



Raising the Alarm: the Case for Better Flame Retardant Regulation in Canada

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Executive Summary

In the 1970s, consumer product manufacturers began adding industrially produced chemicals into their products in order to decrease product flammability and reduce house fires (“flame retardants”). Today, flame retardants continue to be added to, and found in, common household products such as furniture, mattresses, consumer electronics, camping gear, fabrics, vehicles, construction materials, and children’s toys.

Unfortunately, scientific literature and public health bodies have identified that many common flame retardants pose serious long-term health risks to the general public – who are exposed to these chemicals on a daily basis. In addition to the risks for consumers generally, there are several at-risk populations that are rendered significantly more vulnerable and/or exposed to the health risks posed by flame retardants, including young children, fetuses, pregnant women and fire fighters. In British Columbia, flame retardants have also been found to have serious impacts on the health of endangered Southern Resident killer whales as well as other marine mammals.

It is astonishing that these harmful chemicals continue to be added to consumer products despite widely accepted evidence that applying flame retardants to household items **makes no practically significant difference** in terms of preventing house fires or increasing fire safety.

As a result of the profound long-term health risks and environmental impacts of flame retardants, this report proposes that the Canadian federal government follow the lead of the many jurisdictions that have restricted flame retardant usage.

The report proposes that the federal government, through its regulatory powers under the *Canada Consumer Product Safety Act*:

- ● Introduce a ban on the manufacture, sale, distribution and import of household items in four proposed categories (“Four Proposed Product Categories”):
 - 1. children’s products;
 - 2. upholstered furniture;
 - 3. mattresses; and
 - 4. plastic casings surrounding electronics,which contain any chemicals belonging to the class of organohalogen¹ flame retardants; and
- ● Require that a flame retardant falling outside of the organohalogen class undergo testing to demonstrate that it:
 - ○ will not negatively impact human health;
 - ○ that its use is necessary; and
 - ○ no safer alternative exists,before being added in one of the four product categories.

These proposed regulations should be a first step towards broader reform to eliminate organohalogens generally. In order to achieve this longer-term goal, the *Canadian Environmental Protection Act* should be used to generally prohibit the manufacture, use, sale and import of all organohalogens.

This report also proposes supplementary policy measures that the Government of Canada can take, including:

- an immediate halt to federal government purchasing of products containing organohalogen flame retardants for the Four Proposed Product Categories; and
- the creation of a publically accessible online registry of flame retardants and their health risks.

¹ As will be detailed in this report, the proposed approach applies specifically to additive, non-polymeric, organohalogen flame retardants.

...there are several at-risk populations that are rendered significantly more vulnerable and/or exposed to the health risks posed by flame retardants, including young children, fetuses, pregnant women and fire fighters.

The proposed regulatory approach, directed at the class of organohalogen flame retardants and common consumer goods that young children and fire fighters are most often exposed to, has been developed and endorsed by leading public health researchers and organizations. Significantly, in September 2017, the US Consumer Product Safety Commission, a US federal agency, voted to approve a petition to initiate federal law-making procedures to prohibit the addition of organohalogen flame retardants – as a class – in the Four Proposed Product Categories.² In the interim period, as these law reform measures are pursued, the US Consumer Product Safety Commission requested that manufacturers “eliminate” the use of organohalogen flame retardants in these categories and warned pregnant mothers to “obtain assurances from retailers” that any products they buy are free of organohalogen flame retardants.³ In response to the US Commission’s findings and approval of proposed regulatory action, several states including California, Minnesota, Maine and Rhode Island have introduced wide prohibitions on the use of flame retardant chemicals in consumer products.

² For the current state of US federal regulations with respect to organohalogen flame retardants, see “Flame Retardants,” online: *US Consumer Product Safety Commission* <www.cpsc.gov/Business--Manufacturing/Business-Education/Business-Guidance/flame-retardants>. The September 2017 petition initiated rulemaking under the US *Federal Hazardous Substances Act* (FHSA) (15 USC Ch 30 §§ 1261-1278a) and directed staff to convene a Chronic Hazard Advisory Panel pursuant to procedures in the US *Consumer Product Safety Act* (15 USC Ch 47 §§ 2051–2089) in order to assess and report on the risks to consumers’ health and safety from the use of additive, non-polymeric organohalogen flame retardants (OFRs). In order to determine that OFRs are a “hazardous substance” under the FHSA, they must be determined to be toxic. See “Minutes of Commission Meeting September 20, 2017,” online: *US Consumer Product Safety Commission* <www.cpsc.gov/s3fs-public/Minutes_of_Commission-Meeting_September-20-2017-Petition_HP_15-1_Organohalogen_Flame_Retardants.pdf?vBwPee3oztjVKAWUq1k4QLtEJMPJCFL2>. A 2019 report by the National Academy of Sciences (NAS) concluded that hazard assessment of organohalogen flame retardants should be done *not* by treating organohalogen flame retardants as a single class, but by dividing them into 14 subclasses: “Organohalogen Flame Retardants Used in Consumer Products Cannot be Assessed for Hazards as a Single Class, But Can Be Assessed in Subclasses, Says New Report” (15 May 2019), online: *The National Academies of Sciences, Engineering, Medicine* <www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=25412>. The US Consumer Product Safety Commission’s Operating Plan for Fiscal Year (FY) 2020 says that “[i]n FY 2020, staff will continue to evaluate the completed NAS study [mentioned above] and develop proposals for methods to collect and analyze data and other information to perform risk assessment”; see *Fiscal Year 2020 Operating Plan* (approved 16 October 2019) at p 16, online (pdf): *US Consumer Product Safety Commission* <www.cpsc.gov/s3fs-public/FY-2020-Op-Plan.pdf?rWcNsxRYLVDeWWsCZX2FeGdh56A7MwHv>.

³ *Guidance Document on Hazardous Additive, Non-Polymeric Organohalogen Flame Retardants in Certain Consumer Products*, 82 Fed Reg 45268 (2017), at p 45269, online (pdf): <www.gpo.gov/fdsys/pkg/FR-2017-09-28/pdf/2017-20733.pdf> (“CPSC Guidance Document”).

Previously, when the Canadian federal government and other governments have approached flame retardant prohibitions, they have done so on a limited substance-by-substance basis. However, in response, the chemical industry has simply substituted the newly prohibited flame retardant with a structurally similar, but less studied and unregulated flame retardant. Learning from this previous pattern, this report proposes that the Canadian federal government:

- Introduce a class-wide ban on organohalogen flame retardants, following similar precedents in US jurisdictions such as the States of California, Maine and Rhode Island; and
- Similar to requirements in place for hazardous chemicals in California, Oregon, and Minnesota, require that other, non-organohalogen flame retardants be subjected to precautionary testing and safer alternative assessments before being added to any of the Four Proposed Product Categories.

This report has six parts:

- **Part 1** discusses the different categories of flame retardant chemicals found in consumer products and identifies why organohalogen flame retardants form the centre piece of this report's proposed regulatory approach.
- **Part 2** outlines the scandal-laden history of how flame retardant chemicals became ubiquitous in our environments.
- **Part 3** discusses specific health risks flame retardant chemicals pose to the general Canadian public – as well as the special risks faced by pregnant women, young children, fire fighters, and Southern Resident killer whales.
- **Part 4** describes in detail the proposed regulatory approach advocated to address these concerns, and the importance of banning an entire class of organohalogen flame retardants in key products, while requiring precautionary testing and alternative assessments of replacement flame retardants.
- **Part 5** identifies how the Canadian federal government may implement this approach under the *Canada Consumer Product Safety Act*.
- **Part 6** identifies recommended supplementary non-legal policy measures that can be mobilized to help address the pressing health risks posed by flame retardants.

Finally, this report includes two important appendices:

- **Appendix 1** summarizes Canada's current flame retardant regulations;
- **Appendix 2** details recent legislative approaches taken by several US jurisdictions to prohibit the use of flame retardants in categories of consumer products.

Ultimately, many North American jurisdictions with large markets are recognizing the health risks posed by flame retardants in consumer products – Canada should build upon these precedents and take action to protect Canadian consumers, fire fighters, and the environment.



Fire Retardants in our Consumer Products: All of the Health Risks and None of the Benefits

PART 1. WHAT ARE FLAME RETARDANTS AND WHAT DO WE KNOW ABOUT THEM?

Flame retardants can generally be separated into three broad categories based upon their chemical structures:

1. organohalogen;⁴
2. organophosphate;⁵ and
3. mineral/salt/amine (“mineral”) flame retardants.⁶

As will be discussed, additive, non-polymeric, organohalogen⁷ flame retardants are the most concerning class of flame retardants. Not only have they been used in our consumer products for the longest, but they are also known by virtue of their very chemical structure to:

- easily migrate out of products and into the air and dust that surrounds us;
- be highly persistent and toxic in the environment;
- increase in concentration as they move up the food chain and into our bodies, and;
- produce highly potent, carcinogenic dioxins when exposed to fire.⁸

⁴ “Organohalogen chemicals are created by combining carbon molecules with one of the halogen elements. Organohalogen flame retardants (also referred to as halogenated flame retardants) contain bonds between carbon and the elements bromine or chlorine. This class includes brominated and chlorinated phosphate ester flame retardants,” American Academy of Pediatrics et al (the Petitioners), “16 CFR § 1051 Petition for Rulemaking” (2015), submitted to the US Consumer Product Safety Commission, at p 2, footnote 3, online (pdf): earthjustice.org/sites/default/files/files/FHSA-Petition%20revised_6-30-15.pdf (“CPSC Submission”).

⁵ Organophosphate flame retardants contain phosphate groups bound to carbon; Michel Dedeo & Suzanne Drake, “Healthy Environments: Strategies for Avoiding Flame Retardants in the Built Environment – A Perkins + Will White Paper” (15 October 2014), at p. 8, online (pdf): www.ecohabitation.com/media/archives/sites/www.ecohabitation.com/files/nouvelle/perkinswill_flameretardantalternatives.pdf (“Dedeo & Drake”).

⁶ This is a broad category that contains flame retardants that are neither halogenated nor organophosphate. These compounds can contain boron, aluminum, inorganic phosphorus (not bound to carbon), nitrogen, calcium, and magnesium. *Ibid* at p 8.

⁷ From this point onwards, this report will use the term “organohalogen” to refer to additive, non-polymeric organohalogen flame retardants due to the specific risks that those pose.

⁸ Dedeo & Drake, *supra* note 5, at p 9.

...applying flame retardants to household items makes no practically significant difference in terms of preventing house fires or increasing fire safety.

Common organohalogen chemicals used as flame retardants include, PBDEs,⁹ HBCD,¹⁰ TBBPA,¹¹ Firemaster® 550¹² and TDCPP.¹³ In 2012, a research group at the University of California, Riverside, identified 83 different types of organohalogen flame retardants that were currently being used, or available for potential use, in consumer products in North America.¹⁴ Upon screening all 83 identified organohalogen flame retardants, the University of California researchers found:¹⁵

- 58% of the organohalogen flame retardants “are toxic and should not be used;”
- 31% of the organohalogen flame retardants “are of high concern and should be avoided;” and
- 11% of the organohalogen flame retardants “raise moderate concerns and safer alternatives need to be found.”

Significantly, when the researchers took into account data gaps present for several of these chemicals, the study concluded that the entire class of 83 organohalogen flame retardants were either of high concern or toxic.¹⁶ This finding, that as a class, organohalogen flame retardants pose a threat to human health and the environment is consistent with Biomonitoring California’s designated chemicals list, which identifies organohalogen flame

⁹ Polybrominated diphenyl ethers. “There are 209 different PBDE congeners that share the same basic molecular structure and are classified into 10 major groups according to the number of bromine atoms (*e.g.* tetrabrominated diphenyl ether or tetraBDE, pentaBDE, hexaBDE, heptaBDE, octaBDE, nonaBDE, and decaBDE). The focus of Canada’s...regulatory approach... is on the three commercial mixtures of PBDEs (referred to as pentaBDE, octaBDE, and decaBDE);” David Boyd & Dr. S. Scott Wallace, “Fireproof Whales and Contaminated Mother’s Milk: The Inadequacy of Canada’s Proposed PBDE Regulations” (David Suzuki Foundation: October 2006), at p 7, online (pdf): [David Richard Boyd <davidrichardboyd.com/wp-content/uploads/PBDE-report.pdf>](http://davidrichardboyd.com/wp-content/uploads/PBDE-report.pdf) (“Boyd & Wallace”).

¹⁰ Hexabromocyclododecane, also known as HBCDD.

¹¹ Tetrabromobisphenol A.

¹² Firemaster® 550 is “a mixture of two organophosphate and two organohalogen chemicals, which are also now known to be toxic. Firemaster® 550 is an endocrine disruptor that has been associated with weight gain, early onset of puberty and cardiovascular health effects;” CPSC Submission, *supra* note 4 at p 13.

¹³ Tris (1,3-dichloro-2-propyl) phosphate (TDCPP), also known as chlorinated tris. This chemical was used extensively in polyurethane foam in furniture and child products; CPSC Submission, *supra* note 4 at p 13.

¹⁴ Eastmond, DA Bhat, VS & Capsel K, *A Screening Level Assessment of the Health and Environmental Hazards of Organohalogen Flame Retardants* (Capri, Italy: Collegium Ramazzini, 2012), cited in CPSC Submission, *supra* note 4 at p 48.

¹⁵ *Ibid* at p 49.

¹⁶ *Ibid* at p 52.

...organohalogen flame retardants pose a threat to human health and the environment.

retardants as chemicals that are “known to, or strongly suspected of, adversely impacting human health or development, based upon scientific, peer reviewed...studies.”¹⁷

As documented by the US Consumer Product Safety Commission, a federal agency tasked with protecting consumers from *both* fire and chemical hazards,¹⁸ “known adverse health effects of [organohalogen flame retardants] include: Reproductive impairment...; neurological impacts (*e.g.*, decreased IQ in children, impaired memory, learning deficits, altered motor behavior, hyperactivity); endocrine disruption and interference with thyroid hormone action (potentially contributing to diabetes and obesity); genotoxicity; cancer; and immune disorders.”¹⁹

As a result of these documented health effects, and the persistence of these chemicals in our environment the US Consumer Product Safety Commission voted to approve a petition in September 2017 to initiate rulemaking procedures under federal law to prohibit the use of organohalogen flame retardants in children’s products, upholstered furniture, mattresses, and plastic casings surrounding electronics.²⁰ Additionally, the US Consumer Product Safety Commission requested that, in the interim period as law reform measures are pursued, manufacturers “eliminate” the use of organohalogen flame retardants in these categories of consumer products and warned pregnant mothers, and consumers with young children, to “obtain assurances from retailers” that any products they buy are free of organohalogen flame retardants.²¹

In addition to organohalogen flame retardants, organophosphate flame retardants have also been found to pose health risks such as endocrine disruption. Furthermore, some

¹⁷ The quote is from the definition of “designated chemicals” in *California Environmental Contaminant Biomonitoring Program*, 103 Cal Health and Safety Code part 5 ch 8 art 1 § 105440 (b)(6). The current designated chemicals list, maintained by Biomonitoring California, can be found at “Chemicals,” online: *Biomonitoring California* <biomonitoring.ca.gov/chemicals>. As of the writing of this report, the most recent designated chemicals list is dated July, 2019. It can be found at “Designated Chemicals” (July 2019), online (pdf): *Biomonitoring California* <biomonitoring.ca.gov/sites/default/files/downloads/DesignatedChemicalsList_July2019.pdf>. Organohalogen flame retardants are listed as “Brominated and Chlorinated Organic Compounds Used as Flame Retardants” at pp 1-2.

