Presentations of Panelists and Written Comments

Public Meeting on Petition Regarding Additive Organohalogen Flame Retardants

Wednesday, December 9, 2015

Public Meeting on the Petition Regarding Additive Organohalogen Flame Retardants
U.S. Consumer Product Safety Commission
Bethesda, MD
December 9, 2015

EST	Panel		Presenter	Affiliation	Status
9:00 AM	Opening Remarks		Chairman Elliot F. Kaye		
9:05 AM	Panel 1	1	Linda Birnbaum, Ph.D.	NIEHS/National Toxicology Program	in person
9:15 AM	Panel 1 Questions		Commission		
9:45 AM	Panel 2	2	William Wallace	Consumers Union	in person
		3	Eve Gartner	Earthjustice Northeast Office	in person
		4	Simona Balan, Ph.D.	Green Science Policy Institute	in person
		5	Arlene Blum, Ph.D.	Green Science Policy Institute	phone
		6	Miriam Diamond, Ph.D.	University of Toronto	phone
10:10 AM	Panel 2 Questions		Commission		
10:35 AM	----- B r e a k -----				
10:45 AM	Panel 3	7	Jennifer Lowery, MD, FAAP	American Academy of Pediatrics	in person
		8	Patrick Morrison	International Association of Fire Fighters	in person
		9	Luis Torres	League of United Latin American Citizens	in person
		10	Maureen Swanson, MPA	Learning Disabilities Association of America	in person
		11	Daniel Penchina	The Raben Group/Breast Cancer Fund	in person
11:10 AM	Panel 3 Questions		Commission		
11:40 AM	Panel 4	12	Robert Simon	American Chemistry Council/North American Flame Retardant Alliance	in person
		13	Michael Walls	American Chemistry Council	in person
		14	Matthew S. Blais, Ph.D.	Southwest Research Institute	in person
		15	Thomas Osimitz, Ph.D.	Science Strategies	in person
		16	Chris Cleet, QEP	Information Technology Industry Council and the Consumer Technology Association	in person
		17	Timothy Reilly	Clariant Corporation	in person
12:10 PM	Panel 4 Questions		Commission		
12:35 PM	----- L u n c h B r e a k -----				
1:20 PM	Panel 5	18	Rachel Weintraub	Consumer Federation of America	in person
		19	Katie Huffling, RN, MS, CNM	Alliance of Nurses for Family Environments	in person
		20	Kathleen A. Curtis, LPN	Clean and Healthy New York	in person
		21	Jeff Gearhart	Ecology Center/American Sustainable Business Council	in person
		22	Bryan McGannon	American Sustainable Business Council	in person
1:45 PM	Panel 5 Questions		Commission		
2:10 PM	----- B r e a k -----				
2:20 PM	Panel 6	23	Vytenis Babrauskas, Ph.D.	Fire Science and Technology, Inc.	in person
		24	Donald Lucas, Ph.D.	Lawrence Berkeley National Laboratory	in person
		25	Jennifer Sass, Ph.D.	Natural Resources Defense Council	in person
		26	Daniel Rosenberg	Natural Resources Defense Council	in person
		27	Veena Singla, Ph.D.	Natural Resources Defense Council	phone
		28	Holly Davies, Ph.D.	Washington State Department of Ecology	phone
2:50 PM	Panel 6 Questions		Commission		
3:15 PM	Closing Remarks		Commission		
3:30 PM	Adjourn				

Panel 1

Linda S. Birnbaum, Ph.D.
Director, National Institute of Environmental Health Sciences
and the National Toxicology Program

Statement for the Consumer Product Safety Commission
December 9, 2015
Public Hearing on Organohalogen Flame Retardants

Statement of
Linda S. Birnbaum, Ph.D., D.A.B.T., A.T.S.
Director
National Institute of Environmental Health Sciences
National Institutes of Health
and
Director
National Toxicology Program
U.S. Department of Health and Human Services

Good Morning, Commissioners. I am Linda Birnbaum, the Director of the National Institute of Environmental Health Sciences and Director of the National Toxicology Program. I am also a Principal Investigator in the National Institutes of Health intramural research program. For the last 14 years, my research has focused on understanding the environmental health effects of flame retardants, and I am considered a subject matter expert in this area. I am honored to be invited to testify at today's hearing by the Consumer Product Safety Commission Chairman, Elliot Kaye.

Synthetic polymers (e.g., plastics, foams) are generally considered to be more flammable than natural substances (e.g., cellulose); consequently, flame retardants have been added to many modern consumer products and building materials for the purpose of reducing the risk and hazard of fire. Flame retardants containing bromine and/or chlorine have often been preferred for specific applications due to their efficiency and thermal stability. Halogens, particularly bromine, interfere with fire chemistry by forming radical species that compete with propagation of the combustion cycle.

As a consequence of use, many halogenated flame retardants are now found in the environment, and they have been detected in wildlife and humans. They have the ability to accumulate in biological fluids and tissues, and toxicological and epidemiological evaluations indicate that they are potential human toxicants. Included among the flame retardants that may be human toxicants are the polybrominated diphenyl ethers (PBDEs). As a flame retardant, PBDEs are mixed into products without being chemically bonded (reacted) to the matrix of the products. Such additive flame retardants have much greater potential to leach into the environment than reactive flame retardants. Once in the environment, they are more likely to present exposure concerns for humans and wildlife. PBDEs are present in household and office dust, are absorbed following exposure, and accumulate in human fluids and tissues. Toxicity in rodent models includes effects on endocrine disruption such as thyroid hormone homeostasis, modulation of estrogen and androgen signaling, effects on obesity and diabetes, altered fertility, and neurotoxicity. Epidemiology studies have documented many of these same effects in humans.

Fetuses, nursing infants, and young children may be at highest risk due to critical developmental windows of susceptibility and/or potential for exposure.

There are 209 possible congeners of PBDEs, and three different molecular weight formulations have been used as commercial flame retardants. Two of the commercial mixtures have been shown to be carcinogens in both rats and mice. The extent of absorption, internal dose, and toxicity are largely determined by congener differences in bromine number and substitution patterns. Congeners of the lowest molecular weight mixture, used largely in polyurethane foam, are readily absorbed and are prevalent in human tissues and fluids. The major congener of the highest molecular weight mixture, used primarily in heavy textiles and heavy plastic casings for electronic equipment, is poorly absorbed, but persists in the environment. Concern over persistence and toxicity has led to removal of all PBDE commercial formulations from production in the United States and bans in Canada, Europe, and Japan.

The lower molecular weight PBDEs have been listed for elimination under the Stockholm Convention of Persistent Organic Pollutants and Deca BDE is currently proposed for listing as well. Another high volume brominated flame retardant also listed for elimination under this international treaty is hexabromocyclododecane (HBCD). HBCD is also a persistent and additive flame retardant and is found in the environment, wildlife, and people. Mechanistic and animal studies have indicated it is an endocrine disruptor, is toxic to the liver, and causes adverse neurodevelopmental effects.

Tetrabromobisphenol A (TBBPA) is an example of a halogenated flame retardant with a biological fate that is different from that of HBCD and PBDEs. TBBPA is a reactive, high production volume chemical bonded to resins of circuit boards. An advantage of this application is the low potential for TBBPA to leach into the environment. Although readily absorbed following exposure, TBBPA is rapidly conjugated and excreted, resulting in low bioavailability and little potential to accumulate in tissues. Recently however, the use of TBBPA in an additive mode has increased. Current research is assessing whether there may be adverse effects due to greater levels of exposure for both humans and wildlife, continuous exposures, and epidemiological studies detecting TBBPA in human serum and the milk of lactating women in the United States, Europe, and Asia. Thus far, animal studies have shown it to be a carcinogen in rats and mice and to cause endocrine disruption. Studies are underway to assess the potential for TBBPA to cause developmental effects in rats at low doses. This work will lead to a better understanding of the health risks of TBBPA to humans.

