Estimated costs to even attempt to remove TFA would run to 200 billion euros per year for industrial wastewater and 38 billion euros per year for drinking water to be cleaned with reverse osmosis, the only one of two techniques that can remove TFA from the water. But it would be almost impossible to clean all drinking and wastewater with this technique as the infrastructure upgrade would not be realistic.[52] Robust data for the level of TFA in drinking water is absent for Canada but the problem is universal. We note that the second largest use of PFAS reported under the New Substances Notification Regulations is F-gases, which is why the refrigeration/air conditioning and sectors using blowing agents with PFAS, must be priorities for substitution to PFAS-free alternatives. Other sectoral use of F-gases needs to be documented.

For F-gases used in refrigeration and blowing agents, PFAS-free alternatives, such as natural refrigerants, are on the market and proven to be highly effective and cost competitive. Natural refrigerants include ammonia carbon dioxide, and hydrocarbons such as propane and isobutane and their use is done with safety protocols in place. According to industry analysts, energy efficiency of natural

[48] The World Needs F-gases. Chemours. https://www.chemours.com/en/chemistry-in-action/world-needs-f-gases

[49] Guomao Zheng. Elevated Levels of Ultrashort- and Short-Chain Perfluoroalkyl Acids in US Homes and People. Environ Sci Technol. 2023 Oct 24; 57(42): 15782–15793. doi: 10.1021/acs.est.2c06715

[50] Isabelle J. Neuwald et al. Ultra-Short-Chain PFASs in the Sources of German Drinking Water: Prevalent, Overlooked, Difficult to Remove, and Unregulated. Environ. Sci. Technol. 2022, 56, 10, 6380–6390. May 4, 2022. https://doi.org/10.1021/acs.est.1c07949

[51] Behringer et al, Final Report Persistent degradation products of halogenated blowing agents in the environment type, environmental concentrations and fate with particular regard to new halogenated substitutes with low global warming potential, German Environment Agency, 2021, at: https://www.umweltbundesamt.de/sites/default/files/medien/5750/publikationen/2021-05-06_texte_73-2021_persistent_degradation_products.pdf, p. 119. and Scheurer M, Nödler K, Freeling F, Janda J, Happel O, Riegel M, Müller U,Storck FR, Fleig M, Lange FT, Brunsch A, Brauch HJ, "Small, mobile, persistent: Trifluoroacetate in the water cycle - Overlooked sources, pathways, and consequences for drinking water supply,"Water Resources, 2017 Dec 1;126:460-471 at: https://pubmed.ncbi.nlm.nih.gov/28992593/.

[52] SETAC Europe 2022 Keynote- Hans Peter H. Arp: Reducing Pollution of PMT Substances to Protect Water. https://www.youtube.com/watch?v=s6_O6MBpE8k&t=1648s

refrigerants can rival or exceed efficiency of fluorinated gasses currently used as refrigerants[53] and the market share for natural refrigerants is rising steadily. [54]

Recommendation 13: The Revised risk management scope for PFAS should include the need to prohibit the use of F-gases as regrettable substitutions for ozone depleting substances, and prevent further formation of TFA. Regulatory emphasis on the need to transition to safer PFAS-free alternatives for refrigeration and blowing agents is needed to transition to safer alternatives that are already on the market. We owe it to future generations to ensure we are championing and implementing true climate solutions that will not increase the PFAS burden onto us and future generations.

4.6 Hazardous designation for waste containing PFAS

The Revised risk management scope for PFAS does not include a proposal to track or address PFAS in waste, particularly for the transboundary movement of waste containing PFAS. Under the Cross-border Movement of Hazardous Waste and Hazardous Recyclable Material Regulations, Schedule 2 Environmentally Hazardous Constituents. PFAS is currently not listed on Schedule 2.[55]

Recommendation 14: Designate PFAS as a class as hazardous substances under Cross-border Movement of Hazardous Waste and Hazardous Recyclable Material Regulations to be able to implement a Prior Informed Consent requirement.

We would also like to note that in October 2020, the governments of Canada and the United States reached an agreement concerning the environmentally sound management of non-hazardous waste and scrap that are transported across their borders. The arrangement specifically covers waste and scrap materials that are not included under the OECD Decision (OECD/LEGAL/0266) or the Canada-US Agreement on the Transboundary Movement of Hazardous Waste. According to the arrangement, both countries should guarantee that non-hazardous plastic waste is managed in an environmentally sound manner, which includes recycling, energy recovery and disposal.

In line with this agreement, the International Recycling Group signed an MOU on Plastics Recycling Arrangement with Stelco Inc. of Canada. The idea is to sell flaked, unrecyclable plastics to a steel-making facility in Nanticoke, Ontario (Stelco), to partially replace coke.

Noting that PFAS can be found in various types of plastic products, it is important for companies such as Stelco to guarantee that using plastic as an alternate fuel will not result in toxic emissions and toxic ash. Companies should provide the federal, state, and local governments with documents explaining how they plan to address this.

[53] https://cooltechnologies.org

[54] Natural Refrigerants: State of the Industry Report: Commercial and Industrial Refrigeration in Europe, North America and Japan. 2022 Edition. ATMOsphere. February 2023.

[55] Cross-border Movement of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2021-25). https://laws.justice.gc.ca/eng/regulations/sor-2021-25/page-11.html#docCont

4.7 Biosolids

Shortly after publication of the Draft State of PFAS Report in May 2023, the Canadian Food Inspection Agency (CFIA) announced plans to engage with other levels of government and industry stakeholders to implement an interim standard for PFOS in domestic and imported biosolids used in fertilizers, set at 50 parts per billion (ppb) (the Interim Standard), to mitigate the potential risks to human health through farming. The sixty-day public consultations ended in February 2024.[56] However, we do not know when CFIA will finalize guidelines on biosolids. Communities have no information about the level of PFAS in biosolids being sold and spread on farmland and forests, or whether biosolids are regularly tested for PFAS contamination. There has been no information available on whether tests are conducted for total fluorine contamination or only for a limited number of PFAS banned in Canada since 2016.

This again emphasizes the lack of coordination between provincial jurisdictions who set regulations on contaminants in biosolids, municipalities who authorize the permitting of biosolid use from municipal waste water treatment plans, and the Federal Government who sets chemical policies. It also highlights the need for greater community right to know about PFAS releases in their community.

Recommendation 15: The Provincial and territorial response to proposed guidelines to address PFAS in biosolids, drinking water, air standards for affected industrial operations should be undertaken without delay. Require public reporting on an annual basis of provincial/territorial response to address PFAS in biosolids, wastewater treatment plant, air and drinking water.

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[56] https://inspection.canada.ca/en/about-cfia/transparency/consultations-and-engagement/completed/interim-standards-pfas