¹⁸ Among other things. See “About CPSC”, online: *United States Consumer Product Safety Commission* <www.cpsc.gov/About-CPSC>. For a discussion of the known and suspected health effects of organohalogen chemicals by the Biomonitoring California, see Gail Krowech, “Brominated and Chlorinated Organic Chemical Compounds Used as Flame Retardants, Presentation to Scientific Guidance Panel” (5 December 2008), online (pdf): <https://biomonitoring.ca.gov/sites/default/files/downloads/120408flame_pres.pdf>.

¹⁹ CPSC Guidance Document, *supra* note 3 at p 45269.

²⁰ *Ibid* at p 45268. See also *supra* note 2.

²¹ CPSC Guidance Document, *supra* note 3 at p 45269.

...known adverse health effects...include: Reproductive impairment...; neurological impacts (e.g., decreased IQ in children, impaired memory, learning deficits, altered motor behavior, hyperactivity); endocrine disruption and interference with thyroid hormone action (potentially contributing to diabetes and obesity); genotoxicity; cancer; and immune disorders.

organophosphate flame retardants have been found to be semi-volatile – meaning they can move out of consumer products into air and dust.²² Additionally, some mineral flame retardants are also persistent in our environment – although they are generally less likely to migrate out of consumer products and tend not to increase in concentration as they move up the food chain and into our bodies.²³ However, organohalogen flame retardants form the centre of this report’s policy recommendations as they are the most pervasive, well studied,²⁴ volatile (*i.e.* move the easiest into our bodies) class of flame retardants and pose elevated health risks upon combustion – a problem that poses a particular health risk for fire fighters who are exposed to the toxins that are released from combustion more frequently than the general population.

However, to address the potential harms posed by other flame retardants, and to avoid the problem of regrettable substitution,²⁵ this report also recommends mandatory precautionary testing and alternative assessments of any proposed non-organohalogen flame retardant before it is approved for use in any of the Four Proposed Product Categories.

²² Dedeo & Drake, *supra* note 5 at p 9; CPSC Submission, *supra* note 4 at pp 55-56.

²³ Dedeo & Drake, *supra* note 5 at p 9.

²⁴ CPSC Submission, *supra* note 4 at p 56.

²⁵ Regrettable substitution occurs when in response to regulations prohibiting or placing conditions on the use of a particular hazardous chemical, new chemical replacements are introduced that may only be different enough in their composition to be considered distinct by regulators. These chemicals have not been proved to be safer and can sometimes lead to the introduction and proliferation of even more hazardous chemicals. See “Harmful chemicals removed from products often replaced with something as bad or worse,” online: *Harvard T.H. Chan School of Public Health* <www.hsph.harvard.edu/news/hsph-in-the-news/harmful-chemicals-removed-from-products-often-replaced-with-something-as-bad-or-worse/>.

PART 2. A LONG HISTORY OF INADEQUATE PROTECTION

Given the “overwhelming scientific evidence”²⁶ of the health risks posed by organohalogen flame retardants and their limited utility in increasing fire safety, how did these chemicals become so ubiquitous in our lives?

Flame retardants began appearing in commercial products in North American markets in the 1970s. Most notably, in 1975, the State of California introduced a flammability standard for upholstered furniture sold within the state.²⁷ The mandatory performance standard required that the foam/filler in upholstered furniture be able to withstand 12 seconds of a small open flame without igniting. To meet this standard, manufacturers began dousing the filler in residential upholstered furniture with large amounts of flame retardant chemicals.²⁸ Because California is such a large market for consumer products, manufacturers across North America (and some global manufacturers) began ensuring that all of their upholstered furniture could pass California’s flammability standard. Instead of creating separate products specifically for California, manufacturers chose to meet the California standard and mass produce only one version of their product to be sold on all markets. As a result, the vast majority of upholstered furniture sold in the US and Canada after 1975 contained flame retardant chemicals.²⁹ Other products sold throughout the US, including baby products such as car seats, strollers, and changing table pads, have been found to contain flame retardant chemicals as well.³⁰

Similar flammability standards for a wide variety of products, including electronics and appliances, have been developed by a large number of standards bodies.³¹ For example,

²⁶ CPSC Guidance Document, *supra* note 3 at p 45269.

²⁷ This flammability standard was called Technical Bulletin 117 (TB 117); the new smolder standard is Technical Bulletin 117-2013. See “Technical Bulletin 117 - Residential Upholstered Furniture Standard - Fact Sheet,” at p 1, online (pdf): *California Bureau of Household Goods and Services* <www.bearhfti.ca.gov/industry/tb_117_faq_sheet.pdf> (“TB 117 Fact Sheet”).

²⁸ *Ibid.* See also Heather M. Stapleton *et al*, “Identification of Flame Retardants in Polyurethane Foam Collected from Baby Products” (2011) 45 *Environmental Science & Technology* 5323 at p 5324, online: <pubs.acs.org/doi/pdf/10.1021/es2007462> (“Flame Retardants in Baby Products”).

²⁹ “Toxic by Design: Eliminating harmful flame retardant chemicals from our bodies, homes, & communities” (October 2016) at p 13, online (pdf): *Endocrine Disruptors Action Group* <endocrinedisruptorsaction.files.wordpress.com/2016/10/toxicbydesign-oct25-lg.pdf> (“Toxic by Design”).

³⁰ Flame Retardants in Baby Products, *supra* note 28 at pp 5323 & 5324. Other baby products surveyed by the study include nursing pillows, portable crib mattresses, and infant sleep positioners (p 5324). The study notes that, “[d]espite the fact that compliance with TB117 is only required for residential upholstered furniture sold in the State of California, a significant fraction of products sold elsewhere in the US also complies with TB117 and therefore also contains flame retardant additives” (*ibid.*). See also Susan D Shaw, Arlene Blum *et al*, “Halogenated Flame Retardants: Do the Fire Safety Benefits Justify the Risks?” (2010) 25:4 *Reviews on Environmental Health* 261 at p 278, online (pdf): <greensciencepolicy.org/wp-content/uploads/2013/12/25-HFRs-benefit-v-risk-Review-of-Env-Health-2010-SHAW-BLUM-et-al.pdf> (“Shaw & Blum”). Shaw & Blum notes that “TB117 is becoming a de facto national standard, with organohalogen flame retardants being found in many baby products containing polyurethane foam” (p 278).

³¹ Shaw & Blum, *supra* note 30 at p 278.

...numerous studies have found that fire fighters have higher levels of organohalogen flame retardants and dioxins and furans in their bloodstreams than the average population.

many electronic products comply with a voluntary flammability standard known as UL-94, which is met by adding flame retardant chemicals to internal components and their plastic outer casings, including those of TVs.³²

Unfortunately, not only did the California flammability standard lead to increased exposure to toxic chemicals in households across North America – it actually failed to increase fire safety. A 2012 test conducted by the US Consumer Product Safety Commission found that “fire-retardant foams did not offer a practically significantly greater level of **open flame safety** than did the untreated foams.”³³ Moreover, not only do fire-retardant treated foams fail to practically increase fire safety in instances of fires ignited by **open flames**, they are not designed to provide any increased protections against the leading cause of fire ignition: **smoldering sources** such as cigarettes and radiant heaters.³⁴ Thus, while foam doused in flame retardants is able to pass a small “open flame” test, this fails to take into account the nature of real life house fires and does not significantly impact fire safety. This is now widely acknowledged.³⁵

Significantly, the choice has never been between the addition of flame retardants to household items (which both the federal US Consumer Product Safety Commission and California’s bureau have concluded offer no meaningful protection),³⁶ or no fire safety features/protective measures at all.

Instead, other more effective fire safety measures are available. Several studies have found that the use of different material linings, certain types of fabric covering, and cotton filling can have “a large influence” and can “substantially reduce” the ease with which a product

³² Amy Westervelt, “Flame retardants may be coming off of furniture, but they’re still in your TV sets,” *The Guardian* (19 May 2015), online: <www.theguardian.com/sustainable-business/2015/may/19/flame-retardant-chemicals-tvs-electronics-hazard>.

³³ “Upholstered Furniture Full Scale Chair Tests – Open Flame Ignition Results and Analysis – Memorandum to Dale R Ray, Project Manager, Upholstered Furniture Project” (9 May 2012), at p 23, online (pdf): *US Consumer Product Safety Commission* <www.cpsc.gov/s3fs-public/openflame.pdf> (emphasis added).

³⁴ TB 117 Fact Sheet, *supra* note 27 at pp 1-2.

³⁵ *Ibid.* Also of note, in 2018, the State of California passed Bill AB 2998 which, in addition to prohibiting the use of organohalogen flame retardants in some common household products, “declare[d]” that “[f]lame retardant chemicals are not needed to provide fire safety” (US, AB 2998, *An act to add Article 5.5 (commencing with Section 19100) to Chapter 3 of Division 8 of the Business and Professions Code, relating to business*, Cal, 2017-2018, s 1(a), online: <leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB2998>).

³⁶ US, *Flame Retardants and Technical Bulletin 117-2013*, Background for the Informational Hearing of the Senate Environmental Quality Committee, Cal (2 April 2014) at p 2, online (pdf): <senv.senate.ca.gov/sites/senv.senate.ca.gov/files/Background-Flame%20retardants.pdf>.

...flame retardant chemicals continue to be present in many Canadian household products – and ultimately in Canadians’ bloodstreams. ...other more effective fire safety measures are available.

can catch on fire.³⁷ Therefore, the use of flame retardants to meet open flame flammability tests has encouraged the addition of harmful chemicals in consumer products that not only negatively impact long-term human health – they have also drawn the focus away from *product design* that can effectively increase fire safety and save lives.

Recognizing these significant flaws with the open flame flammability test,³⁸ a new “smolder standard” flammability standard was introduced in the State of California (TB 117-2013),³⁹ which effectively repealed and replaced the old open flame standard (TB 117). The focus of the new test is on the upholstery cover fabric of furniture and its response to smoldering sources, as well as the interactions between components within furniture (*i.e.* foam, fabric and protective batting).⁴⁰ Importantly, the new standard was specifically designed to be met *without the use of flame retardants* and also introduced new labelling requirements requiring manufacturers to indicate on their products whether they contain any added flame retardant chemicals.⁴¹

So, why did it take so long to change the law, despite known health risks and limited practical fire-safety benefits? It is well documented that the reason that California’s 1975 open flame standard took approximately 40 years to change – and fire retardant chemicals continued to be added to products to meet the standard – was the extremely effective lobbying and scare campaign led by the chemical industry.⁴² In fact, the chemical industry spent approximately \$23 million US dollars in lobbying against the introduction of a new flammability standard that could be met without the use of flame retardants.⁴³ Additionally, as documented by the *Chicago Tribune*, chemical companies had paid for the testimony of a respected burns surgeon who testified against the new flammability standard before

³⁷ *Ibid.*

³⁸ *Ibid* at p 3.

³⁹ The new standard became mandatory on January 1, 2015: “The New California TB116-2013 regulation: What does it mean?” (11 Feb 2014) at p 1, online (pdf): *Green Science Policy Institute* <greensciencepolicy.org/wp-content/uploads/2015/06/TB117-2013_manufacturers_021114.pdf>.

⁴⁰ TB 117 Fact Sheet, *supra* note 27 at pp 1-2.

⁴¹ SF Environment, a Department of the City and County of San Francisco, “Flame Retardant Ordinance and Furniture Retailers Factsheet,” online (pdf): <sfenvironment.org/sites/default/files/fliers/files/sfe_th_factsheet_furniture_flameretardants.pdf> (“SF Factsheet”).

⁴² See the award winning Chicago Tribune exposé, Patricia Callahan, Sam Roe, and Michael Hawthorne, “Tribune Watchdog: Playing with Fire” (2012), online: <media.apps.chicagotribune.com/flames/index.html>.

⁴³ Liza Gross, “Money to Burn,” *East Bay Express* (16 November 2011), online: <www.eastbayexpress.com/oakland/money-to-burn/Content?oid=3042155&showFullText=true>.

...the chemical industry spent approximately \$23 million US dollars in lobbying against the introduction of a new flammability standard that could be met without the use of flame retardants.

California lawmakers, and who falsified stories of babies who suffered fatal burns while laying on bedding without flame retardants.⁴⁴ [A Government of Canada decision to take further action on flame retardants in Canada today must not be delayed by economic pressures – pressures that have presented themselves recently through the lobbying activities of the bromine industry in Canada in relation to the regulation of flame retardant chemicals under the *Canadian Environmental Protection Act, 1999* (“CEPA”)⁴⁵ (bromine is found in some flame retardants).]⁴⁶

While the new California flammability standard was introduced to *allow* manufacturers to discontinue the use of flame retardants in their products, TB 117-2013 does not explicitly restrict their addition. As a result, some manufacturers continued using flame retardants in upholstered furniture and children’s products.⁴⁷ Recognizing this gap, the City and County of San Francisco, followed by the State of California, introduced new laws banning the manufacture and sale of upholstered furniture containing flame retardants within their jurisdictional boundaries – these prohibitions took effect January 1, 2019 and January 1, 2020 respectively.⁴⁸ Despite these sweeping prohibitions in California, and the continued sale of upholstered furniture (as well as other consumer products) with dangerous levels of flame retardants in Canada, Canadian governments have failed to introduce similar broad prohibitions.

Having said that, Canada has taken some steps over the past 15 years to deal with certain flame retardant substances. In particular, beginning with the 2006 *Ecological Screening Assessment Polybrominated Diphenyl Ethers (PBDEs)*, under CEPA, the federal government

⁴⁴ Patricia Callahan & Sam Roe, “Fear fans flames for chemical makers,” *Chicago Tribune* (6 May 2012), online: <www.chicagotribune.com/investigations/ct-met-flame-retardants-20120506-story.html>; see also Sam Roe & Patricia Callahan, “Former chief of Harbourview burn unit relinquishes medical license,” *Seattle Times* (23 May 2014), online: <www.seattletimes.com/seattle-news/former-chief-of-harborview-burn-unit-relinquishes-medical-license/>.

⁴⁵ SC 1999 c 33.

⁴⁶ Toxic by Design, *supra* note 29 at p 12.

⁴⁷ *Ibid*, at p. 5.

⁴⁸ SF Factsheet, *supra* note 41 at p 1.

⁴⁹ *Ibid* with respect to the San Francisco ordinance; with respect to the State of California, see 8 Business and Professions Code ch 3 art 5.5 § 19101, online: <leginfo.ca.gov/faces/codes_displayText.xhtml?lawCode=BPC&division=8.&title=&part=&chapter=3.&article=5.5>. The specifics of the State of California’s prohibitions will be explored later in this report.