Some brominated and chlorinated organophosphate flame retardants have been known for over 30 years to be animal carcinogens. Recent studies have shown that some of these are also developmental neurotoxicants.

Alternate halogenated flame retardants include a TBBPA derivative (TBBPA-DBPE), a tetrabromobenzoate (TBB), a tetrabromophthalate (TBPH), and decabromodiphenyl ethane (DBDPE). TBB and TBPH are often used in a commercial mixture, Firemaster 550 (FM550), which is used as an additive flame retardant. A small study in animals has

demonstrated endocrine disruption and neurobehavioral impacts of developmental exposure to FM550. Both TBB and TBPH have been found in house dust, and a metabolite of TBB has been found in human urine. TBBPA-DBPE, TBPH, and DBDPE, which are environmentally persistent and found in wildlife, are poorly absorbed, whereas TBB is well-absorbed, rapidly metabolized, and eliminated. Toxicological studies are underway to characterize the risk of exposure for these and other novel halogenated flame retardants.

In conclusion, the halogenated flame retardants for which there is data have been shown to be environmentally and/or biologically persistent and toxic in animals. Many have also been shown to have impacts in human populations. When used in an additive mode, over time they leach into the environment, and they have been detected in humans. Use in a reactive mode or in polymers reduces the opportunity for exposure, and hence, reduces risk.

Thank you for the opportunity to comment. I am happy to answer questions.

References

Bailey JM, Levin ED. Neurotoxicity of FireMaster 550® in zebrafish (Danio rerio): Chronic developmental and acute adolescent exposures. Neurotoxicol Teratol. 2015 Jul 31.

Bearr JS, Stapleton HM, Mitchelmore CL. Accumulation and DNA damage in fathead minnows (Pimephales promelas) exposed to 2 brominated flame-retardant mixtures, Firemaster 550 and Firemaster BZ-54. Environ Toxicol Chem. 2010 Mar;29(3):722-9.

Butt CM, Congleton J, Hoffman K, Fang M, Stapleton HM. Metabolites of organophosphate flame retardants and 2-ethylhexyl tetrabromobenzoate in urine from paired mothers and toddlers. Environ Sci Technol. 2014 Sep 2;48(17):10432-8.

Chen A, Yolton K, Rauch SA, Webster GM, Hornung R, Sjödin A, Dietrich KN, Lanphear BP. Prenatal polybrominated diphenyl ether exposures and neurodevelopment in U.S. children through 5 years of age: the HOME study. Environ Health Perspect. 2014 Aug;122(8):856-62.

Frederiksen M, Vorkamp K, Thomsen M, Knudsen LE. Human internal and external exposure to PBDEs--a review of levels and sources. Int J Hyg Environ Health. 2009 Mar;212(2):109-34.

Herbstman JB, Mall JK. Developmental Exposure to Polybrominated Diphenyl Ethers and Neurodevelopment. Curr Environ Health Rep. 2014 Jun 1;1(2):101-112.

Hoffman K, Fang M, Horman B, Patisaul HB, Garantziotis S, Birnbaum LS, Stapleton HM. Urinary tetrabromobenzoic acid (TBBA) as a biomarker of exposure to the flame retardant mixture Firemaster® 550. Environ Health Perspect. 2014 Sep;122(9):963-9.

Koch C, Schmidt-Kötters T, Rupp R, Sures B. Review of hexabromocyclododecane (HBCD) with a focus on legislation and recent publications concerning toxicokinetics and -dynamics. Environ Pollut. 2015 Apr;199:26-34.

National Toxicology Program. NTP Technical Report on the Toxicology and Carcinogenesis Studies of Decabromodiphenyl Oxide in F344/N Rats and B6C3F1 Mice. NIH Publication No. 86-2565. May 1986.

Noyes PD, Haggard DE, Gonnerman GD, Tanguay RL. Advanced morphological - behavioral test platform reveals neurodevelopmental defects in embryonic zebrafish exposed to comprehensive suite of halogenated and organophosphate flame retardants. Toxicol Sci. 2015 May;145(1):177-95.

Patisaul HB, Roberts SC, Mabrey N, McCaffrey KA, Gear RB, Braun J, Belcher SM, Stapleton HM. Accumulation and endocrine disrupting effects of the flame retardant mixture Firemaster® 550 in rats: an exploratory assessment. J Biochem Mol Toxicol. 2013 Feb;27(2):124-36.

Sagiv SK, Kogut K, Gaspar FW, Gunier RB, Harley KG, Parra K, Villaseñor D, Bradman A, Holland N, Eskenazi B. Prenatal and childhood polybrominated diphenyl ether (PBDE) exposure and attention and executive function at 9-12years of age. Neurotoxicol Teratol. 2015 Aug 10.

U.S. Environmental Protection Agency. Technical Fact Sheet – Polybrominated Diphenyl Ethers (PBDEs) and Polybrominated Biphenyls (PBBs). EPA 505-F-14-006. January 2014.

Panel 2

William Wallace
Consumers Union

Consumers Union®

POLICY & ACTION FROM
CONSUMER REPORTS

Summary of the Oral Presentation of Consumers Union to the U.S. Consumer Product Safety Commission on the Petition Requesting Rulemaking: Products Containing Organohalogen Flame Retardants
December 9, 2015

On behalf of Consumers Union, the policy and advocacy arm of Consumer Reports,[1] thank you for the opportunity to present to the Consumer Product Safety Commission (CPSC) on the petition requesting rulemaking on products containing organohalogen flame retardant chemicals. This petition was filed earlier this year, when Consumers Union joined Earthjustice and the Consumer Federation of America, as well as nine other co-petitioners, in calling for CPSC to declare several categories of products containing non-polymeric, additive organohalogen flame retardants to be "banned hazardous substances" under the Federal Hazardous Substances Act (FHSA).

American consumers are widely exposed to potentially toxic flame retardant chemicals from products in their homes that could pose serious health risks, especially to vulnerable populations like children, and may not actually provide significantly better fire protection than other available technologies without these chemicals. Many of these chemicals have the potential to cause serious reproductive, neurological, hormonal, and carcinogenic health problems, and studies have shown can be found in household air and dust. Current regulation does not adequately address the health hazards of these chemicals, and CPSC has clear authority under FHSA to protect consumers from the potential risk of harm.

It is for these reasons that Consumers Union strongly supports the petition before the Commission. Consumers rightly expect products in their homes to meet flammability standards – but not at the expense of being exposed to potentially toxic chemicals that are often branded in a proprietary manner, and therefore specific ingredients are typically not disclosed. As requested by the petition, CPSC should ban the use of non-polymeric, additive organohalogen flame

---

[1] Consumers Union is an expert, independent, nonprofit organization whose mission is to work for a fair, just, and safe marketplace for all consumers and to empower consumers to protect themselves. It conducts this work in the areas of food and product safety, telecommunications reform, health reform, financial reform, and other areas. Consumer Reports is the world's largest independent product-testing organization. Using its more than 50 labs, auto test center, and survey research center, the nonprofit organization rates thousands of products and services annually. Founded in 1936, Consumer Reports has over 8 million subscribers to its magazine, website, and other publications.

retardants in children's products and other specified product categories and encourage manufacturers to instead use physical barriers for flame retardants like fabrics that are naturally smolder-resistant, fire-resistant barrier materials, and inherently non-flammable materials. We will be planning to submit comments to the docket, which will include the points that follow below.