...chemical companies had paid for the testimony of a respected burns surgeon who testified against the new flammability standard before California lawmakers, and who falsified stories of babies who suffered fatal burns laying on bedding without flame retardant.

has moved to restrict the use of PBDEs.⁴⁹ Canada currently prohibits the manufacture, use, sale or import of PBDEs (with a limited number of exceptions), and HBCDs (with a limited number of exceptions).⁵⁰

Canada is a party to the *Stockholm Convention on Persistent Organic Pollutants*,⁵¹ the objective of which is “to protect human health and the environment from persistent organic pollutants” (“POPs”).⁵² Canada’s PBDE regulations were enacted partially to comply with Article 3 of the Convention, which obliges the parties to the convention to “prohibit and/or take the legal and administrative measures necessary to eliminate the production, use, import and export if POPs that are listed in Annex A of the Convention” (PBDEs are listed).⁵³

Additionally, Canada launched the Chemicals Management Plan (“CMP”) in 2006. The CMP provides a framework for assessing and managing the risks associated with chemical substances in general, in accordance with CEPA. A number of flame retardant substances

⁴⁹ Duncan Berry Consulting, “Polybrominated Diphenyl Ethers in the Great Lakes Basin: Final Report”, (Submitted to the International Joint Commission – Great Lakes Water Quality Board Legacy Issues Working Group, 30 October 2016) at pp 63 & 67-70, online (pdf): [International Joint Commission <legacyfiles.ijc.org/tinymce/uploaded/WQB/Appendix-A_WQB-PBDE_Consultants_Report.pdf>](http://legacyfiles.ijc.org/tinymce/uploaded/WQB/Appendix-A_WQB-PBDE_Consultants_Report.pdf); See also Health Canada, *Polybrominated Diphenyl Ethers (PBDEs) risk assessment* (date modified: 21 December 2018), online: www.canada.ca/en/health-canada/services/chemical-substances/other-chemical-substances-interest/polybrominated-diphenyl-ethers-risk-assessment.html.

⁵⁰ As well as other flame retardants. See Table 1 of Appendix 1 to this report. Environment and Climate Change Canada is currently proposing to amend the CEPA regulations to remove the exemptions on PBDEs (except decaBDE, which has an exemption for spare automotive parts that would continue until 2036) and HBCD; see Environment and Climate Change Canada, *Proposed amendments to the Prohibition of Certain Toxic Substances Regulations, 2018 consultation document: chapter 2*, at 2.5.4 (for HBCDs) and at 2.6.3 (for PBDEs), online: www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/proposed-amendments-certain-toxic-substances-2018-consultation/chapter-2.html#toc26.

⁵¹ *Stockholm Convention on Persistent Organic Pollutants (POPS)*, 22 May 2001 2256 UNTS 119 (entered into force 17 May 2004), online: *United Nations Treaty Collection* <treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-15&chapter=27#1> (“Stockholm Convention”). A certified true pdf copy of the Convention is available online: *United Nations Treaty Collection* <treaties.un.org/doc/Treaties/2001/05/20010522%2012-55%20PM/Ch_XXVII_15p.pdf>.

⁵² *Ibid*, Article 1.

⁵³ Environment and Climate Change Canada, *Update to Canada’s National Implementation Plan on Persistent Organic Pollutants: chapter 3* (date modified: 11 May 2015), online: www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/publications/update-national-implementation-plan-pollutants/chapter-3.html.

Although Canada has already implemented regulatory measures to restrict or prohibit the use of certain flame retardant substances, far more action is urgently needed.

have been assessed under the CMP. So far, this has resulted in the prohibition of the manufacture, use, sale or import of polybrominated biphenyls (PBBs), in addition to the restrictions on PBDEs and HBCDs mentioned above.⁵⁴

Additionally, following screening assessments of 10 organic flame retardants under CEPA, pursuant to the CMP, the Minister of the Environment and the Minister of Health have recommended that two flame retardants, decabromodiphenyl ethane (DBDPE) and Dechlorane Plus (DP), be added to the Schedule 1 of CEPA. This would enable risk management measures respecting preventative or control actions of these substances under CEPA, although no specific risk management proposal has been made as of yet.⁵⁵

Although Canada has already implemented regulatory measures to restrict or prohibit the use of certain flame retardant substances, far more action is urgently needed. Ultimately, while Canada never had a national flammability standard for upholstered furniture,⁵⁶ as a

⁵⁴ All these substances are restricted pursuant to CEPA's *Prohibition of Certain Toxic Substances Regulation*, 2012, SOR/2012-285; for a summary of flame retardant assessments and management conducted under CEPA, see Environment and Climate Change Canada, *Summary of flame retardant assessments and management conducted under the Canadian Environmental Protection Act, 1999* (date modified: 28 August 2019), online: <www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/summary-flame-retardant-assessments-management-conducted-cepa.html> as provided by Environment and Climate Change Canada.

⁵⁵ Department of the Environment, Department of Health, *Order Adding Toxic Substances to Schedule 1 to the Canadian Environmental Protection Act, 1999* in the *Canada Gazette, Part I*, Vol 153, No 26 (29 June 2019), online: *Government of Canada* <gazette.gc.ca/rp-pr/p1/2019/2019-06-29/html/reg2-eng.html>. DBDPE and DP were found to be harmful to the environment following screening assessments, hence this proposal. However, screening assessments for phosphoric acid, tris(methylphenyl) ester (TCP) and ethylene bis(tetrabromophthalimide) (EBTBP) concluded that these substances are *not* harmful to human health or the environment. Of the remaining six substances included in the screening assessments, three were determined not to be harmful at current levels of exposure (benzene, 1,3,5-tribromo-2-(2-propenyloxy) (ATE) 2-ethylhexyl-2,3,4,5 tetrabromobenzoate (TBB) and bis(2-ethylhexyl) 3,4,5,6-tetrabromophthalate (TBPH)), and the final screening assessments for three others (melamine, 2-Propanol, 1-chloro-, phosphate (3:1) (TCPP) and 2-Propanol, 1,3-dichloro-, phosphate (3:1) (TDCPP)) are yet to be released. See Health Canada, *Certain Organic Flame Retardants Substance Grouping*, (date modified: 27 August 2019) at "Final screening assessments, state of the science reports and risk management approaches," online: *Government of Canada* <www.canada.ca/en/health-canada/services/chemical-substances/substance-groupings-initiative/certain-organic-flame-retardants-substance-grouping.html>.

⁵⁶ There are however, flammability standards in place in Canada for other consumer products. For example, general textiles such as fabric, drapers, outerwear, daywear and bedding, children's sleepwear, cribs, cradles, bassinets, expansion gates and playpens, toys (i.e. plush/soft toys) are all tested by exposure to an open flame source. Tent components are subjected to a unique leaching and weathering flammability test. However, futons and mattresses are subjected to a smoulder test under CCPSA regulations, and carpets are subjected to testing that is very similar to the smoulder test (Email Correspondence between Environmental Law Centre articulated

result of the impact California and US standards have had on products worldwide, flame retardant chemicals continue to be present in many Canadian household products – and ultimately in Canadians' bloodstreams.⁵⁷ This needs to change.

student and Judy Hartman, Product Safety Officer, Consumer Product Safety, Regulatory Operations and Regions Branch, Health Canada (January 3, 2019)).

⁵⁷ Health Canada studies have found Polybrominated Flame Retardants (a type of organohalogen flame retardant) in the plasma of Canadians. For example, tetraBDE, pentaBDE and hexaBDE have been found in plasma in ~75%, ~26%, and ~42% of the Canadian population, respectively. Other types of flame retardants were not tested for in the study; Health Canada, *Report on human biomonitoring of environmental chemicals in Canada. Results of the Canadian Health Measures Survey Cycle 1 (2007–2009)* (date modified: 22 March 2011), online: <www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/environmental-contaminants/report-human-biomonitoring-environmental-chemicals-canada-health-canada-2010.html>.

PART 3. GENERAL RISKS AND DISPROPORTIONATE IMPACTS ON VULNERABLE POPULATIONS

The use of flame retardant chemicals in common household products such as furniture, mattresses, consumer electronics and children's toys introduces long-term health risks for the general population – who are exposed to these products on a daily basis. According to leading public health experts at the University of California and Columbia University (in a view endorsed by the American Academy of Pediatrics), “human exposure to all studied organohalogen flame retardants is associated with long-term chronic health effects.”⁵⁸ The organohalogen flame retardants that are added to household products are commonly ingested by consumers through indoor dust – and “given that humans spend 90% of their time indoors, human exposure to flame retardants can be significant.”⁵⁹ Thus, the use of organohalogen flame retardants in common consumer products poses health risks for all Canadians. However, as is explored below, these exposure pathways also pose serious and increased risks for several at-risk populations in our society and environment. These populations include fire fighters, young children, fetuses, pregnant women, and marine mammals, such as the endangered Southern Resident killer whales.

Disproportionate risks: increased danger for fire fighters

The scariest building a firefighter goes into isn't on fire, it's the building where their oncologist works.

– President, San Francisco Firefighters unit⁶⁰

While the general public are exposed to long-term health risks by organohalogen flame retardants present in household goods, fire fighters are exposed to increased risks when

⁵⁸ CPSC Submission, *supra* note 4 at p 42; see also the following expert statements of Dr. Kim Harley, Associate Director for Health Effects, Center for Environmental Research and Children's Health, University of California, Berkeley, School of Public Health, at Exhibit F; Dr. Julie Herbstman Environmental Health Science, Columbia University, Mailman School of Public Health: “my professional opinion is that there is reason to be concerned that the entire class of organohalogen flame retardants may cause injury or illness to humans, particularly to fetuses and young children,” at Exhibit G, and; Dr. David Eastmond, Professor and Chair, Department of Cell Biology & Neuroscience, University of California: “all of the non-polymeric OFRs [organohalogen flame retardants] that we have screened using the QCAT® and related methodologies were found to be either of high concern or toxic” at Exhibit C: Expert Statements submitted to the CPSC pursuant to the CPSC Submission, online: lulac.org/advocacy/Statements_in_Support_of_Petition_to_the_Consumer_Product_Safety_Commission_3.31.2015.pdf (“CPSC Expert Statements”).

⁵⁹ City and County of San Francisco, *Ordinance No. 211-17* (17 October 2010), s 1(f), online: sfgov.legistar.com/View.ashx?M=F&ID=5539758&GUID=CFBA7447-EE27-45D3-92A9-C7E2F5CF5D32.

⁶⁰ Quoted in Joshua Sabatini, “SF to ban sale of upholstered furniture containing flame retardants linked to cancer,” *San Francisco Examiner* (10 October 2017), online: www.sfexaminer.com/sf-ban-sale-upholstered-furniture-containing-flame-retardants-linked-cancer/.

...cancer is the leading cause of occupational injury and death among Canadian fire fighters.

these products burn. Shockingly, upholstered furniture, which is the cause of many house fires, “can contain up to two pounds of [flame retardant chemicals] in their foam cushions.”⁶¹ When products that contain organohalogen flame retardants burn, they produce toxic combustion products such as halogenated dioxins and furans⁶² – which are recognized by the US Environmental Protection Agency, the Stockholm Convention and the World Health Organization as presenting serious health risks to humans and are also recognized as carcinogenic.⁶³ Ultimately, “smoke from flame-retardant-treated products is more toxic than the smoke from un-treated products,” and numerous studies have found that fire fighters have higher levels of organohalogen flame retardants and dioxins and furans in their bloodstreams than the average population.⁶⁴

Moreover, fire fighters, “who are routinely exposed on the job to the byproducts of burning consumer products, have disproportionately high levels of four cancers associated with dioxin exposure – testicular cancer, melanoma, brain cancer, and esophageal cancer.”⁶⁵ A 2018 report by the BC Injury Research and Prevention Unit found that in Canada, cancer is the leading cause of occupational injury and death among Canadian fire fighters.⁶⁶ Recognizing an association between increased exposure to carcinogenic chemicals, and serious increased cancer rates in fire fighters, the International Association of Fire Fighters, an organization that represents over 300,000 fire fighters and paramedics in Canada and the US, adopted a resolution in 2014 to advocate for the elimination of the use of “carcinogenic

⁶¹ CPSC Submission, *supra* note 4 at p 22, citing an unsourced Chicago Tribune article that attributed the quote to then-Chair of the CPSC Tenenbaum speaking before a congressional hearing in July 2012.

⁶² Shin-ichi Sakai *et al*, “Combustion of brominated flame retardants and behavior of its products,” 42:5-7 *Chemosphere* 519-31 (February 2001), online: *Science Direct* <[https://doi.org/10.1016/S0045-6535\(00\)00224-1](https://doi.org/10.1016/S0045-6535(00)00224-1)>.

⁶³ “Dioxins and their effects on human health,” (4 October 2016), online: *World Health Organization* <www.who.int/news-room/fact-sheets/detail/dioxins-and-their-effects-on-human-health>; see also CPSC Expert Statements, *supra* note 58, at Exhibits A & M.

⁶⁴ See Susan D Shaw *et al*, “Persistent organic pollutants including polychlorinated and polybrominated dibenzo-p-dioxins and dibenzofurans in firefighters from Northern California,” 91:10 *Chemosphere* 1386-94 (June 2013), online: *Science Direct* <www.sciencedirect.com/science/article/pii/S0045653513000313?via%3Dihub>; see also Jed M Waldman *et al*, “Exposures to environmental phenols in Southern California firefighters and findings of elevated urinary benzophenone-3 levels,” 88:281–287 *Environ Int* 281-287 (March 2016).

⁶⁵ CPSC Submission, *supra* note 4, at p 53; see also Grace Lemasters *et al*, “Cancer Risk Among Firefighters: A Review and Meta-Analysis of 32 Studies,” 48:11 *Journal of Occupational and Environmental Medicine* 1189-202 (December 2006), online: *ResearchGate* <www.researchgate.net/publication/6698949_Cancer_Risk_Among_Firefighters_A_Review_and_Meta-analysis_of_32_Studies>.

⁶⁶ Rachel Ramsden *et al*, *Determinants of Injury and Death in Canadian Firefighters: A Case for National Firefighter Wellness Surveillance System*, (Abbotsford, BC: University of the Fraser Valley, 2018) at pp 9 - 11, online (pdf): *Centre for Public Safety and Criminal Justice Research at the University of the Fraser Valley* <cjr.ufr.ca/wp-content/uploads/2018/03/Determinants-of-Injury-.pdf>.

...upholstered furniture, which is the cause of many house fires, “can contain up to two pounds of [flame retardant chemicals] in their foam cushions.

flame retardants and other toxic chemicals,” and the adoption of “safer alternatives or methods.”⁶⁷

It is not just researchers and fire fighter organizations that are recognizing this problem – law makers are too. When the State of California signed into law a prohibition on the use of a wide class of flame retardants in residential upholstered furniture, mattresses and children’s projects above certain levels, the text of the bill explicitly “declare[d]” that an impetus for the legal change was the fact that “[f]ire fighters are at particular risk from flame retardant chemicals...[including] increased cancer rates and deaths.”⁶⁸

Ultimately, those on the frontlines of fighting fires are opposed to the use of flame retardants as a result of both their inability to meaningfully increase fire safety, and their association with disproportionately high levels of cancer in their profession. Fire fighters expose themselves to many risks on the job. The unnecessary long term health risks posed by combusting flame retardants (which fail to provide meaningful fire safety benefits) should not be one of them.

Disproportionate risks: young children and pregnant women

Extensive empirical research has documented increased levels of flame retardants in the blood streams of young children, as compared to the general adult population.⁶⁹ Research suggests that these increased levels could be a result of “frequent hand-to-mouth contact” and high exposure to children’s products that contain flame retardants.⁷⁰

⁶⁷ International Association of Fire Fighters, “Standing Strong – 52nd Convention Resolutions Book” (June 17, 2014), Resolution No. 34 at p 29, online (pdf): iaffconvention2014.org/wp-content/uploads/2014/06/2014_Resolutions.pdf; quoted in CPSC Submission, *supra* note 4 at p 8.

⁶⁸ US, AB 2998, *An act to add Article 5.5 (commencing with Section 19100) to Chapter 3 of Division 8 of the Business and professions Code, relating to business*, Cal, 2017-2018, s 1(e), online: leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB2998.

⁶⁹ See Lunder, S et al, “Significantly higher polybrominated diphenyl ether levels in young U.S. children than in their mothers,” 44:13 *Environmental Science and Technology* 5256-62 (2010); see also Craig M Butt et al, “Metabolites of Organophosphate Flame Retardants and 2-Ethylhexyl Tetrabromobenzoate in Urine from Paired Mothers and Toddlers,” 48:17 *Environmental Science & Technology* 10432-38 (August 2014), online (pdf): pubs.acs.org/doi/pdf/10.1021/es5025299; other related studies are mentioned in CPSC Submission, *supra* note 4 at pp 39-40.

⁷⁰ Stapleton, HM et al “Serum PBDEs in a North Carolina toddler cohort: associations with handwipes, house dust, and socioeconomic variables.” 120:7 *Environmental Health Perspectives* 1049-5 (2012) at p 1049, online:

Fire fighters expose themselves to many risks on the job. The unnecessary long term health risks posed by combusting flame retardants (which fail to provide meaningful fire safety benefits) should not be one of them.

Furthermore, these levels increase even more for “young children from communities of low socioeconomic status and communities of color,”⁷¹ possibly due in part to “differences in housing stock and furniture quality” between socioeconomic classes.⁷² For example, levels may be higher in these populations because of longer use and reuse of older products, and challenges with cleaning and dust removal under circumstances of poverty (related to poor housing conditions where cleaning is more difficult, lack of affordability of a good quality vacuum or access to any vacuum cleaner, older carpeting that retains dust, poorer ventilation in deteriorating housing, lack of time due to multiple jobs, etc.). Nutritional factors may also be at play, *e.g.*, higher fat diet, compromised nutrition leading to greater uptake, etc.⁷³

Concern about higher levels of child exposure is heightened by studies that show that children, along with pregnant women, may be more sensitive to the impacts of organohalogen flame retardants than the general population. Namely, organohalogen flame retardants can disrupt human hormone systems that support cellular function (Endocrine Disrupting Chemicals – “EDCs”). EDCs negatively impact reproductive health, among other things, and are linked to autism, cardiac issues, and neurotoxicity.⁷⁴ Additionally, a person’s sensitivity to EDCs is “greatest when the hormone system is working “at its height, which includes fetal development, infancy and childhood, puberty, and during breastfeeding.”⁷⁵

ResearchGate

<www.researchgate.net/publication/228323985_Serum_PBDEs_in_a_North_Carolina_Toddler_Cohort_Associations_with_Handwipes_House_Dust_and_Socioeconomic_Variables>; see also Babich, MA, US Consumer Product Safety Commission, *CPSC Staff Preliminary Risk Assessment of Flame Retardant (FR) Chemicals in Upholstered Furniture Foam* (December 2006), online: *ResearchGate* <www.researchgate.net/publication/292146433_CPSC_Staff_Preliminary_Risk_Assessment_of_Flame_Retardant_FR_Chemicals_in_Upholstered_Furniture_Foam>.

⁷¹ CPSC Submission, *supra* note 4 at p 40.

⁷² Ami R Zota *et al*, “Are PBDEs an Environmental Equity Concern? Exposure Disparities by Socioeconomic Status.” 44:15 *Environmental Science & Technology* 5691-5692 (August 2010), at 5692, online: <pubs.acs.org/doi/pdf/10.1021/es101723d>. For example, “the physical weathering and crumbling of PBDE-treated foam in older furniture, more often found in lower income homes, may release greater amounts of penta-BDE compounds into indoor environment” (*ibid*).

⁷³ *Ibid*.

⁷⁴ Toxic By Design, *supra* note 29, at pp 3-4.

⁷⁵ *Ibid* at p 5.

In British Columbia, flame retardants have also been found to have serious impacts on the health of endangered Southern Resident killer whales as well as other marine mammals.

Risk to Marine mammals and Southern Resident killer whales

The negative impacts of organohalogen flame retardants do not end at risks to human health – these persistent chemicals also have negative impacts on our ecosystems and marine mammals. In 2006, Canada’s leading marine mammal toxicologist, Dr. Peter Ross, published a report titled “Fireproof Killer Whales.”⁷⁶ The report documented the vulnerability of marine mammals to bioaccumulative and persistent organohalogen flame retardants – particularly those species with long life spans⁷⁷ and high trophic levels (*i.e.* killer whales on the top of the food chain). Dr. Ross highlighted how the endocrine-disrupting nature of organohalogen flame retardants and the threat EDCs pose to marine mammals’ reproductive health and immune systems was particularly problematic for species whose numbers are already threatened – such as the Southern Resident killer whale. Studies based on samples taken between 1993 and 1996 show that “PBDEs in Southern Resident and transient killer whales are approaching 1000 ug/kg, or about 40 times that found in the breast milk of Canadian women.”⁷⁸

In October 2018, the Fisheries and Oceans Canada (the “DFO”) issued a news release identifying the Southern Resident killer whale as “an iconic species that faces significant threats to its survival and recovery.”⁷⁹ The news release and *Canada Gazette* notices published by the DFO identified contaminants in the water, including flame retardants, as “one of the key threats” posed to the species survival and promised to take steps to enhance the regulatory control of at least two types of organohalogen flame retardants:

⁷⁶ Peter S Ross, “Fireproof killer whales (Orcinus orca): Flame-retardant chemicals and the conservation imperative in the charismatic icon of British Columbia, Canada,” 63:1 *Canadian Journal of Fisheries and Aquatic Sciences* 224-234 (January 2006), online: [ResearchGate <www.researchgate.net/publication/237437027_Fireproof_killer_whales_Orcinus_orca_Flame-retardant_chemicals_and_the_conservation_imperative_in_the_charismatic_icon_of_British_Columbia_Canada>](https://www.researchgate.net/publication/237437027_Fireproof_killer_whales_Orcinus_orca_Flame-retardant_chemicals_and_the_conservation_imperative_in_the_charismatic_icon_of_British_Columbia_Canada).

⁷⁷ For example, “[f]emale killer whales can live up to 85 years and males 50 years, and therefore, they have a long exposure to contaminants, such as fire retardants that accumulate in their tissues” (Boyd & Wallace, *supra* note 9 at p 9).

⁷⁸ *Ibid.*

⁷⁹ Fisheries and Oceans Canada, *Government of Canada taking further action to protect Southern Resident Killer Whales*, (News Release) (date modified: 1 November 2018), online: www.canada.ca/en/fisheries-oceans/news/2018/10/government-of-canada-taking-further-action-to-protect-southern-resident-killer-whales.html (“DFO News Release”).

HBCD and PBDEs.⁸⁰ However, these proposed steps would not address the large number of other organohalogen flame retardants with similar chemical compositions, which are also known to be endocrine disruptors and continue to be used in Canadian products – and which can also end up in our waters.

Flame retardants are not needed to provide fire safety.

– Legislature of the State of California

⁸⁰ Department of the Environment, Department of Health, *Notice of intent to amend the Prohibition of Certain Toxic Substances Regulations, 2012* in the Canada Gazette, Part I, Vol 152, No 41 (13 October 2018), online: *Government of Canada* <www.gazette.gc.ca/rp-pr/p1/2018/2018-10-13/html/notice-avis-eng.html>. The proposals are yet to be implemented, see *supra* note 50.

PART 4. A PROPOSED CANADIAN LEGAL RESPONSE

In light of the serious long-term health risks that are introduced to Canadians by the use of organohalogen flame retardants in common household products, this report proposes that the Canadian federal government introduce regulations prohibiting the manufacture, sale, distribution and import of Four Proposed Product Categories:

1. durable infant or toddler products, children's toys, child care articles or other children's products;
2. upholstered furniture sold for use in residences;
3. mattresses and mattress pads; and
4. plastic casings surrounding electronics

which contain non-polymeric,⁸¹ additive⁸² organohalogen⁸³ flame retardants.⁸⁴

Targeting these Four Proposed Product Categories and the use of organohalogen flame retardants as a class is consistent with the approach reviewed and backed by the US Consumer Product Safety Commission.⁸⁵ As outlined, this class of flame retardants poses

⁸¹ Polymeric organohalogen flame retardants are believed to be less likely to be harmful to humans; CPSC Submission, *supra* note 4, footnote 1 at p 2.

⁸² "Additive (as opposed to reactive) flame retardants are not chemically bound to the products containing them, thus they can migrate out of products, resulting in human exposure;" *ibid*, footnote 2.

⁸³ Flame retardants can be divided into three broad categories based on their chemical composition: halogenated, organophosphate, and mineral/salt/amine flame retardants. Organohalogen flame retardants are of the highest concern to public health researchers. "Organohalogen chemicals are created by combining carbon molecules with one of the halogen elements. Organohalogen flame retardants (also referred to as halogenated flame retardants) contain bonds between carbon and the elements bromine or chlorine. This class includes brominated and chlorinated phosphate ester flame retardants" (*ibid*, footnote 3). In this report, the term "organohalogen flame retardants" refers to non-polymeric, additive organohalogen flame retardants.

⁸⁴ As is discussed below in Appendix 2, the State of California has passed legislation banning the addition of *both* organohalogen flame retardants *and* organophosphate flame retardants in upholstered furniture, juvenile products and mattresses. However, the Canadian approach proposed in this report would apply to a wider number of consumer products than California's bill – including all children's products (i.e. toys), all mattress components (including electronic components) and the plastics surrounding electronics. As will be discussed, the proposed approach in this report also adopts a graduated regulatory response, not found in California's legislation, which would require *any* chemical flame retardant outside of the organohalogen flame retardant class (i.e. including organophosphate flame retardants) to pass stringent precautionary tests, as well as a safer alternatives assessment, *before* being approved for use in the product categories. In light of the many different design approaches (i.e. fabric choices) to reducing product flammability, and the limited utility of using flame retardants to increase fire safety (i.e. difficult to demonstrate that the use of the additive flame retardant is necessary), the proposed regulatory approach would significantly restrict the addition of chemical flame retardants in the Four Proposed Product Categories in Canada.

⁸⁵ CPSC Guidance Document, *supra* note 3, at p 45268. Note that while the CPSC Guidance Document explicitly exempts children's car seats from any proposal to prohibit the use of organohalogen flame retardants in "children's products," this is only because children's car seats are regulated by the National Highway Traffic Safety Administration and fall outside of the CPSC's jurisdiction. A Canadian legislative approach should include a prohibition on the use of organohalogen flame retardants in children's car seats. The federal government has the

the greatest potential risks to human health and the environment.⁸⁶ (Note that the addition of any type of flame retardant chemical in the four product categories listed above is not currently required by any legally binding standard in Canada.)

Additionally, this report proposes that other non-organohalogen flame retardants be subjected to precautionary testing and safer alternatives assessments before being added to any product in the Four Proposed Product Categories. This section of the report will discuss the need for a class-wide ban on organohalogen flame retardants to avoid the problem of substituting equally harmful chemicals for a banned one. This section will also outline the details of a policy approach that would subject non-organohalogen flame retardants to precautionary testing and safer alternatives assessments – similar to approaches taken in California and Oregon.

Regulating the addition of organohalogen flame retardants as a class as opposed to a substance-by-substance approach

In Canada, the regulation of organohalogen flame retardants has generally been approached on a substance-by-substance basis under the federal *Canadian Environmental Protection Act, 1999* (“CEPA”),⁸⁷ and to a lesser extent, the *Canada Consumer Product Safety Act* (“CCPSA”).⁸⁸ For example, under CEPA, restrictions have been placed on the manufacture, use, sale and import of organohalogen flame retardants such as PBBs, HBCDs, and PBDEs⁸⁹ (and in the case of PBBs and HBCDs their use in consumer products).⁹⁰ Additionally, under the CCPSA, prohibitions have been placed on the use of TCEP in consumer products intended for children under the age of three.⁹¹

CEPA is “the most comprehensive federal environmental law in Canada,” a law which, “at its core, [is] designed to identify, assess and control the use of substances that may pose a risk

power to regulate children’s car seats, as well as other consumer products under the *Canada Consumer Product Safety Act*, SC 2010 c 21, and its regulations (for example, see *Restraint Systems and Booster Seats for Motor Vehicles Regulations*, SOR/2016-191).

⁸⁶ CPSC Guidance Document, *supra* note 3, at p 45269.

⁸⁷ SC 1999 c 33.

⁸⁸ SC 2010 c. 21. There are some exceptions to this substance-by-substance approach under the CCPSA. As will be discussed in this report, the *Children’s Sleepwear Regulations* SOR/2016-169 (regulations promulgated under the CCPSA) have prohibited the addition of any flame retardant that would cause adverse health effects, and requires that they pass set toxicology tests. See Table 2 in [Appendix 1](#) of this report.

⁸⁹ Polybrominated Biphenyls; Hexabromocyclododecane; Polybrominated diphenyl ethers. See Table 1 in [Appendix 1](#) of this report.

⁹⁰ See Table 1 in [Appendix 1](#) of this report.

⁹¹ CCPSA, Schedule 2, no 16. TCEP is tris (2-chloroethyl) phosphate. For a comprehensive summary of current federal regulations in effect for flame retardants under CEPA and the CCPSA see Tables 1 and 2 in [Appendix 1](#) of this report.

...there is nothing in CEPA that prevents more sweeping regulations that would apply to a whole class of chemicals.

to human health and the environment.”⁹² Although as of yet, Canada’s regulatory approach has been on a substance-by-substance basis, there is nothing in CEPA that prevents more sweeping regulations that would apply to a whole class of chemicals.

CEPA is a powerful instrument, though not without its flaws. The Canadian Environmental Law Association (“CELA”) has proposed important amendments to CEPA that would considerably enhance its ability to fulfil its purpose.⁹³

As a general overview, under CEPA, the federal government undertakes assessments of substances commercially available in Canada and determines whether they are “toxic” – *i.e.* whether they are harmful to human health and/or the environment. It is only once a substance has been assessed as “toxic” that the federal government has powers under CEPA to place restrictions and prohibitions on the manufacture, use, sale, and/or import of that particular substance – including, although not always acted upon, the power to limit the use of the substance in consumer products.⁹⁴ Note, however, that the assessment of whether a

⁹² Joseph F Catrilli, ed, *Annotated Guide to the Canadian Environmental Protection Act, Volume 1*, (Toronto: Thomson Reuters, 2014) (loose-leaf updated December 2014, release 17) at I-1.