Non-polymeric, additive organohalogen flame retardants are pervasive in the product categories covered by the petition. The scope of the petition is clear. It covers organohalogen flame retardants in non-polymeric, additive form, and seeks a CPSC rulemaking under FHSA covering specified products containing these chemicals. As the petition states on page 2, the petition covers organohalogen flame retardants in additive form and not in reactive form because "[a]dditive (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." The petition seeks regulation of these chemicals as a class, including those that are used or could be used in additive form in the specified products covered by the petition.

The specific product categories covered by the petition are those for which the petition demonstrates that the flame retardants have been intentionally added, or are often present, in a large percentage of the products. These categories are any of the following that contain non-polymeric, additive organohalogen flame retardants: (1) durable infant or toddler products, children's toys, child care articles, or other children's products, aside from children's car seats; (2) upholstered furniture sold for use in residences; (3) mattresses or mattress pads; and (4) electronic devices, to the extent its plastic casing contains the chemicals. Pages 25 through 28 of the petition document the research and testing which have determined the pervasiveness of the flame retardant chemicals in these products.

Consumers can be exposed to these chemicals, from migration or disintegration from household products. Numerous studies have shown their presence in indoor air and house dust (as demonstrated by Weschler & Nazaroff and Shin et al.), and it is reasonable to conclude that these chemicals can persist in the indoor environment.

This can lead to chronic human exposure from household products. EPA has found that ingestion of organohalogen flame retardants in household dust accounts for over 80% of the overall exposure to these chemicals, and a study by the state of Massachusetts found that inhalation may also account for a significant proportion of exposures. CDC estimates that 97% of people living in the United States have measurable quantities of organohalogen flame retardants in their blood. Additional studies have found significant exposure of pregnant women to these chemicals – leading to exposure by fetuses and newborn infants – as well as particularly elevated levels of exposure by young children, likely due to their frequent hand-to-mouth behaviors. These populations are believed to be at even greater risk.

In conclusion, and in light of the points we have raised, we urge you to grant the petition – and declare the specified categories of products containing non-polymeric, additive organohalogen flame retardants to be "banned hazardous substances" under the Federal Hazardous Substances Act (FHSA). Thank you.

Eve C. Gartner
Staff Attorney
Earthjustice

December 9, 2015
Statement of Eve C. Gartner,
Staff Attorney, Earthjustice
Before the
U.S. Consumer Product Safety Commission
Public Hearing on Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants [Docket No. CPSC-2015-0022]

I am Eve Gartner, a staff attorney at Earthjustice, and co-counsel with Consumer Federation of America representing the many petitioners[1] in this matter. I appreciate the opportunity to provide comments to you on this Petition.

I want to touch on three points today. First, I will reiterate the scope of the rulemaking we have asked the Commission to undertake. Second, I will discuss how the Consumer Product Safety Improvement Act of 2008 sheds light on the ways that Congress intends for the Federal Hazardous Substances Act to be implemented to protect children from products containing toxic substances. Finally, I will talk about a particular subset of organohalogen flame retardants that are covered by this Petition – PBDEs (or polybrominated diphenyl ethers) – to show how the federal government has failed to protect the public from toxic chemicals in products, and why it is so essential for this Commission to do so as soon as possible.

Scope of Petition

We have asked the Commission to adopt mandatory standards under the Federal Hazardous Substances Act to protect consumers from the health hazards caused by the use of *non-polymeric*, organohalogen flame retardants in *additive* form, in specific categories of consumer products. The petition does not include polymeric flame retardants or flame retardants in reactive form, and it does not include flame retardants used in the circuitry of electronics.

The particular categories of consumer products covered by the Petition are:

- durable infant or toddler products, children's toys, child care articles, and children's products (other than children's car seats)
- upholstered furniture sold for use in residences
- mattresses and mattress pads

[1] American Academy of Pediatrics, American Medical Women's Association, Consumer Federation of America, Consumers Union, Green Science Policy Institute, International Association of Fire Fighters, Kids in Danger, Philip J. Landrigan, M.D., M.P.H., League of United Latin American Citizens, Learning Disabilities Association of America, National Hispanic Medical Association, and Worksafe.

- electronic devices with additive organohalogen flame retardants in the plastic casing or enclosure.

To be clear about the scope of the Petition, we specified that these terms should have the meaning given to them in CPSC's statutes, regulations and rulemakings.

Questions have been raised about ***which*** organohalogen flame retardants are covered by the Petition. The short answer is: the Petition seeks a regulation governing the class of all non-polymeric organohalogen flame retardants that are used in additive form in the products covered by the Petition. In 2012, a research group at the University of California-Riverside identified 83 non-polymeric organohalogen flame retardants as in use or available for potential use in consumer products.

Questions have also been raised about the list of chemicals that appears after the signature page of the Petition, and which is entitled "FLAME RETARDANTS REFERENCED IN THIS PETITION." This is <u>not</u> a list of the organohalogen flame retardants covered by the Petition. Rather this is a list of chemicals that – as indicated in the title -- are "*referenced* in this Petition." We included this list as a way for the Commission to easily link the full name and abbreviated name of every chemical mentioned in the Petition. To the extent the chemicals listed are not organohalogen flame retardants, they are not covered by the Petition, and we are not asking the CPSC to regulate products containing them.

<u>Congressional Intent for Implementation of the FHSA</u>

The Federal Hazardous Substances Act authorizes CPSC to regulate products that are "hazardous substances." Under this law, household products are considered "hazardous substances" if they fall within the definition of "toxic," and they "may cause substantial personal injury or substantial illness during or as a proximate result of any customary or reasonably foreseeable handling or use." And the FHSA defines "toxic" to mean that the substance has "the capacity to produce personal injury or illness ...through ingestion, inhalation, or absorption through any body surface." So, taking these provisions together:

- if a substance has "the *capacity* to produce personal injury or illness ...through ingestion, inhalation, or absorption" <u>and</u>
- it "*may cause* substantial personal injury or substantial illness during or as a proximate result of any customary or reasonably foreseeable handling or use," <u>then</u>
- it is a "hazardous substance" under the FHSA
- and it is subject to CPSC regulation.

We believe the Petition, the additional information submitted during the comment period, and the presentations you will hear today establish that products containing organohalogen flame retardants meet this statutory definition of "hazardous substances.

We also believe that the manner in which lead is regulated under the Consumer Product Safety Improvement Act (CPSIA) provides a helpful illustration for how Congress intends

the Federal Hazardous Substances Act to be used to protect children and consumers from toxic products. The CPSIA made consumer products safer by practically eliminating lead in children's products. In section 101 of the CPSIA, Congress declared that any children's product containing lead over a certain level is a "banned hazardous substance" within the meaning of the FHSA.[2] In addition, section 101 clarifies that any lead limit from this section "shall be considered a regulation of the Commission promulgated under or for the enforcement of section 2(q) of the Federal Hazardous Substances Act (15 U.S.C. 1261(q))."[3]

Congress determined that the FHSA was the appropriate statutory mechanism to use to significantly ban lead from children's products because of the CPSC's explicit authority under the FHSA to protect consumers from chemical hazards and the health hazards they pose to the public. The CPSIA's ban on lead in children's products over trace amounts is a model for how Congress envisions consumers should be protected from toxic household products.

For the same reasons that Congress determined that lead should be banned from children's products under the FHSA, the CPSC should adopt regulations banning children's products and other consumer products if they contain organohalogen flame retardants.

PBDEs and the Vacuum of Leadership in Protecting Consumers from Toxic Products

Polybrominated diphenyl ethers – or PBDEs – are a group of organohalogen flame retardant that are covered by this petition.