⁹³ Joseph Catrilli, CELA, “Proposed Amendments to CEPA 1999” (15 October, 2018), online: CELA <cela.ca/proposed-amendments-to-cepa-1999/>. Among other things, CELA proposes that CEPA be amended to explicitly recognize the right of every Canadian to a healthy environment (with concomitant government duties to protect that right along with procedural avenues for persons to vindicate that right in federal court), and to add provisions requiring the relevant Ministers to consider the substitution of safer alternatives when considering preventative or control actions for toxic substances. Further, CELA proposes that to clarify that the *manufacturer* (or importer or user) has the burden of persuading the Ministers that the environmental and health risks of a substance are acceptable, during categorization, screening assessment, re-evaluation, special review, or assessment of substances or activities new to Canada (p 3). Please consult the document for a full explanation of CELA’s proposed amendments.

⁹⁴ Under CEPA, a substance is defined as “toxic” if it is entering the environment in amounts or in a manner that has or may have an immediate or long-term harmful effect on the environment or poses a danger to human health. If, upon an assessment directed by the Minister of Health or Minister of Environment (“Ministers”), the substance is found to be “toxic” or capable of becoming “toxic,” and is also found to: 1) potentially have a long-term harmful effect on the environment; 2) be persistent and bioaccumulative; 3) be inherently toxic to human beings or non-human organisms; and 4) be present in the environment due primarily to human activity, the Ministers must propose that the substance be added to the List of Toxic Substances in Schedule 1 of the *Act*. Upon the Ministers’ proposal, if the Governor in Council is also satisfied that a substance is “toxic,” it may make an order adding the substance to the List of Toxic Substances in Schedule 1 of the *Act*. Once a substance is placed on the List of Toxic Substances, the Governor in Council may introduce regulations and requirements for the substance - including the total, partial or conditional prohibition of the manufacture, use, processing, sale or import of the substance, or a product containing it (CEPA, ss 64, 74-77, 90(1) & 93(1)). CELA’s proposed amendments to CEPA, *supra* note 93, include adding the specification that when a substance is found to be toxic or capable of becoming toxic but is not added to the List of Toxic Substances, any person may apply to the federal court to require this be done.

substance is toxic can be an extremely time-consuming process and can include several different rounds of analysis.⁹⁵

In contrast to CEPA, under the CCPSA there is no prerequisite that an assessment be conducted on a substance before regulations can be introduced that place restrictions and conditions on its use in a consumer product. However, to date, again adopting a substance-by-substance approach, TCEP is the only *specific* flame retardant whose use in consumer products has been regulated under the CCPSA (an important exception to this is the set of broad conditions placed on the use of flame retardants under the *Children's Sleepwear Regulations* which are discussed later in this report).

This substance-by-substance approach has allowed the chemical industry to react to restrictions placed on a single organohalogen flame retardant by marketing a new, similar un-regulated organohalogen flame retardant which contains the same chemical properties. Additionally, under CEPA, where most of Canada's regulation of flame retardants has occurred to date (see Table 1 in [Appendix 1](#) of this report), the slow timeline of assessment cannot adequately address the proliferation and distribution of replacement flame retardant chemicals.⁹⁶ This approach has been likened to a "game of regulatory whack-a-mole," – a game which ends poorly for tax payer dollars and Canadians' exposure to long-term health risks.⁹⁷ For example, a 2016 study that measured the levels of flame retardants present in household dust over several years in the US, found that as the use of the organohalogen flame retardant pentBDE was being phased-out in the mid-2000s, the presence of other harmful flame retardants such as Firemaster® 550 in household dust particles began to increase.⁹⁸

⁹⁵ Under the process, either the Minister of Health or the Minister of Environment (the Ministers) *must* carry out a **preliminary screening assessment** if a substance is listed on the Domestic Substances List and has been identified by the Ministers as: a) inherently toxic (cause toxic effects) to humans or non-human organisms, and displays either the characteristics of persistence (takes long periods of time to break down) or bioaccumulation (collects in living organisms and builds up in the food chain), or; b) presents the greatest potential for exposure to Canadians. In addition to carrying out a mandatory screening assessment, if the substance meets the above criteria, the Ministers must also propose one of the following measures: 1) placing the substance on the Priority Substances List (which prioritizes the substance for a **full toxicity assessment**); 2) placing the substance directly on the List of Toxic Substances, or; 3) taking no further action on the substance. The Domestic Substances List is a list of substances which were between January 1, 1984, and December 31, 1986, in commercial use in Canada, or were used for commercial manufacturing purposes, or were manufactured in or imported into Canada in a quantity of 100 kg or more in any one calendar year (CEPA, ss 74-77).

Government of Canada, Environment and Climate Change Canada, "A Guide to Understanding the Canadian Environmental Protection Act, 1999," (last updated 20 March, 2017), online: <<http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=E00B5BD8-1&offset=5&toc=>>>.

⁹⁶ Toxic By Design, *supra* note 29, at the Executive Summary.

⁹⁷ House of Commons ENVI Committee Meeting, 42-1, No 22 (9 June 2016) at 1110 (Dr. Dayna Scott), online: <www.ourcommons.ca/DocumentViewer/en/42-1/ENVI/meeting-22/evidence> ("Dr. Scott's Evidence").

⁹⁸ Craig M Butt *et al*, "Regional comparison of organophosphate flame retardant (PFRs) urinary metabolites and tetrabromobenzoic acid (TBBA) in mother-toddler pairs from California and New Jersey" 94 *Environment*

The concern of continued exposure to organohalogen flame retardants, even at lower levels, is particularly problematic due to the endocrine disrupting abilities of organohalogen flame retardants.

Furthermore, regulating organohalogen flame retardants on a substance-by-substance basis does not account for the cumulative effects of aggregate exposure to incremental amounts of many different organohalogen flame retardants with similar chemical structures and health risks.⁹⁹ The problem with just restricting a *short list* of specific organohalogen flame retardant chemicals (*i.e.* based upon which ones we are currently exposed to the most and are studied the most) is that this allows continued exposure to various lesser-used, and less studied, organohalogen flame retardants. It also allows manufacturers and the chemical industry to substitute these permitted organohalogen flame retardants for those that have been newly restricted.

The concern of continued exposure to organohalogen flame retardants, even at lower levels, is particularly problematic due to the endocrine disrupting abilities of organohalogen flame retardants. As discussed by Dr. Dayna Scott before the Canadian Standing Committee on Environment and Sustainable Development, “low dose exposures [to endocrine disrupters] are extremely significant and can cause a wide variety of health harms.... The extent of the harm depends more on the person's sex and the timing of exposure than it does on the so-called dose [*i.e.* young children and pregnant mothers)].”¹⁰⁰ This low-dose potency of organohalogen flame retardants has run-up against the substance-by-substance approach under CEPA, where one of the criteria for finding that a substance is toxic is that it “is entering or may enter the environment *in a quantity or concentration*” that poses a threat to human health or the environment.¹⁰¹ Unfortunately, this can mean that no action is taken under CEPA until larger quantities of a substance begins entering into the environment – even where the substance itself is known to be hazardous.¹⁰²

International 627-634 (September 2016), online: *PubMed Central (PMC)*
<www.ncbi.nlm.nih.gov/pmc/articles/PMC4980246/>.

⁹⁹ See House of Commons, *Healthy Environment, Healthy Canadians, Healthy Economy: Strengthening The Canadian Environmental Protection Act, 1999 – Report of the Standing Committee on Environment and Sustainable Development* (June 2017) (Chair: Deborah Schulte), Recommendation 45 at p 57, online (pdf): <www.ourcommons.ca/Content/Committee/421/ENVI/Reports/RP9037962/envirp08/envirp08-e.pdf>. CELA's proposed amendments to CEPA, *supra* note 93, include a new definition of “cumulative effects” and the expansion of the considerations that must be addressed in respect of preventative or control actions for toxic substances to include effects on vulnerable populations, aggregate exposures and cumulative effects, and substitution of safer alternatives (p 3).

¹⁰⁰ Dr. Scott's Evidence, *supra* note 97, at 1115.

¹⁰¹ Emphasis added; CEPA, s 64. However, *cf* CELA's proposed amendments to CEPA with respect to aggregate exposures and cumulative effects, *supra* note 99.

¹⁰² D. Scott, Evidence, *supra* note 97, at 1115.

Moreover, as discussed above, organohalogen flame retardants, as a class, are known by their very structure to easily migrate out of products and into the air and dust that surrounds us.¹⁰³ They are also known by their very structure to:

- last for long periods of time in our environment before breaking down;
- increase in concentration as they move up the food chain and into our bodies, and;
- produce highly potent carcinogenic dioxins when exposed to fire.

This may contribute to the high observed rates of cancers and other diseases in fire fighters.¹⁰⁴

Ultimately, recognizing the general health risks that are introduced by organohalogen flame retardants in consumer products *as a class*, and the significant problems that have resulted from previous attempts to regulate flame retardants on a substance-by-substance basis, this report proposes that all organohalogen flame retardants be promptly prohibited from use in children's products, upholstered furniture, mattresses, and plastic casings surrounding electronics (see the following section). As discussed, this approach is consistent with the approach reviewed and backed by the US Consumer Product Safety Commission.¹⁰⁵

The need for supplementary precautionary testing of non-organohalogen flame retardants

In addition to the prohibition of organohalogen flame retardants described above, before approving any **non-organohalogen** for use in one of the Four Proposed Product Categories,¹⁰⁶ the Canadian federal government should require that any non-organohalogen flame retardants:

1. Pass either a “**reverse burden test**” (conducted by industry) or a “**precautionary test**” (conducted by the regulator) demonstrating that it will not negatively impact

¹⁰³ Dedeo & Drake, *supra* note 5 at p 9.

¹⁰⁴ As discussed, it is also for these reasons that in 2017, the US Consumer Product Safety Commission published a statement in the Federal Register recognizing the health risks posed by organohalogen flame retardants, as a class, including their adverse effects of “reproductive impairment; neurological impacts (e.g., decreased IQ in children, impaired memory, learning deficits, altered motor behavior, hyperactivity); endocrine disruption and interference with thyroid hormone action (potentially contributing to diabetes and obesity); genotoxicity; cancer; and immune disorders,” and voted to approve a petition to federally regulate these flame retardants as a class (CPSC Guidance Document, *supra* note 3 at 45269).

¹⁰⁵ *Ibid* at 45268.

¹⁰⁶ *Cf* notes 93 & 99 with respect to CELA's proposal to amend CEPA, in particular regarding considerations of safer alternative substitutes.

human health before it is approved for use in one of the Four Proposed Product Categories;¹⁰⁷ and

2. Be subjected to a “**safer alternatives assessment**,” where an industry applicant is required to demonstrate that the use of the proposed flame retardant is necessary and that there is no feasible safer alternative.

Currently under CEPA, there are provisions that require assessments of substances where either a significant new activity (“SNAC”) is proposed for a substance, or when a new substance is brought into Canada. In the former case, if a person’s proposed activities with a substance are captured by the definition of SNAC, they must submit a significant new activity notification (“SNAN”) to the federal government for assessment within a specified time period. The SNAC provisions of CEPA may apply to a substance whether or not the substance has been assessed as “toxic.”^{108 109} Once a SNAN has been submitted, the relevant ministers assess the information provided and other available information to determine whether the substance could pose a risk to the environment or human health, and whether further risk management considerations are required.¹¹⁰

Similarly, when the federal government receives a New Substances Notification Package from a person proposing to import or manufacture a new substance, the government carries out an assessment to determine whether there is a potential for adverse effects of the substance on the environment and human health.¹¹¹

Therefore, if organohalogen flame retardants were successfully prohibited, and a non-organohalogen flame retardant were proposed as an alternative, if this alternative

¹⁰⁷ Cf note 93, which discussed CELA’s proposed amendments to CEPA, in particular with respect to clarifying that the burden is on the manufacturer, importer or user of a substance to persuade the Ministers that the environmental and/or health risks of the substance are acceptable.

¹⁰⁸ Environment and Climate Change Canada, “Significant new activity provisions: Canadian Environmental Protection Act” (date modified: 2 October 2019), online: *Government of Canada* <www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/significant-new-activity-provisions.html>.

¹⁰⁹ S. 80 of CEPA defines a “significant new activity” to include, in respect of a substance, any activity that results in or may result in (a) the entry or release of the substance into the environment in a quantity or concentration that “is significantly greater than the quantity or concentration of the substance that previously entered or was released into the environment;” or (b) the entry or release of the substance into the environment or the exposure or potential exposure of the environment to the substance in a manner and circumstances that “are significantly different from the manner and circumstances in which the substance previously entered or was released into the environment or of any previous exposure or potential exposure of the environment to the substance.” The person proposing the significant new activity must supply whatever information the relevant Minister requires before proceeding.

¹¹⁰ Environment and Climate Change Canada, “Significant new activity provisions: Canadian Environmental Protection Act” (date modified: 2 October 2019), online: <www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/significant-new-activity-provisions.html#q6>.

¹¹¹ Environment and Climate Change Canada, “Evaluating new substances” (date modified: 10 December 2019), online: <www.canada.ca/en/environment-climate-change/services/managing-pollution/evaluating-new-substances/evaluating-new-substances.html>.

...new regulations must be written...to ensure that all substances proposed to be used as a flame retardant in lieu of an organohalogen are demonstrated to be safe.

substance were either new to Canada or if its use as an alternative to an organohalogen flame retardant met the definition in CEPA of a SNAC, then this alternative substance would be subject to additional assessments by the federal government.

However, the SNAC and new substances provisions of CEPA are not specifically designed to assess the safety of alternative or substituted substances. Furthermore, as highlighted by CELA's proposed amendments to CEPA, that Act fails to definitively place the burden on the manufacturer, importer, or user to persuade government that the risks of the new substance or use are acceptable.¹¹² Therefore, new CCPSA regulations must be written as proposed in this report¹¹³ to ensure that all substances proposed to be used as a flame retardant in lieu of an organohalogen are demonstrated to be safe. The testing of non-organohalogen alternative chemicals is necessary because, although organohalogen flame retardants have been identified by public health researchers as presenting the *highest* cause for concern,¹¹⁴ other types of flame retardants (such as organophosphate flame retardants) have also been found to pose health risks such as endocrine disruption. In addition, some are also semi-volatile – meaning they can move out of products into air and dust.¹¹⁵

A class-wide ban on the use of the 100+ flame retardants belonging to the organohalogen class in the Four Proposed Product Categories must not result in similar substitution problems – as identified above – whereby organohalogen flame retardants could be replaced by non-organohalogen flame retardants that may nonetheless introduce endocrine disrupting health risks into our environment.¹¹⁶ This specific concern was also identified by the American Academy of Pediatrics and other petitioners before the US Consumer Product Safety Commission, who requested that in implementing a ban on the use of organohalogen flame retardants in the Four Proposed Product Categories, that the Commission avoid

¹¹² See *supra* notes 93 & 99; CELA has proposed to clarify that the burden is on the manufacturer, importer or user to persuade the Ministers that the health and/or environmental risks of substance are acceptable.

¹¹³ To be clear, this report proposes immediate regulatory action under the CCPSA, largely due to the increased possibility of immediate action under the CCPSA as it is currently written (as discussed below, the closest precedent to this report's proposed approach exists under the CCPSA). However, CEPA is designed specifically to regulate chemical substances within Canada, and may be the better tool in the long-run to comprehensively regulate all toxic chemicals in Canada (especially if CEPA is reformed along the lines proposed by CELA, *supra* notes 93 & 99).

¹¹⁴ Dedeo & Drake, *supra* note 5 at p 9; CPSC Submission, *supra* note 4 at p 56.

¹¹⁵ Dedeo & Drake, *supra* note 5 at p 9; CPSC Submission, *supra* note 4 at pp 55-56.

¹¹⁶ CPSC Submission, *supra* note 4 at pp 55-56.

adopting any regulation that would have the effect of simply increasing the use of non-organohalogen phosphate-based flame retardants.¹¹⁷

Accordingly, a class-wide ban on organohalogen flame retardants must be accompanied with a complementary requirement that before *any* flame retardant chemical is added to one of the Four Proposed Product Categories, the chemical must *first* be subjected to a **reverse-burden test** (onus on industry to show chemical is safe) or a **precautionary test** (chemical is assessed by regulator before approved for use) as well as a **safer alternatives assessment** (no safer method is available to increase fire safety and the addition of the chemical is necessary). This approach will ensure that a new game of regulatory whack-a-mole is not created and that the safest, yet feasible, product design is always pursued. There is Canadian precedent for similar stringent requirements – see the *Children's Sleepwear Regulations* ban on the use of any flame retardant in loose-fitting children's sleepwear that does not pass strict toxicity tests.¹¹⁸

A reverse-burden and precautionary test for non-organohalogen flame retardants

A **reverse-burden test** would require the chemical industry/manufacturers to establish, with adequate certainty, that any flame retardant chemical it proposes to add to a product in one of the Four Proposed Product Categories does not introduce unacceptable short-term and long-term risks to human health and/or the environment.¹¹⁹ A reverse-burden test would not be required if a **precautionary test** had already been undertaken by the federal government approving the chemical for use in consumer products. Under the proposed approach, a **precautionary test** is an assessment of a proposed chemical flame retardant undertaken by a federal government agency to similarly determine whether its addition to a product in one of the Four Proposed Product Categories would introduce unacceptable short-term and long-term risks to human health and/or the environment.¹²⁰

Importantly, this is not a new or radical approach to the regulation of flame retardants in consumer products by the Canadian federal government. In Canada, under the *Children's Sleepwear Regulations*, (promulgated under the federal *Canada Consumer Product Safety Act*), loose-fitting children's sleepwear cannot be treated with flame retardant chemicals

¹¹⁷ *Ibid* at p 57.

¹¹⁸ SOR/2016-169, subs. 3(2).

¹¹⁹ As mentioned in *supra* note 93, CELA has proposed amending CEPA to clarify that the burden of persuasion with respect to the safety of a substance is on the proponent of the substance. Furthermore, a coalition of Canadian scientists is currently advocating for a reform to the assessment process for toxic substances generally under CEPA; see online: *Scientists 4 CEPA* <scientists4cepa.org/>.

¹²⁰ For example, a manufacturer/proposed user would not need to conduct a precautionary test if government has already tested and approved the use of the chemical flame retardant in question.

unless the chemical has passed strict toxicological testing.¹²¹ Further, even where a flame retardant has passed these tests, under the *Children's Sleepwear Regulations*, their presence in loose-fitting children's sleepwear must still be clearly indicated on a permanent label.¹²²

Safer alternatives assessment for flame retardants outside of the organohalogen class

In addition to passing a **reverse-burden** or **precautionary test**, this report proposes that before a non-organohalogen flame retardant is approved for use in one of the Four Proposed Product Categories, the applicant must undertake a **safer alternatives assessment**,¹²³ demonstrating why the use of the chemical is necessary in the product and that there is no feasible safer alternative that could be used to achieve the desired results. For example, many different flammability standards can be achieved through proper fabric choice or design (*i.e.* the use of barrier layers of fabric and batting in upholstered furniture) – practical fire safety precautions that do not introduce unknown chemical risks into our environment.¹²⁴ This measure would ensure that manufacturers must always be pursuing the safest ways to meet flammability standards.

Comparable alternative assessment approaches have been used to regulate consumer products and minimize health risks in both California and Oregon. For example, as of 2013, California law requires manufacturers and other designated entities that are using “potentially harmful chemicals” in certain priority products, as identified by the regulator, to perform an alternatives analysis to identify, evaluate and compare one or more alternatives to be used instead.¹²⁵ In response to this analysis (submitted in the form of a public report)

¹²¹ *Children's Sleepwear Regulations*, SOR/2016-169, s. 3(2); CBC Marketplace, “Health Canada Q&A: flame retardants,” CBC News (November 30, 2012), online: <<https://www.cbc.ca/marketplace/blog/health-canada-qa-flame-retardants>>.

¹²² *Children's Sleepwear Regulations*, SOR/2016-169, s. 4.

¹²³ CELA (see *supra* note 93) has proposed amending CEPA to require consideration of safer alternative substances during preventative or control actions for toxic substances. Expanding on this, CELA proposes a new Part 5.1 to CEPA, which would identify Schedule 1 toxic substances as priority toxic substances; the relevant Minister would prepare national safer alternatives action plans for these substances following the production of assessment reports on safer alternatives. The action plans would then be models for individual substitution implementation plans and reports prepared by manufacturers, importers, processors or users of priority toxic substances (p 4). The proposal in this report is less ambitious, but more targeted. The purpose of the approach advocated by this report – to target a class of flame retardants with respect to certain consumer products under the CCPSA – is to achieve fast action regarding clearly toxic chemicals that unnecessarily appear in certain consumer goods.

¹²⁴ For ideas of other viable alternatives to chemical flame retardants see: Lowell Center for Sustainable Production, *Decabromodiphenylether: An Investigation of Non-Halogen Substitutes in Electric Enclosure and Textile Applications* (Lowell: University of Massachusetts, 2005).

¹²⁵ California Department of Toxic Substances Control Safer Consumer Products, *Alternatives Analysis Guide, version 1.0*, (June 2017) at p 1, online: <dtsc.ca.gov/scp/alternatives-analysis-guide-version-1-0-downloads/>.

...many different flammability standards can be achieved through proper fabric choice or design (i.e. the use of barrier layers of fabric and batting in upholstered furniture) – practical fire safety precautions that do not introduce unknown chemical risks into our environment.

the regulator will decide what regulatory response is needed – including whether any identified safer alternatives must be used and prohibiting the use of the chemical.¹²⁶

In Oregon, when a manufacturer of children’s products sold in the state removes a “high priority chemical of concern for children’s health” (as identified by the regulator) from the product, and proposes to substitute another chemical, the manufacturer must submit a hazard assessment to the Oregon Health Authority that explains how the substitute chemical is inherently less hazardous than its predecessor.¹²⁷

Similar to the approaches adopted in California and Oregon, the safer alternatives assessment proposed in this report would require manufacturers to undertake a safer alternatives assessment when proposing the addition of designated chemicals (non-organohalogen flame retardants) in designated products (the Four Proposed Product Categories).

However, the approach proposed in this report would take some of these requirements a step further by requiring a manufacturer/applicant to demonstrate that there is *no* feasible, safer alternative to the addition of a proposed flame retardant, and that its addition is necessary, *before* obtaining approval to add it in one of the four regulated product categories.

¹²⁶ *Ibid* at p.17.

¹²⁷ US, SB 478, *Toxic Free Kids Act*, 80th Leg Assem, Reg Sess, Or, 2019, s 6(1) (enacted), online: *Oregon State Legislature* <olis.leg.state.or.us/liz/2015R1/Downloads/MeasureDocument/SB478>.

PART 5. THE CANADIAN GOVERNMENT'S REGULATORY AUTHORITY TO IMPLEMENT THIS PROPOSAL

As advocated for in this report, the Canadian government has the regulatory authority by regulation under the *Canada Consumer Product Safety Act* ("CCPSA")¹²⁸ to both:

- Introduce a class-wide ban on the manufacture, sale, distribution and import of children's products, upholstered furniture, mattresses, and plastic casings surrounding electronics which contain organohalogen flame retardants; and
- Require that a flame retardant falling outside of the organohalogen class undergo a reverse burden or precautionary test and safer alternatives assessment before being added to a product in one of the four product categories.

The purpose of the CCPSA is to protect the public by addressing or preventing dangers to human health or safety that are posed by consumer products in Canada.¹²⁹ The CCPSA and its regulations set out prohibitions and restrictions that must be complied with when manufacturing, importing, advertising or selling a consumer product in Canada, and provides the Governor in Council with wide powers to add to these prohibitions and restrictions and introduce regulations for carrying out the Act's health and safety purposes.¹³⁰ For example, the Governor in Council has already introduced broad-based regulations under the CCPSA that restrict the addition of a group of chemicals known as phthalates, above a set threshold level, in toys and child care articles that are manufactured, imported, advertised or sold in Canada.¹³¹

There is also precedent for regulating the addition of organohalogen flame retardants across a wide span of consumer products – under the CCPSA all consumer products intended for a child under three years of age are prohibited from being made from polyurethane foam that contains an organohalogen flame retardant known as TCEP.¹³² Additionally, as outlined above, there is precedent where the Governor in Council has introduced tests that must be met before certain chemicals are added to consumer products – the *Children's Sleepwear Regulations* under the CCPSA require that any flame retardants used in loose-fitting children's sleepwear pass toxicity testing requirements.

Thus, pursuant to her powers under s. 37(1) of the CCPSA, the Governor in Council can introduce the regulatory changes and approaches recommended in this report. The class-wide ban and precautionary testing/alternatives assessment approach is consistent with the purposes of the CCPSA and its preamble, which "recognizes that a lack of full scientific

¹²⁸ *Supra* note 88.

¹²⁹ *Ibid*, s 3.

¹³⁰ *Ibid*, s 6.

¹³¹ *Phthalates Regulations*, SOR/2016-188.

¹³² See *supra* note 91.

The science is in. We already know organohalogen flame retardants are harmful, and they are still in widespread use. The federal government can and should act immediately, using its powers under the CCPSA, to prohibit the manufacture, sale, distribution and import of children's products, upholstered furniture, mattresses, and plastic casings surrounding electronics which contain organohalogen flame retardants.

certainty is not to be used as a reason for postponing measures that prevent adverse effects on human health if those effects could be serious or irreversible.”¹³³

While there is also the possibility that the proposed regulatory approach could be promulgated through regulations under CEPA, as discussed above, there are more regulatory hurdles to regulating organohalogen flame retardants as a class under CEPA than the CCPSA. Namely, it is only once a substance has been assessed as “toxic” that the federal government has powers under CEPA to place restrictions and prohibitions on the use of the substance – including as an additive in consumer products. The assessment process can be extremely time consuming and proceeds on a substance-by-substance basis that is not easily suited to passing regulations that restrict a wide class of chemicals. While the Minister of Health and the Minister of Environment may make interim orders under CEPA respecting substances that have not yet been assessed as toxic and placed on the List of Toxic Substances, this is an extreme and rare measure that requires the ministers to believe that “immediate action is required to deal with a significant danger” – a finding that may be ill suited to the long-term health effects of organohalogen flame retardants.¹³⁴ Thus, this report recommends that the proposed regulatory approach be pursued under the *Consumer Product Safety Act* – which requires no specific assessments or classification processes before regulations that provide for consumer health and safety are introduced.

To be clear, CEPA, as discussed above, is Canada’s most comprehensive piece of environmental legislation and is specifically designed to regulate chemicals. Indeed, as discussed, *some* organohalogen flame retardants are already prohibited under CEPA. It is CEPA, not the CCPSA, which is best able to regulate and control the use of substances in Canada throughout the lifetime of the substance. Even if the regulations under the CCPSA that this report proposes are enacted, there would still be organohalogen and other harmful flame retardants in use in products not regulated by CCPSA, such as fire-fighting foam, etc. The changes proposed in this report will not result in comprehensive elimination of organohalogen and other harmful flame retardant chemicals in Canada.

¹³³ CCPSA, preamble.

¹³⁴ CEPA, subs. 94(1).

To achieve a near-total elimination of all organohalogens would likely require action under CEPA. Moreover, if the federal government adopts CELA's proposed CEPA amendments, discussed above,¹³⁵ and also prohibits all organohalogen flame retardants by CEPA regulation, this would achieve much the same result as the CCPSA regulations proposed in this report are designed to do – and on a more comprehensive scale. Thus, in the long-term, regulatory action utilizing the tools available in CEPA should be implemented to achieve comprehensive hazardous chemical reduction in Canada's environment.

Nonetheless, in the short-term, there is a pressing need for as much action as possible on the issue of organohalogen flame retardants. That is why this report proposes regulatory action under the CCPSA. The science is in. We already know organohalogen flame retardants are harmful, and they are still in widespread use. The federal government can and should act immediately, using its powers under the CCPSA, to prohibit the manufacture, sale, distribution and import of children's products, upholstered furniture, mattresses, and plastic casings surrounding electronics which contain organohalogen flame retardants.

¹³⁵ *Supra* note 93.

PART 6. SUPPLEMENTARY NON-LEGAL MEASURES

In addition to the implementation of the proposed approach under CCPSA regulations, there are several immediate, non-legal tools that can be used to help minimize the proliferation of flame retardant chemicals in consumer products.

First, recognizing the health risks posed by organohalogen flame retardants to the Canadian public, and their limited utility in increasing fire safety, the federal government could immediately halt the purchase of products within the Four Proposed Product Categories that contain organohalogen flame retardants. In light of the large number of employees of the federal government, and the mass product requirements of the varied public sector, this could have a large market influence on product manufacturers and retailers. Moreover, using the federal government's purchasing power to lead change has a very recent precedent. In September 2018, the federal government announced that while plans were underway to introduce laws to address marine plastic pollution, the federal government would eliminate single-use plastics from all federal operations.¹³⁶

Second, the public should be empowered to track and advocate against the addition of organohalogen flame retardants in consumer products on the Canadian market. Consistent with policy recommendations included in Environment and Human Health Inc.'s report *Flame Retardants: The Case for Policy Change*, the Canadian federal government should maintain a publically accessible online registry of flame retardants that identifies flame retardants currently added to Canadian consumer products and summarises their known health hazards.¹³⁷ The registry should also include a list of consumer product manufacturers and retail outlets that sell flame-retardant free products.

...the federal government could immediately halt the purchase of products within the Four Proposed Product Categories that contain organohalogen flame retardants.

¹³⁶ Michael Gorman, "Ottawa aims to eliminate single-use plastics from federal operations," *CBC News* (20 September 2018), online: <www.cbc.ca/news/canada/nova-scotia/environment-g7-oceans-plastic-waste-catherine-mckenna-1.4831484>.