"PentaBDE" was widely used as a flame retardant in residential seating furniture and in baby products, "OctaBDE" was used in plastics for personal computers and small appliances, and "decaBDE" was widely used as a flame retardant in plastic electronic enclosures and fabrics. These organohalogen PBDEs have now been shown to present a range of very serious human health risks. They alter the brain, cause immune and endocrine disruption, and affect reproduction.

In addition to being toxic, they are persistent and bioaccumulative. As a result, 97% of people who live in the United States have measurable quantities of PBDEs in their blood. Children have the highest body burdens, and children from communities of color have the very highest levels. Several of the scientist's statements submitted in support of the petition describe these adverse health effects. (Statements of Kim Harley, Ph.D.; Susan Kasper, Ph.D.; and Julie Herbstman, Ph.D.)

In the face of what was known a decade ago about the toxicity of PBDEs – which is far less than what we know today -- EPA negotiated a voluntary phase-out of the production of octaBDE and pentaBDE in the United States, effective at the end of 2004. In addition, EPA negotiated a phaseout of the domestic production of decaBDE, effective in 2013.

---

[2] 15 U.S.C. § 1278a(a)(1).

[3] 122 STAT. 3022 PUBLIC LAW 110–314—AUG. 14, 2008 (101(g)).

But in several fundamental ways, consumers remain unprotected from PBDEs:

First: While manufacturers voluntarily agreed not to produce penta, octa and deca in the United States, these chemicals are still being made overseas. Yet no United States law or regulation prohibits the importation and sale of products containing any PBDE in this country. Some states have banned the sale of *some* products containing *some* PBDEs, but this scattered approach is not sufficient.

EPA has proposed using its Significant New Use Rule (or "SNUR") authority to prohibit importation of products containing PBDEs, but significant industry pushback has prevented these rules from being finalized.

We know from manufacturers' self reporting in Washington State that children's products containing high levels of decaBDE are still being sold in this country. And there is no way to know for sure whether imported furniture contains pentaBDE.

This is a major regulatory hole that we are asking this Commission to fill. If the CPSC grants this Petition, no consumer product could be sold in this country with PBDE flame retardants in additive form.

Second: Even apart from whether imported products contain PBDEs, millions of people in this country continue to live with products containing PBDEs –particularly upholstered furniture. This furniture will likely remain in people's homes, and continue to be used for decades. This is especially true in low-income communities.

The "voluntary phase-out" of *future* chemical production did nothing to protect people in the United States from the toxic furniture and poison toys they already own and that continue to release poisons into the dust throughout our homes.

We believe there can be little doubt that products containing PBDEs meet the definition of a banned hazardous substance under the FHSA. Multiple studies have confirmed that these chemicals not only have the *capacity* to cause personal injury, they in fact *have caused* injury.

And once a product is declared a "banned hazardous substance" -- even if it was not a "banned hazardous substance" when it was sold -- the CPSC has broad authority under Section 15 of the FHSA to take protective action. In addition to the other actions we sought in our petition, we ask the CPSC to consider what steps would be appropriate to protect children and consumers from products containing toxic PBDE flame retardants that are in homes all over this country.

Finally: I have focused these comments on PBDEs because of the extensive and alarming evidence of human exposure and toxicity, and because they provide a case study for how we are not protected by current federal regulations or policies from a group of chemicals that are well-understood to be toxic and to lead to human exposures as a result of their customary use in consumer products.

But as we laid out in detail in the Petition and supporting statements, and as you will hear today and read in the written comments submitted, manufacturers have replaced PBDEs with other non-polymeric halogenated flame retardants and the mounting evidence is that they are similarly toxic.

This is not a huge surprise: It is a basic fact that chemicals with similar structures are similarly toxic.

Let's learn our lesson from the failure to protect our children and ourselves from PBDEs. The CPSC has the authority to protect consumers by banning the sale of products containing organohalogen flame retardants because this entire class has "the *capacity* to produce personal injury or illness" and "*may cause* substantial personal injury or substantial illness" as a result of reasonably foreseeable use. We ask that you grant this Petition.

Simona Balen, Ph.D.
Senior Scientist
Green Science Policy Institute

Petition for Rulemaking on Products Containing Organohalogen Flame Retardants (OFRs)

Simona Balan, PhD

simona@greensciencepolicy.org

Green Science Policy Institute

December 9, 2015

Human health matters

Over 300,000,000 Americans have the toxic flame retardant PentaBDE in their bodies, in an unsuccessful effort to prevent an estimated 30 preventable small open flame furniture fire deaths annually.

CPSC (2008)

Strong scientific basis for banning all additive non-polymeric OFRs

"...properties shared by all organohalogen flame-retardants as a class can lead to adverse effects for human health."

– David Epel, Professor Emeritus of Biological and Marine Sciences, Stanford University

Cellular defense systems do not recognize organohalogens

- Organohalogens, unnatural to mammalian biochemistry
- Not recognized by efflux (ABC) transporters
- Passively diffuse across cell membranes into cells

Cellular bouncers

Cellular detoxifiers

Scientists still catching up with PBDEs

- Delayed puberty in girls (Windham et al., 2015)
- Increased risk of preterm births (Behnia et al., 2015; Peltier et al., 2015)
- Impaired executive function in young children (Cowell et al., 2015; Sagiv et al., 2015)

Study of 35 brominated FRs concludes they "**cannot be regarded as suitable replacements to PBDEs**"

(Liagkouridis et al., 2015)

All OFRs are on Biomonitoring California's authoritative list

The Scientific Guidance Panel for Biomonitoring California recommended adding **the entire class of brominated and chlorinated organic compounds used as flame retardants** to the list of priority chemicals for the Program to biomonitor.

http://biomonitoring.ca.gov/chemicals/brominated-and-chlorinated-flame-retardants

A human toxicological trial?

"We are conducting a massive clinical toxicological trial, and our children and our children's children are the experimental subjects."

-Herbert Needleman & Philip Landrigan

By Phone

Arlene Blum, Ph.D.
Executive Director
Green Science Policy Institute

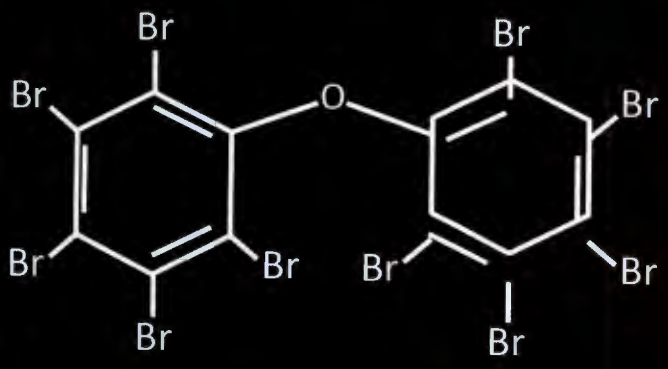
Regrettable Substitution of Organohalogen Flame Retardants

Arlene Blum PhD

Executive Director, Green Science Policy Institute

Visiting Scholar in Chemistry, U.C. Berkeley

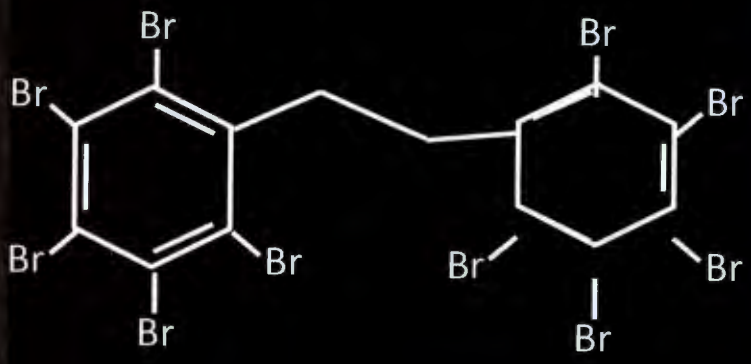
Problem
Regrettable Substitution



Decabromodiphenyl ether

Concerns:

- Persistence
- Bioaccumulation
- Toxicity



Decabromodiphenyl ethane

Concerns:

- Persistence
- Bioaccumulation
- Toxicity?

GREEN SCIENCE POLICY INSTITUTE
www.GreenSciencePolicy.org

Science, January 7, 1977

Flame-Retardant Additives as Possible Cancer Hazards

The main flame retardant in children's pajamas is a mutagen and should not be used.

Arlene Blum and Bruce N. Ames

U.S. Consumer Product Safety Commission

TRIS-Treated Children's Garments Banned

April , 1977

Chlorinated Tris replaced Brominated Tris

- Removed from pajamas in 1978
- Used in furniture until 2012

Human Health effects of PentaBDE:

Higher pentaBDE

associated with

lower birth weight
impaired attention
poorer coordination
lowered IQ

longer time to get pregnant
altered thyroid hormones

Eskenazi et al, 2010, 2011, 2012

Link between pentaBDE exposure and cancer

- NTP 2-year study found "**clear evidence of carcinogenic activity**" in animal studies:
  - liver tumors and cancer (rats and mice)
  - thyroid tumors and cancer (male rats)
  - potentially increased uterine tumors and cancer (female rats)

NTP TR 589, Peer Review Draft

In 2005, PentaBDE phased out

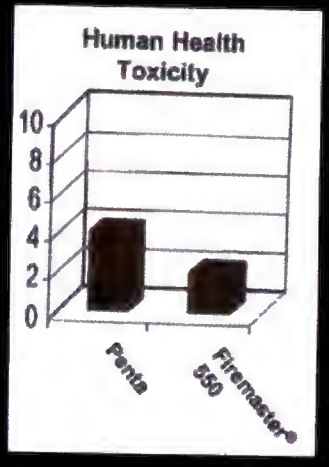
Replacements to meet TB117:

Chlorinated Tris

Estimated lifetime cancer risk from tris treated furniture foam is up to 300 cancer cases/million (2006 CPSC report)

Firemaster 550

EPA Design for the Environment predicted reproductive, neurological, & developmental toxicity and persistent degradation products in 2004.



Chemtura brochure

CPSC Report, Michael Babich, Dec 21, 2006

TDCPP on Proposition 65 List

Tris listed as a carcinogen under Calif. Prop 65.

Beginning October 18, 2012, stores selling furniture, baby products, carpet cushion containing Tris must to display this label:

CALIFORNIA PROPOSITION 65 WARNING

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

(California law requires this warning to be given to customers in the State of California.)

For more information: www.watts.com/prop65

Maryland, New York State, and Vermont have banned TDCPP in furniture and in juvenile products.

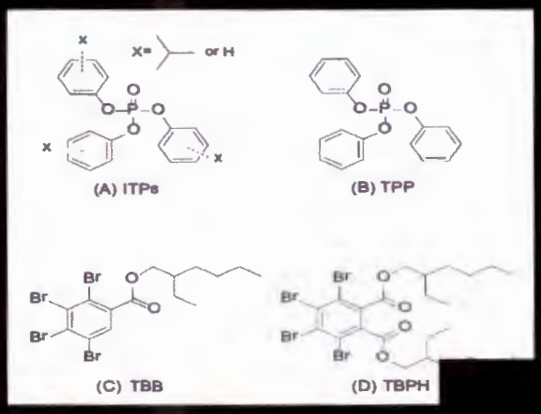
Chlorinated Tris in all 22 mothers & 26 children tested

- Children are exposed at critical periods during brain development.
- Children had levels nearly five times higher than mothers of a breakdown product of chlorinated Tris in their urine.
- One child had 23 times the level of their mother

Bitt et al, Environ. Sci. Technol., 2014, 48 (17), pp 10432–10438
DOI: 10.1021/es5025299

Firemaster® 550

- 2nd most common FR used in foam products in U.S.
- found in more than 95% of house dust sampled
- Increased thyroxin levels, anxiety, early puberty, reproductive problems, and weight gain in pilot study (Patisaul et al., 2013)



Firemaster® 550

Courtesy, NIEHS,

PentaBDE replaced with Firemaster® 550

"We didn't think it would bioaccumulate, but it turns out that prediction isn't borne out by reality."

- Jim Jones, Assistant Administrator, EPA's Office of Chemical Safety and Pollution Prevention

  interview for the Chicago Tribune (Toxic roulette, May 10, 2012)

Pulitzer Prize
Finalist

Goldsmith Prize
Investigative Reporting

Environmental Journalists Society
Environmental Reporting

Gerald Loeb Award
Business and Financial Journalism

National Press Club
Consumer Award

Chicago Tribune

Sunday, May 6, 2012

TRIBUNE WATCHDOG

Playing with fire

A deceptive campaign by industry brought toxic flame retardants into our homes and into our bodies. And the chemicals don't even work as promised.

By Patricia Callahan and Sam Roe
Tribune reporters

Dr. David Heimbach knows how to tell a story.

Before California lawmakers last year, the noted burn surgeon drew gasps from the crowd as he described a 7-week-old baby girl who was burned in a fire started by a candle while she lay on a pillow that lacked flame retardant chemicals.

"Here this is a tiny little person, no bigger than my Italian greyhound at home," said Heimbach, gesturing to approximate the baby's size. "Half of her body was severely burned. She ultimately died after about three weeks of pain and misery in the hospital."

Heimbach's passionate testimony about the baby's death made the long-term health concerns about flame retardants raised by doctors, environmentalists and even firefighters sound abstract and petty.

But there was a problem with his testimony. It wasn't true. Records show there was no dangerous pillow or candle fire. The baby he described didn't exist.

Neither did the 9-week-old patient who Heimbach told California legislators died in a candle fire in 2009. Nor did the 6-week-old patient who he said Alaska lawmakers was fatally burned in her crib in 2010.

Heimbach is not just a prominent burn doctor. He is a star witness for the manufacturers of flame retardants.

His testimony, the Tribune found, is part of a decades-long campaign of deception that has loaded the furniture and electronics in American homes with pounds of toxic chemicals linked to cancer, neurological deficits, developmental problems and impaired fertility.

The tactics started with Big Tobacco, which wanted to shift focus away from cigarettes as the cause of fire deaths, and continued as chemical companies worked to preserve a lucrative market for their products, according to a Tribune review of thousands of government, scientific and internal industry [illegible] the public's fear of fire and helped organize and steer an association of top fire officials that spent more than a decade campaigning for their cause.

Today, scientists know that some flame retardants escape from household products and settle in dust. That's why toddlers, who play on the floor and put things in their mouths, generally have far higher levels of these chemicals in their bodies than their parents.

Blood levels of certain widely used flame retardants doubled in adults every two to five years between 1970 and 2004. More recent studies show levels haven't declined in the U.S. even though some of the chemicals have been pulled from the market. A typical American baby is born with the highest recorded concentrations of flame retardants coursing [illegible] in the world.

People might be willing to accept the health risks if the


By reducing the use of
Organhalogen Flame Retardants
We can have a healthier world.
www.GreenSciencePolicy.org

By Phone

Professor Miriam Diamond
Earthjustice

Earth Sciences
UNIVERSITY OF TORONTO

February 6, 2015

I, Miriam L. Diamond, am writing this statement in support of the Petition to the CPSC to regulate four categories of household products containing non-polymeric additive organohalogen flame retardants.