¹³⁷ *Flame Retardants: The Case for Policy Change*, (North Haven, CT: EHHI 2018), at pp 87-88, online: *Environment and Human Health, Inc.* <http://www.ehhi.org/reports/flame/EHHI_FlameRetardants_1113.pdf>. This report proposes, among other things, that the US federal government establish a Registry of Flame-Retardants.



Summary of Proposed Recommendations

Flame retardant chemicals introduce significant health risks for Canadians and render several at-risk groups particularly vulnerable – including fire fighters, young children, fetuses and pregnant women. The US Consumer Product Safety Commission, a federal agency tasked with protecting consumers from both fire and chemical hazards, recognizes that the “known adverse health effects” of organohalogen flame retardants *include* neurological impairment (*i.e.* decreased IQ in children), endocrine disruption, cancer, and reproductive impairment – impacts that are also threatening the survival of one of Canada’s most “iconic” endangered species: the Southern Resident killer whale.¹³⁸

In response to these serious impacts, and recognizing that adding flame retardants to consumer products makes no practically significant difference in terms of increasing fire safety,¹³⁹ several North American jurisdictions have prohibited the addition of flame retardants to different categories of consumer products – including California, Maine, Rhode Island, Minnesota and Washington (See [Appendix 2](#)). This report calls upon the Canadian federal government to follow the lead of these jurisdictions and implement the following recommendations.

¹³⁸ DFO News Release, *supra* note 79.

¹³⁹ US Consumer Product Safety Commission, *Upholstered Furniture Full Scale Chair Tests – Open Flame Ignition Results and Analysis*, MD 20814 (May 9, 2012), at p. 23, online: <<https://www.cpsc.gov/s3fs-public/openflame.pdf>>.

SIX RECOMMENDATIONS FOR BETTER FLAME RETARDANT REGULATION IN CANADA

Recommendation #1

Introduce regulations under the *Canada Consumer Product Safety Act* prohibiting the manufacture, sale, distribution and import of the following enumerated products (collectively, the “Four Proposed Product Categories”) which contain non-polymeric, additive organohalogen flame retardants:

- a) durable infant or toddler products, children's toys, child care articles or other children's products;
- b) upholstered furniture sold for use in residences;
- c) mattresses and mattress pads; and
- d) plastic casings surrounding electronics.

Recommendation #2

Introduce regulations under the *Canada Consumer Product Safety Act* requiring that any non-organohalogen flame retardants pass either:

- a) a reverse burden test placing the onus on industry to demonstrate that the proposed flame retardant will not negatively impact human health, or
- b) a precautionary test, in an assessment conducted by Health or Environment Canada, to demonstrate that the proposed flame retardant will not negatively impact health

before being approved for use in any of the Four Proposed Product Categories.

Recommendation #3

Introduce regulations under the *Canada Consumer Product Safety Act* requiring that any non-organohalogen flame retardants be subjected to a safer alternatives assessment before being approved for use in any of the Four Proposed Product Categories. A safer alternatives assessment requires an industry applicant to demonstrate that the use of the proposed flame retardant is necessary and that there is no feasible safer alternative.

Recommendation #4

Immediately halt the federal government's purchasing of products within the Four Proposed Product Categories that contain organohalogen flame retardants.

Recommendation #5

Create and maintain a publically accessible online registry which identifies all flame retardants that are currently added to Canadian consumer products, summarizes their known health hazards, and points Canadian consumers to manufacturers and retailers that sell products free from flame retardants.

Recommendation #6

In the long run, regulations under the *Canadian Environmental Protection Act* (CEPA) should be made to prohibit the manufacture, use, sale and import of organohalogens generally, including in all consumer products. It is only through CEPA that the virtual elimination of organohalogens in Canada can be achieved.¹⁴⁰

¹⁴⁰ CELA's proposed CEPA amendments (see supra note 93) include the repeal and replacement of the definition of "virtual elimination" so that it accords with the concept of zero discharge. CEPA should be amended in accordance with CELA's proposals.

Appendix 1: Canada's current regulation of flame retardants

The class-wide ban on the manufacture, sale, distribution and import of consumer products containing organohalogen flame retardants within the Four Proposed Product Categories is a large departure from Canada's current regulation of flame retardants. While the class of organohalogen flame retardants includes over 100 flame retardants (with 83 recently identified as being in use or available for use in North American markets), the Canadian government has introduced regulations for only a handful of flame retardant chemicals. This section will identify existing restrictions placed on flame retardant chemicals (*i.e.* including organophosphate and mineral flame retardants) under CEPA and the CCPSA. Table 1 below summarizes the restrictions in place under CEPA, whereas Table 2 summarizes the restrictions in place under the CCPSA.

TABLE 1: CURRENT FLAME RETARDANT REGULATIONS UNDER CEPA

Flame Retardant	Restriction	Scope of application to consumer goods
Polybrominated Biphenyls (PBBs)	Prohibited from manufacturing, using, selling, or importing the substance or a product containing it (unless incidentally present) ¹⁴¹	Applies to all consumer goods
Polychlorinated Terphenyls (PCTs)	Prohibited from manufacturing, using, selling, or importing the substance or a product containing it (unless incidentally present)	Applies to all consumer goods
Hexabromocyclododecane (HBCD or HBCDD)	Prohibited from manufacturing, using, selling, or importing the substance or expanded and extruded polystyrene foam containing HBCD, and their intermediary products, when specifically used for building or construction applications	Applies to a specific consumer good
Polybrominated diphenyl ethers (PBDEs)	Prohibited from manufacturing, using, selling, or importing the substance or a product	Currently all manufactured goods containing PBDEs are exempt from the prohibition.

¹⁴¹ *Prohibition of Certain Toxic Substances Regulations, 2012, SOR/2012-285, Subs. 4(1), Schedule 1, Part 1.* Note that a prohibition under subs. 4(1) is subject to s 9, whereby a manufacturer or importer of a prohibited toxic substance or a product containing it can continue to manufacture or import the substance or product, if they were manufacturing or importing the substance or product on March 14, 2013, and if they are issued a permit under s. 10.

Flame Retardant	Restriction	Scope of application to consumer goods
	containing it (unless incidentally present), with an exemption that allows for the import, manufacture, use sale or offer for sale of manufactured items containing PBDEs. ¹⁴²	However, Environment and Climate Change Canada is proposing to eliminate this exemption. ¹⁴³
Polychlorinated biphenyl (PCB)	Prohibited from manufacturing, using, selling, importing or exporting the substance or products containing the substance above set concentration levels (threshold varies on intended use). ¹⁴⁴	Applies generally to all consumer goods – with specific exceptions (i.e. electrical capacitors) ¹⁴⁵

TABLE 2: CURRENT FLAME RETARDANT REGULATIONS UNDER CCPSA

Flame Retardant	Restriction	Scope of application to consumer goods
Tris (2-chloroethyl) phosphate (TCEP)	Prohibits the manufacture, import, advertising or sale of consumer products intended for children under three years of age that are made, in whole or in part, of polyurethane foam containing TCEP. ¹⁴⁶	Applies to a specific class of consumer goods

¹⁴² *Ibid* subs. 4(2); see also Environment and Climate Change Canada, “Substance prohibition summary for polybrominated diphenyl ethers” (date modified: 20 June 2018), online: <www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/substance-prohibition-summary-polybrominated-diphenyl-ethers.html#fn2>

¹⁴³ Environment and Climate Change Canada, “Proposed amendments to the Prohibition of Certain Toxic Substances Regulations, 2018 consultation document: chapter 2” (date modified: 21 December 2018), at 2.6, online: <www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/proposed-amendments-certain-toxic-substances-2018-consultation/chapter-2.html#toc26>. Under Environment and Climate Change Canada’s proposed changes, there would still be an exception for decabromodiphenyl ethers (decaBDE). The decaBDE exemption would allow the import, manufacture, use, sale and offer for sale of decaBDE in spare parts for vehicles until 2036. The proposed changes to Canada’s PBDE restrictions are in light of international phase outs of the use of PBDEs. In particular, the Stockholm Convention (see *supra* note 51), which Canada ratified in 2001 (although the Convention didn’t come into force in Canada until May, 2004) requires parties to the Convention to eliminate production, use, import and export of PBDEs, among other Persistent Organic Pollutants (POPs) listed in Annex A of the Convention. The Convention also has exemptions for the use of decaBDE for parts for use in certain vehicles, which also expire in 2036: *Amendments to Annexes A and C, Stockholm Convention on Persistent Organic Pollutants*, CN.766.2017.TREATIES-XXVII.15 (Depository Notification) (entered into force: 18 December 2018), at pp 7-8, online (pdf): *United Nations Treaty Collection* <treaties.un.org/doc/Publication/CN/2017/CN.766.2017-Eng.pdf>.

¹⁴⁴ *PCB Regulations*, SOR/2008-273, s. 6.

¹⁴⁵ *Ibid*, s. 9.

¹⁴⁶ CCPSA, *supra* note 88, s. 5, and Schedule 2, no. 16.

Flame Retardant	Restriction	Scope of application to consumer goods
All flame retardants	<p>Prohibited from adding any flame retardants to children's loose-fitting sleepwear that causes <i>any</i> of the following consequences:¹⁴⁷</p> <ul style="list-style-type: none"> I. acute lethality as a result of oral or skin exposure to specified doses of the chemical II. erythema or edema formation when specific testing procedure is used III. certain levels of dermal sensitisation in animals when tested IV. gene mutation or chromosomal aberration when specific testing procedure is used V. tumors when specific testing procedure is used <p>Loose-fitting children's sleepwear that is treated with a flame retardant must have a permanent label indicating that a flame retardant is used.¹⁴⁸</p>	Applies to a specific class of consumer goods

¹⁴⁷ *Children's Sleepwear Regulations*, SOR/2016-169, subs. 3(2).

¹⁴⁸ *Children's Sleepwear Regulations*, SOR/2016-169, s 4.

Appendix 2: North American jurisdictions with sweeping flame retardant legislation

As identified, in 2017, the US Consumer Product Safety Commission voted to approve a petition to initiate rulemaking procedures under US federal law to prohibit the addition of organohalogen flame retardants in children's products, upholstered furniture, mattresses, and plastic casings surrounding electronics.¹⁴⁹ While these procedures are underway, and recognizing the length of time this may take, several US states have taken action to introduce flame retardant regulations at the state level. This section of the report will highlight several of these measures. States with large markets and influence, such as California, have taken progressive, sweeping legislative action to minimize exposure to chemical flame retardants. Thus, there are important North American precedents for introducing laws regulating the addition of flame retardants in consumer products – Canada should build upon these precedents and take action to protect Canadian consumers. This section will also comment on how the report's current proposal compares to these US State precedents.

California

In late September 2018, California signed into law a prohibition on the addition of a wide number of flame retardants (including both organohalogen and organophosphorus flame retardants)¹⁵⁰ to residential upholstered furniture, juvenile products,¹⁵¹ and mattresses or their "constituent component[s]."¹⁵² The prohibition took effect on January 1, 2020.¹⁵³ Specifically, the new law prohibits a person, including a manufacturer, from "sell[ing] or

¹⁴⁹ CPSC Guidance Document, *supra* note 3 at 45268.

¹⁵⁰ Specifically, California State law prohibits "covered flame retardant chemical[s]", which are defined as chemicals that are used "to resist or inhibit the spread of fire, or [are] synergist[s] to chemicals that are used to resist or inhibit the spread of fire" while also being one of the of following: (i) halogenated, organophosphorus, organonitrogen or nanoscale chemicals; (ii) chemicals defined as "designated chemicals" under California's Health and Safety Code; or (iii) chemicals listed on the Washington Department of Ecology's Chemicals of High Concern to Children list that are "identified as ... flame retardant[s] or synergist[s] to a flame retardant in the rationale for inclusion in the list" (8 Business and Professions Code ch 3 art 5.5 § 19100, online: leginfo.ca.gov/faces/codes_displayText.xhtml?lawCode=BPC&division=8.&title=&part=&chapter=3.&article=5.5) ("Art 5.5 of Cal BPC"); see also Beveridge & Diamond PC, "California Enacts Broad Prohibitions on Flame Retardant Use," (11 October 2018), online: *Lexology* <www.lexology.com/library/detail.aspx?g=c533d882-5070-4691-81ca-8f98b848f11e> ("Beveridge & Diamond").

¹⁵¹ "'Juvenile product' means a product... designed for residential use by infants and children under 12 years of age, including, but not limited to, a bassinet, booster seat, changing pad, floor playmat, highchair, highchair pad, infant bouncer, infant carrier, infant seat, infant swing, infant walker, nursing pad, nursing pillow, playpen side pad, playard, portable hook-on chair, stroller, and children's nap mat" (Art 5.5 of Cal BPC, *supra* note 150, § 19100(d)). The prohibition does not extend to the electronic components of juvenile products – or any other of the product categories.

¹⁵² *Ibid.*, § 19101(a).

¹⁵³ *Ibid.*

distribut[ing]” these items within the State of California, and prohibits an upholsterer from repairing furniture “using replacement components that contain covered flame retardant chemicals” at levels above 1000ppm.¹⁵⁴ The law does allow for the continued sale of second hand products.

Significantly, as part of the text of the enabling bill, the Legislature of the State of California “declare[d]” the following:

- a) “Flame retardant chemicals are not needed to provide fire safety.”
- b) “Scientists have found that...flame retardant chemicals...accumulate in our bodies and the environment...for long periods of time...and are toxic to humans and animals.”
- c) “Fire fighters are at particular risk from flame retardant chemicals...[including] increased cancer rates and deaths.”
- d) “[C]ertain flame retardant chemicals are associated with loss of IQ, attention problems, and other developmental problems in children.”¹⁵⁵

The text of the bill also recognizes that although California changed its flammability standard test in 2013 to remove the need for manufacturers to use flame retardants to meet the test – some product manufacturers “still use flame retardant chemicals in upholstered furniture and juvenile products.”¹⁵⁶

As discussed by US legal practitioners, the California law contains several important exceptions, “including, among other things, electronic components (and their associated casings) of regulated products, certain other furniture components, thread or fiber used to stitch mattress components together, as well as any components of adult mattresses other than foam.”¹⁵⁷ The bill also appears to target children’s furniture/home products such as bassinets, booster seats, changing pads, floor playmats and highchairs – as opposed to including children’s toys and educational tools. However, the text of the bill notes that

[w]hile many categories of products and materials that are not covered by this act contain flame retardant chemicals, which pose health risks—as the United States Consumer Product Safety Commission has recognized, for example—this act takes an incremental approach to addressing these health risks and focuses on those categories of products and materials with which the [State Bureau of Electronic and Appliance Repair, Home Furnishings, and Thermal Insulation] has prior experience in addressing the presence of flame retardant chemicals.¹⁵⁸

While the proposed approach in this report focuses only on prohibiting the addition of organohalogen flame retardants, our proposed approach would apply to a wider number of consumer products than California’s bill – including all children’s products (*i.e.* toys), all mattress components (including electronic components) and the plastics surrounding

¹⁵⁴ *Ibid*, § 19101(b).

¹⁵⁵ US, AB 2998, *An act to add Article 5.5 (commencing with Section 19100) to Chapter 3 of Division 8 of the Business and professions Code, relating to business*, Cal, 2017-2018, s 1, online: leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB2998 (“AB 2998”).