1. Personal Information. I am a Professor in the Department of Earth Sciences at the University of Toronto with cross appointments in the Department of Chemical Engineering and Applied Chemistry, Dalla Lana School of Public Health, School of the Environment, and Department of Physical and Environmental Sciences at the University of Toronto. I received a B.Sc. from the University of Toronto in 1976, a M.Sc. in Zoology from the University of Alberta in Edmonton Alberta in 1980, a M.Sc.Eng. in Mining Engineering from Queen's University in Kingston, Ontario, and a PhD. in Chemical Engineering and Applied Chemistry from University of Toronto in 1990. My research concerns the sources, emissions and fate of environmental chemicals and exposure of these chemicals to humans and ecosystems. I am a Fellow of the Royal Geographic Society. I have served on the Board of Directors and Executive Committee of the Society of Environmental Toxicology and Chemistry, and have been an Associate Editor of the journal *Environmental Science and Technology*, the leading journal in the field, since 2012. I have held the INNOLEC Science Guest Chair in Chemistry, Masarykova Univerzita, Czech Republic, been a visiting scholar in the Department of Applied Environmental Science at Stockholm University, and the Joseph R. Meyerhoff Visiting Professorship at the Weizmann Institute in Israel. In 2008 I was appointed by the Minister of Environment of the Province of Ontario to co-chair the Toxics Reduction Scientific Expert Panel that brought in Canada's first Toxic Reduction Act. I have served on numerous advisory panels for the U.S. Environmental Protection Agency and on a National Academies of Sciences expert panel, and I am a member of the Canadian Chemicals Management Plan Science Committee. I have attached my CV and list of publications.

2. Personal Expertise. A major focus of my research has been documenting emissions and fate of semi-volatile organic compounds or SVOCs (those with boiling points between 240° and 400°C according to WHO 1997[1]) in the indoor and outdoor urban environments. In 2005 we published the first paper to show that household dust, and not diet, was a major exposure route of the flame retardant polybrominated diphenyl ethers (PBDEs). This marked a radical shift in understanding sources and pathways of these and other SVOCs that are used in consumer products.[2] We were also the first to quantitatively estimate the emissions and fate of PBDEs in an indoor environment using a mathematical model that we developed[3,4] and, in conjunction with Prof. Stuart Harrad of the University of Birmingham, we measured house dust levels of organohalogen flame retardants.[5,6,7] Additionally, we documented the release into the indoor environment of deca-BDE, although it had not been expected to migrate from the products to which it was added because of its very low vapour pressure.[8]

3. Working with colleagues, we have measured concentrations of PBDEs in indoor dust, and in indoor and outdoor air that originate from indoor products and building materials.[9,10,11,12] Our data show that PBDEs migrate from consumer products into the indoor air and dust, and from there make it into the outdoor environment. In this study, we measured the geographic pattern of PBDE outdoor air concentrations at locations across Toronto, Canada, and found that it coincides with the inventory of PBDE-containing products found indoors.[13,14,15] In other words, we determined that PBDEs were migrating from consumer products into the indoor air, and then into outdoor air. The only plausible explanation for this spatial pattern of PBDEs in outdoor air is that the PBDEs migrated out of consumer products, as industries using PBDEs do not have this geographic pattern in Toronto.

4. Other organohalogen flame retardants in addition to PBDEs migrate from consumer products into the indoor environment, including into house dust. We determined this by sampling and analyzing 12 additive organohalogen flame retardants plus PBDEs in the surface wipes of casings of electronic and electrical equipment and the dust of 35 homes in the Toronto area.[16] We found particularly elevated concentrations of penta-, octa- and decaBDE mixtures, tris(1,3-dichloro-2-propyl)phosphate (TDCPP), tetrabromobenzotriazole (TBB), bis(2-ethylhexyl) tetrabromophthalate (TBPH), decabromodiphenyl ethane (DPDPE) and octabromotrimethylphenylindane (OBIND) in both surface wipes and house dust samples.[17,18,19]

5. In points 3 and 4, I explained that specific organohalogen flame retardants migrate from consumer products to indoor and outdoor air based on evidence from measurements. We know that organohalogen flame retardants as a class (not just the specific chemicals we identified in house dust) tend to migrate out of consumer products because they are typically used in additive form (i.e. not chemically bonded to the materials containing them) and because of their physical-chemical properties.[20] The first critical physical-chemical property is that organohalogen flame retardants are semi-volatile organic compounds (SVOCs) and the second property is that these compounds are persistent indoors:

> i) Organohalogen flame retardants as a class are SVOCs[20]. According to the U.S. EPA,[21] a chemical can be classified as a SVOC if its boiling point (a physical-chemical property) is greater than that of water and may vapourize (change from liquid or solid phase to vapour phase as measured by a chemical's vapour pressure) at or above room temperatures. A SVOC can exist simultaneously in a solid phase (i.e., as a flame retardant in a polymer), AND in the vapour phase (i.e., in air). The significance of these flame retardants being SVOCs is that over time, some of the molecules of an organohalogen flame retardant added to a polymer will migrate into air. The migration is purely a function of the chemical being a SVOC and that it is added to, rather than reacted with or bound to, the polymer.
>
> ii) Organohalogen flame retardants are persistent indoors. Their persistence is a desired property for a flame retardant, i.e., the molecule will not break down during the life time of the product to which it has been added. However, the implication of this persistence is that the chemical will not break down indoors after it has migrated from the product.

6. The phenomenon of human exposure to constituents in house dust has been well established in the asthma and allergy field.[22] As noted above, our exposure analysis demonstrated that house dust is also a major source of human exposure to penta- and octaBDEs.[23] This finding has been corroborated by other exposure studies, including studies of organohalogen flame retardants in addition to PBDEs.[24,25,26,27] However, the most recent research suggests that organohalogen concentrations in house dust may be a proxy for another exposure pathway, that of direct transfer from product-to-hand, followed by hand-to-mouth transfer.[28,29] In other words, the most recent research indicates that humans are exposed to organohalogen flame retardants by touching consumer products in which these chemicals are present in additive form and by touching house dust which also contains organohalogen flame retardants. The measurement of organohalogen flame retardants in house dust is thus an indicator of the levels of organohalogen flame retardants in the home that residents come into contact with, both when they touch consumer products containing these chemicals and when they touch or inhale the dust itself.

7. In summary, there is a sufficient body of knowledge to conclude that all organohalogen flame retardants – because they are SVOCs – will tend to migrate out of the consumer products in which they are present in

Earth Sciences
UNIVERSITY OF TORONTO

additive form, resulting in human exposure. Once released indoors, organohalogen flame retardants will accumulate in indoor dust, and they are persistent in the indoor environment. Humans are exposed to organohalogen flame retardants as a result of direct contact with consumer products and with indoor dust containing these compounds. The inevitability of this human exposure, combined with the evidence showing that these compounds have toxicity, leads to the conclusion that all organohalogen flame retardants present in consumer products in additive form pose significant risks to human health.

I therefore urge the CSPC to ban the use of additive organohalogen flame retardants in the four consumer product categories covered in this petition.

Miriam Diamond

Miriam Diamond, Ph.D.
Professor,
University of Toronto

[1] WHO, World Health Organization. 1997. Environmental Health Criteria 192, International Programme on Chemical Safety. Geneva. 81 p. ISBN 9241571926.
[2] JONES-OTAZO H, JP CLARKE, ML DIAMOND, JA ARCHBOLD, G FERGUSON, T HARNER, MG RICHARDSON, JJ RYAN, B WILFORD. 2005. Is house dust the missing exposure pathway for PBDEs? An analysis of urban fate and human exposure to PBDEs. *Environ Sci Technol.* 39:5121-5130.
[3] ZHANG X., ML DIAMOND, SJ HARRAD, C IBARRA. 2009. Multimedia modeling of PBDE emissions and fate indoors. *Environ Sci Technol.* 43(8):2845-2850.
[4] ZHANG X, M ROBSON, ML DIAMOND, C IBARRA, SJ HARRAD. 2011. Polybrominated diphenyl ethers (PBDEs) and polychlorinated biphenyls (PCBs) indoors in Toronto: concentrations, air/dust distribution, sources and emissions. *Environ Sci Technol.* 45:3268-3274.
[5] ABDALLAH MA-E, S HARRAD, C IBARRA, M DIAMOND, L MELYMUK, M ROBSON, A COVACI. 2008. Hexabromocyclododecanes in indoor dust from Canada, the United Kingdom and the United States. *Environ Sci Technol.* 42(2):459-464.
[6] HARRAD S, C IBARRA, M DIAMOND, L MELYMUK, M ROBSON+, J DOUWES, L ROOSENS, AC DIRTU, A COVACI. 2008. Polybrominated diphenyl ethers in domestic indoor dust from Canada, New Zealand, United Kingdom and United States. *Environ Internat.* 34:232-238.
[7] HARRAD S, C IBARRA, M ROBSON, L MELYMUK, X ZHANG, M DIAMOND, J DOUWES. 2009 Polychlorinated biphenyls in indoor dust from Canada, New Zealand, United Kingdom and United States: implications for human exposure. *Chemosphere.* 76(2):232-238.
[8] BUTT CM, ML DIAMOND, J TRUONG, MG IKONOMOU, AFH TER SCHURE. 2004. Spatial distribution of polybrominated diphenyl ethers in southern Ontario as measured in indoor and outdoor window organic films. *Environ Sci Technol.* 38:724-731.
[9] HARRAD S, C IBARRA, M DIAMOND, L MELYMUK, M ROBSON, J DOUWES, L ROOSENS, AC DIRTU, A COVACI. 2008. Polybrominated diphenyl ethers in domestic indoor dust from Canada, New Zealand, United Kingdom and United States. *Environ Internat.* 34:232-238.
[10] HARRAD S, C IBARRA, M ROBSON+, L MELYMUK, X ZHANG, M DIAMOND, J DOUWES. 2009. Polychlorinated biphenyls in indoor dust from Canada, New Zealand, United Kingdom and United States: implications for human exposure. *Chemosphere.* 76(2):232-238.
[11] ZHANG X, M ROBSON, ML DIAMOND, C IBARRA, SJ HARRAD. 2011. Polybrominated diphenyl ethers (PBDEs) and polychlorinated biphenyls (PCBs) indoors in Toronto: concentrations, air/dust distribution, sources and emissions. *Environ Sci Technol.* 45:3268-3274.
[12] MELYMUK L, M ROBSON, PA HELM, ML DIAMOND. 2012. PCBs, PBDEs and PAHs in Toronto air: spatial and seasonal trends and implications for contaminant transport. *Sci Total Environ.* 429:272-280. doi:10.1016/j.scitotenv.2012.04.022
[13] MELYMUK L, M ROBSON, PA HELM, ML DIAMOND. 2012. PCBs, PBDEs and PAHs in Toronto air: spatial and seasonal trends and implications for contaminant transport. *Sci Total Environ.* 429:272-280.
[14] MELYMUK L, M ROBSON, PA HELM, ML DIAMOND. 2013. Application of land use regression to identify sources and assess spatial variation in urban SVOC concentrations. *Environ Sci Technol.* 47(4):1887-1895.
[15] CSISZAR SA, SM DAGGUPATY, ML DIAMOND. 2013. SO-MUM: a coupled atmospheric transport and multimedia model used to predict intraurban-scale PCB and PBDE emissions and fate. *Environ Sci Technol.* 47:436-445.
[16] ABBASI G, SAINI, A, GOOSEY, E, DIAMOND M. Forthcoming. 2014. Halogenated flame retardants in Canadian house dust. *Integr Environ Assess Manag.*

[17] GOOSEY, ER, SANAI A, ABBASI G, CHAUDHURI S, DIAMOND ML. 2013. Sources and multimedia partitioning of BFRs indoors. *Organohalogen Compd.*
[18] GOOSEY E., A SAINI, S CHAUDHURI, ML DIAMOND. 2013. Assessment of the prevalence and exposure to new flame retardants (NFRs) in Canadian indoor environments. Report to Health Canada. 93 pp.
[19] ABBASI G, SAINI, A, GOOSEY, E, DIAMOND M. Forthcoming. 2014. Halogenated flame retardants in Canadian house dust. *Integr Environ Assess Manag.*
[20] SERODIO, D. 2015. Novel halogenated and organophosphate flame retardants: do novel flame retardants have the same environmental fate as the compounds they are replacing? M.A.Sc. Thesis, Department of Earth Sciences, University of Toronto.
[21] http://www.epa.gov/reg3hwmd/bf-lr/regional/analytical/semi-volatile.htm
[22] ROBERTS JW, WT BUDD, MG RUBY, D CAMANN, RC FORTMANN, RG LEWIS, LA WALLACE, TM SPITTLER. 1992. Human exposure to pollutants in the floor dust of homes and offices. *J Expo Anal Environ Epi.* 2:127-146.
[23] JONES-OTAZO H, JP CLARKE, ML DIAMOND, JA ARCHBOLD, G FERGUSON, T HARNER, MG RICHARDSON, JJ RYAN, B WILFORD. 2005. Is house dust the missing exposure pathway for PBDEs? An analysis of urban fate and human exposure to PBDEs. *Environ Sci Technol.* 39:5121-5130.
[24] JOHNSON PI, STAPLETON HM, SJODIN A, MEEKER JD. 2010. Relationships between polybrominated diphenyl ether concentrations in house dust and serum. *Environ Sci Technol.* 44:5627-5632.
[25] KARLSSON M, JULANDER A, VAN BAVEL B, HARDELL L. 2007. Levels of brominated flame retardants in blood in relation to levels in household air and dust. *Environ Int.* 33(1):62-69.
[26] LORBER M. 2008. Exposure of Americans to polybrominated diphenyl ethers. *J Exposure Sci Environ Epi.* 18(1):2-19.
[27] WU N, HERMANN T, PAEPKE O, TICKNER J, HALE R, HARVEY E, LA GUARDIA M, MCCLEAN MD, WEBSTER TF. 2007. Human exposure to PBDEs: associations of PBDE body burdens with food consumption and house dust concentrations. *Environ Sci Technol.* 41(5):1584-1589.
[28] WATKINS DJ, MCCLEAN, MD, FRASER AJ, WEINBERG J, STAPLETON HM, SJODIN A, WEBSTER TF. 2011. Exposure to PBDEs in the office environment: evaluating the relationships between dust, handwipes, and serum. *Environ Health Persp.* 119:1247-1252.
[29] STAPLETON HM, EAGLE S, SJOEDIN, WEBSTER TF. 2012. Serum PBDEs in a North Carolina toddler cohort: associations with handwipes, house dust, and socioeconomic variables. *Environ Health Persp.* 120(7):1049-1054.

Panel 3

Jennifer Lowery, MD, FAAP
American Academy of Pediatrics

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

December 9, 2015

Testimony of
Jennifer Lowry, MD, FAAP

On behalf of the
American Academy of Pediatrics

Before the
U.S. Consumer Product Safety Commission

"Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants."