¹⁵⁶ *Ibid*, s. 1(a).

¹⁵⁷ Beveridge & Diamond, *supra* note 150.

¹⁵⁸ AB 2998, *supra* note 155, s. 1(k).

electronics. Additionally, our proposed approach includes a graduated regulatory response not found in California's legislation, which would require *any* chemical flame retardant outside of the organohalogen flame retardant class (*i.e.* including organophosphate flame retardants) to pass stringent precautionary tests, as well as a safer alternatives assessment, *before* being approved for use in the product categories. In light of the many different design approaches (*i.e.* fabric choices) for reducing product flammability, and the limited utility of using flame retardants to increase fire safety (*i.e.* it is difficult to demonstrate that the use of the additive flame retardant is necessary), the proposed regulatory approach would significantly restrict the addition of chemical flame retardants in the Four Proposed Product Categories in Canada.

Maine

In 2017, the State of Maine passed legislation that prohibits the addition of *any* flame-retardant chemical, above specified levels, in residential indoor, upholstered furniture.¹⁵⁹ The law widely defines a "flame-retardant chemical" as "a chemical or chemical compound for which a functional use is to resist or inhibit the spread of fire," – and thus extends to all classes of flame retardant chemicals.¹⁶⁰ Effective January 1, 2019, the new legislation prohibits the sale of upholstered furniture that contains flame-retardant chemicals above 0.1%.¹⁶¹

Key exemptions under the act apply to:

- a) used upholstered furniture;
- b) upholstered furniture purchased for public use in public facilities, including but not limited to, schools, jails and hospitals, that is required to meet the flammability standard in California; and
- c) new upholstered furniture otherwise subject to this prohibition that is sold, offered for sale or distributed for promotional purposes in the State by a retailer or wholesaler on or after January 1, 2019, but was imported into the State or otherwise purchased or acquired by the retailer or wholesaler for sale or distribution in the State prior to January 1, 2019.¹⁶²

While the proposed approach in this report focuses on prohibiting the addition of organohalogen flame retardants, as opposed to targeting all flame retardants like Maine, our proposed approach would apply to a wider number of consumer products than Maine's flame retardant law. In addition to upholstered furniture, the approach proposed in this

¹⁵⁹ US, HP 138, *An Act To Protect Firefighters by Establishing a Prohibition on the Sale and Distribution of New Upholstered Furniture Containing Certain Flame-retardant Chemicals*, 128th Legislature, Reg Sess, Maine, 2017, online: *Maine Legislature* <www.mainelegislature.org/legis/bills/bills_128th/billtexts/HP013801.asp>. This bill added §1609-A to Me Rev Stat tit 38 ch 16, online: *Maine Legislature – Maine Revised Statutes* <legislature.maine.gov/legis/statutes/38/title38sec1609-A.html> ("Maine Statute").

¹⁶⁰ "Flame-retardant chemical" "includes, but is not limited to, halogenated, phosphorus-based, nitrogen-based and nanoscale flame retardants and any chemical or chemical compound for which 'flame retardant' appears on the substance safety data sheet required under 29 Code of Federal Regulations, Section 1910.1200(g) (2015) (Maine Statute, *supra* note 160, §1609-A).

¹⁶¹ *Ibid.*

¹⁶² *Ibid.*

report would prohibit organohalogen flame retardants in all children's products, mattresses, and plastics surrounding electronics. This report's approach targets a wide class of organohalogen flame retardants that poses the highest concern to consumers (a class containing over 100 different chemicals) – and their presence in a much larger group of consumer products - and adopts a rational, graduated regulatory approach to the use of any other flame retardants in these products.

As discussed, our proposed requirement that the future addition of any chemical flame retardant outside of the organohalogen flame retardant class pass stringent precautionary tests, as well as a safer alternatives assessment, will have the intended effect of significantly curtailing, and ultimately eliminating, the addition of all flame retardants that pose health risks to Canadian consumers.

Rhode Island

In October 2017, Rhode Island passed legislation that regulates the addition of all organohalogen flame retardants in residential upholstered furniture or bedding.¹⁶³ Specifically, as of July 1, 2019, “no manufacturer, wholesaler, or retailer may manufacture, knowingly sell, offer for sale, or distribute for use in this state any residential upholstered bedding or furniture, which contains one hundred parts per million (100 ppm), or greater of any organohalogen flame retardant chemical...that is added to a plastic, foam or textile.”¹⁶⁴ However, on July 8, 2019, the governor signed HB 5119 which *increased* the maximum amount of non-polymeric organohalogen flame retardant from 100 ppm to 1000 ppm, effective January 1, 2020.¹⁶⁵

Interestingly, the new law requires manufacturers of upholstered bedding or furniture to participate in the education of retailers about this law. The law requires manufacturers of products that are prohibited from sale to notify persons or entities that sell these manufactured products about the new measures in advance of them coming into effect.¹⁶⁶

The approach proposed in this report builds upon Rhode Island State's prohibition on the use of additive organohalogen flame retardant chemicals, and applies the prohibition to a wider category of products. Additionally, the proposed approach would target the addition of other substitute non-organohalogen flame retardants by requiring precautionary testing and safer alternatives assessment before approving usage.

¹⁶³ Safeguards (SGS), “US State of Rhode Island Restricts Flame Retardants” (9 October 2017), online: www.sgs.com/en/news/2017/10/safeguards-15617-us-state-of-rhode-island-restricts-flame-retardants.

¹⁶⁴ RI Gen Laws tit 23 ch 26 § 23-26-3.1(a) [effective until January 1, 2020], online: *State of Rhode Island General Assembly* <webserver.rilin.state.ri.us/Statutes/TITLE23/23-26/23-26-3.1.HTM>.

¹⁶⁵ “US State of Rhode Island Announces New Limit for Flame Retardants” (October 2019), online: *QIMA* <www.qima.com/regulation/10-19/oct2019-ri-limit-flame-retardants>. The new law is RI Gen Laws tit 23 ch 26 § 23-26-3.1(a) [effective January 1, 2020] online: *State of Rhode Island General Assembly* <webserver.rilin.state.ri.us/Statutes/TITLE23/23-26/23-26-3.1-1.HTM>.

¹⁶⁶ *Ibid*, § 23-26-3.1(c).

Minnesota

The State of Minnesota has introduced legislation requiring manufacturers, wholesalers and retailers to comply with limits on organohalogenated flame retardant chemicals in children's products and in all upholstered residential furniture.¹⁶⁷ The new law is phased in through two stages:¹⁶⁸

1. On and after July 1, 2021 no manufacturer or wholesaler may manufacture, sell, offer for sale, distribute for sale, or distribute for use a children's product, upholstered residential furniture, residential textile, or mattress containing, in amounts greater than 1,000 ppm in any product component, any organohalogenated flame retardant chemical.
2. On and after July 1, 2022 no retailer may sell or offer for sale or use in this state a children's product, upholstered residential furniture, residential textile, or mattress containing in amounts greater than 1,000 parts per million in any product component any organohalogenated flame retardant chemical.

It is important to note that, in addition to prohibiting the addition of organohalogenated flame retardant chemicals above certain levels, the Minnesota law also places important restrictions on chemicals added to replace any organohalogenated flame retardants. Specifically, "a manufacturer shall not replace a chemical whose use is prohibited under this section with a chemical identified on the basis of credible scientific evidence by a state, federal, or international agency as being known or *suspected* with a high degree of probability to:

1. harm the normal development of a fetus or child or cause other developmental toxicity;
2. cause cancer, genetic damage, or reproductive harm;
3. disrupt the endocrine or hormone system; or
4. damage the nervous system, immune system, or organs, or cause other systemic toxicity."¹⁶⁹

The policy proposal in this report adopts Minnesota's general approach of prohibiting the addition of specified flame retardants with complementary precautionary restrictions on the addition of any chemical substitutes that may cause negative health effects. However, the approach proposed in this report applies to wider product categories and requires that the use of any other flame retardant be shown not to cause adverse health effects before it is added in one of the Four Proposed Product Categories (*i.e.* as opposed to preventing the substitution of chemicals that have already been flagged on a list as harmful).

¹⁶⁷ "Upholstered residential furniture" means furniture with padding, coverings, and cushions intended and sold for use in the home or places of lodging (Minn Stat ch. 325F.071 §1(d) (2019) online: *Minnesota Legislature* <www.revisor.mn.gov/statutes/cite/325F.071> ("Minnesota Statute").

¹⁶⁸ *Ibid* at notes; see also US, HF 359, *An act relating to health; prohibiting the use of certain flame-retardant chemicals in certain products; allowing certain exemptions; amending Minnesota Statutes 2018, section 325F.071; proposing coding for new law in Minnesota Statutes, chapter 325F*, 2019, Reg Sess, Minn, ch 47, Effective Date, online: *Minnesota Legislature* <www.revisor.mn.gov/laws/2019/0/47/>.

¹⁶⁹ Emphasis added; Minnesota Statute, *supra* note 167, §3.

Washington

On May 8, 2019, Governor Jay Inslee of Washington State signed SB 5135, also known as the *Pollution Prevention for Our Future Act*, effective July 28, 2019. This legislation has been called “the nation’s strongest policy regulating toxic chemicals in products.”¹⁷⁰

Pursuant to this legislation, the department of ecology must identify “priority consumer products that are a significant source of or use of priority chemicals specified in RCW [Washington Revised Code] 70.365.010(12) (a) through (f) of this act [a list that includes organohalogen flame retardants, and flame retardants more generally, among other things]” by June 1, 2020.¹⁷¹ By June 1, 2022, the department must “determine regulatory actions regarding the priority chemicals and priority consumer products,”¹⁷² and must “adopt rules to implement” these regulatory actions by June 1, 2023.¹⁷³ The department of ecology must consider, among other things, the availability and feasibility of safer alternatives when identifying priority consumer products that are a significant source of priority chemicals.¹⁷⁴

The legislation sets up a five-year cycle – the actions described above, wherein the department of ecology identifies consumer products that are a source of priority chemicals, then determines regulatory actions, and finally adopts rules implementing the regulatory actions, are to repeatedly occur with respect to newly identified priority chemicals, every five years.¹⁷⁵

Of particular note, the criteria for identifying priority chemicals include whether a chemical or member of a class of chemicals is a concern for “sensitive species.”¹⁷⁶ An example of “sensitive species,” which is defined to mean a species or grouping of animals that may be or is disproportionately or more severely affected by priority chemicals, includes southern resident killer whales.¹⁷⁷ In fact, SB 5135 was one of five bills that the Governor’s Office describes as “crucial orca recovery bills...that protect the safety and livelihood of the Southern Resident orca.” Governor Inslee said that, “[b]y signing these bills, we are investing in one of our most iconic Pacific Northwest animals,” and “[t]he orcas are part of our identity as Washingtonians and we’ve gotten one step closer to protecting them, their homes, and our own survival.”¹⁷⁸

The proposed immediate CCPSA regulatory approach in our report is less sweeping than the one adopted by Washington State. Our report proposes banning organohalogen flame

¹⁷⁰ “Washington State Takes the Lead With Toughest Regulations for Toxic Chemicals in Consumer Products” (10 June 2019), online: *Taylor Anderson LLP* <www.talawfirm.com/washington-state-takes-the-lead-with-toughest-regulations-for-toxic-chemicals-in-consumer-products>.

¹⁷¹ Wash Rev Code tit 70 ch 70.365 §70.365.050(1)(a), online: *Washington State Legislature* <app.leg.wa.gov/RCW/default.aspx?cite=70.365.050>.

¹⁷² *Ibid*, §70.365.050(1)(b).

¹⁷³ *Ibid*, §70.365.050(1)(c).

¹⁷⁴ *Ibid*, §70.365.030(2)(f).

¹⁷⁵ *Ibid*, §§ 70.365.020, 70.365.030(1), 70.365.040(1), 70.365.050(1)(b)-(c),

¹⁷⁶ *Ibid*, §70.365.20(3).

¹⁷⁷ *Ibid*, §170.365.010(15)(a).

¹⁷⁸ Washington Governor’s Office, “Inslee signs bill package to protect, aid, grow orca and salmon population in Salish Sea” (8 May 2019), online: *Medium* <medium.com/wagovernor/inslee-signs-bill-package-to-protect-aid-grow-orca-and-salmon-population-in-salish-sea-721b2d4758c9>.

retardants from certain consumer products, whereas Washington has adopted a long-term regulatory framework for identifying and restricting the use of various hazardous chemicals. The Washington approach is somewhat analogous to the CEPA approach – which already provides a broad Canadian framework for the regulation of hazardous chemicals. As noted already, the Canadian Environmental Law Association has proposed amendments to CEPA that this report endorses. CEPA could and should be used to virtually eliminate organohalogen flame retardants from Canada’s environment.

In the short term, this report proposes immediate regulation under the *Canada Consumer Products Safety Act* to ban organohalogen flame retardants from certain consumer goods.

Anchorage, Alaska

The city of Anchorage on March 19, 2019 approved an ordinance “to protect the health of children and fire fighters” that banned flame retardants in certain consumer products, taking effect January 1, 2020.¹⁷⁹ The preamble to the ordinance notes that “birth defects in Alaska are twice as high as the national average, and Alaska Native infants have twice the incidence of birth defects as non-Native infants in Alaska”¹⁸⁰

Specifically, the ordinance amends the Anchorage Municipal Code to, effective January 1, 2020, prohibit the sale, manufacture or distribution of “any covered product that contains, or a constituent component of which contains, a prohibited flame retardant chemical at levels above 1,000 part per million.”¹⁸¹ Prohibited chemicals include PBDEs as well as “a halogenated, organophosphorus, organonitrogen, or nanoscale flame retardant chemical.”¹⁸²

¹⁷⁹ “Anchorage Assembly Approves Landmark Ban on Flame Retardants in Consumer Products” (20 March 2019), online: *Anchorage Press* <www.anchoragepress.com/bulletin/anchorage-assembly-approves-landmark-ban-on-flame-retardants-in-consumer/article_da61823e-4b4a-11e9-b4fc-6b7c8083ba80.html>.

¹⁸⁰ US, Municipality of Anchorage, AO No 2019-15(S), As Amended, *AN ORDINANCE OF THE ANCHORAGE MUNICIPAL ASSEMBLY TO PROTECT THE HEALTH OF CHILDREN AND FIREFIGHTERS BY AMENDING THE ANCHORAGE MUNICIPAL CODE TO ADD A NEW CHAPTER 15.100, CONSUMER PRODUCTS, AND A NEW SECTION TO PROHIBIT CERTAIN CONSUMER PRODUCTS CONTAINING FLAME RETARDANT CHEMICALS HARMFUL TO HUMAN HEALTH AND DEVELOPMENT*, online (pdf): *Municipality of Anchorage* <[www.muni.org/Departments/Assembly/Documents/AO%202019-15\(S\)_1_As%20Amended.pdf](http://www.muni.org/Departments/Assembly/Documents/AO%202019-15(S)_1_As%20Amended.pdf)>.

¹⁸¹ US, Anchorage Code of Ordinances, tit 15 ch 15.100, §15.100.010 A.

¹⁸² *Ibid*, §15.100.010 B. 2.