American Academy of Pediatrics • Department of Federal Affairs
601 13th Street NW, Suite 400 North • Washington, DC 20005
Tel: 800.336.5475 • E-mail: kids1st@aap.org

Good morning Chairman Kaye and Commissioners Buerkle, Adler, Robinson, and Mohorovic:

My name is Dr. Jennifer Lowry, and I am here representing the American Academy of Pediatrics (AAP), a non-profit professional organization of 64,000 primary care pediatricians, pediatric medical sub-specialists, and pediatric surgical specialists dedicated to the health, safety, and well-being of infants, children, adolescents, and young adults. I serve as the Chair of the AAP's Council on Environmental Health Executive Committee.

In addition to my role within the AAP, I also work at Children's Mercy Kansas City, where I am the Chief of the Section of Clinical Toxicology, the Medical Director of the Division of Clinical Pharmacology, Toxicology, and Therapeutic Innovation, and the Medical Director of the Center for Environmental Health.

Introduction

I am here today to discuss the need for a federal policy solution to the serious child health threat posed by organohalogen flame retardants. The AAP appreciates the opportunity to provide input on the petition to the U.S. Consumer Product Safety Commission (CPSC) requesting the banning of all organohalogen flame retardants in four product classes under the Federal Hazardous Substances Act (FHSA). The AAP is one of the original petitioners and strongly supports CPSC moving forward on this important child health issue.

This petition requests that CPSC use its authority under the FHSA to ban the use of organohalogen flame retardants in four key product classes:

1. All children's products other than car seats, which are generally under the jurisdiction of the National Highway Traffic Safety Administration's jurisdiction unless they also serve as infant carriers;
2. Upholstered furniture;
3. Mattresses and mattress pads; and
4. The plastic casing on electronic devices.

Organohalogen flame retardants have well-documented association with significant deleterious child health effects and are extensively used in these four product classes. These chemicals are known to leech from those products, resulting in widespread human exposure. CPSC is well-positioned to act on this public health threat through its FHSA authority. We urge you to move forward in your consideration of this petition and develop a proposed rule to ban this chemical class in these four product categories.

Children Are Disproportionately Vulnerable to Toxic Chemicals

Not only do children have more opportunities to be exposed to environmental chemicals, but as children grow and mature, their unique physiologic, developmental, and behavioral differences make them especially vulnerable to chemical exposures. Because children are smaller than adults, their surface area–to–body mass ratio is greater. Children eat more food and drink more water per unit of body weight than do adults, and breathe at a faster rate. Infants and children of all ages spend more time on the floor or ground than adults. Therefore, children will come into more contact with contaminants on these surfaces. Chemical exposures can disrupt the critical and rapid stages of development that

occur in prenatal and early childhood life, particularly involving the neurologic and endocrine systems.

Chemical Flame Retardants Are Associated with Negative Health Effects

Organohalogen flame retardants are associated with a wide range of serious adverse health effects, including reproductive impairment, neurological effects including IQ decrements and learning deficits, endocrine disruption and interference with thyroid hormone action, genotoxicity, cancer, and immune disorders. Children exposed to these chemicals can face serious and irreversible health consequences. Banning these flame retardants will help to prevent these adverse health effects in children.

Children Face Extensive Exposure to Chemical Flame Retardants

In addition to the extensive evidence for the detrimental health effects these chemicals pose to children, the U.S. Centers for Disease Control and Prevention's (CDC) biomonitoring program estimates that 97 percent of U.S. residents have measurable quantities of these chemicals in their blood. There also several studies which have identified flame retardants in household dust, as well as within all species tested of birds, fish, and mammals, indicating ubiquitous presence of these harmful chemicals in the environment. Further, the highest levels of harmful flame retardants in the general population are found in young children from communities of low socioeconomic status and communities of color. Flame retardant exposure is ubiquitous in the U.S., presenting a serious public health threat to children. Given the documented health threat these

chemicals pose and the evidence of significant exposure, public health action is critical to protect children from organohalogen flame retardants.

CPSC Action Is Critical to Protecting Child Health

The health risks organohalogen flame retardants pose and the widespread human exposure to these compounds are all the more troubling given that they are not necessary for products to meet any mandatory flammability standard. Most fire deaths and injuries result from inhaling carbon monoxide, irritant gasses, and soot. The incorporation of organohalogen flame retardants can increase the yield of the toxic by-products during combustion. The risks of this chemical class far outweigh their intended benefit; organohalogen flame retardants are unnecessary to protect against fires, and instead pose their own serious risks to children. We therefore urge CPSC to advance this petition to the rulemaking process and promulgate a proposed rule to ban all organohalogen flame retardants in these four product classes.

An FHSA ban of this entire chemical class in all four product categories is necessary because history and extensive scientific research demonstrate that the health threats from these chemicals are present across the chemical class. Warning labels are insufficient to protect children and families from the risks flame retardants pose. Previous attempts to address the health effects of flame retardants on a chemical-by-chemical basis led to regrettable substitution, whereby the banning of one problematic compound led to the adoption across the industry of a chemical with similar health risks but less available research demonstrating them. CPSC has the expertise and the authority under the FHSA to

effectively address this public health issue, and we urge CPSC to move forward in developing a rule to protect children from the adverse health effects of flame retardants.

Conclusion

The AAP strongly supports the petition to ban all organohalogen flame retardants in children's products, upholstered furniture, mattresses and mattress pads, and the plastic casing of electronic devices. CPSC action on this issue will be critical to protecting children from the serious health risks these chemicals pose. Thank you again for the opportunity to speak today, and we look forward to working with you on this important issue.

Patrick Morrison
Assistant to the General President Division of Occupational Health Safety and Medicine, International Association of Fire Fighters

Testimony of
Patrick Morrison
International Association of Fire Fighters
U.S. Consumer Product Safety Commission
December 9, 2015

Good morning Commissioners and thank you for allowing the International Association of Fire Fighters (IAFF) to testify today before the U.S. Consumer Product Safety Commission on the Petition Requesting Rulemaking on Products containing Organohalogen Flame Retardants (Docket No. CPSC-2015-0022). I am Patrick Morrison, Assistant to the General President Division of Occupational Health, Safety and Medicine for the IAFF.

The IAFF is an international union that represents over 300,000 paid professional fire service employees in the United States and Canada. The IAFF has been actively involved in improving the health and safety of fire fighters for more than 90 years. This is a critical activity for a workforce in which fatalities and early retirement due to work-related injuries and illnesses occur regularly.

Fire fighters dying from occupational-related cancers now account for more than half of our members line-of-duty deaths each year. This is the largest health-related issue facing the firefighting profession. We must reduce this number and removing the class of non-polymeric organohalogen flame retardants in products is a positive step forward in protecting first responders from the harmful effects of these toxic flame retardants.

In the vast majority of US workplaces, occupational exposure levels have greatly declined in the past 2-3 decades. Improved workplace conditions can be attributed to many factors including governmental occupational safety and health agencies, legislation, training programs for occupational health professionals, and good business practice including the need to keep highly skilled workers healthy and working.

Unfortunately, fire fighters have not benefited from this overall improvement. They are still entering uncontrolled, hazardous environments regularly. Studies of the chemicals contained within the complex mixture of the smoke that fire fighters commonly encounter have a clearly documented reason for concern about these exposures. Recent studies have shown that fire fighters have higher levels of flame retardant chemicals in their body than the general population.

Fire fighters come into contact with toxic flame retardants in their daily lives, just like the rest of the population. But fire fighters have a much higher risk of suffering the negative, cancer-causing effects of carcinogenic flame retardants as those chemicals burn in a fire –

whether it's in the air they breathe, exposure during the overhaul of fires, the absorption through their skin during and after working at a fire, or after the incident as they are exposed to the toxic soot that covers their turnouts and equipment. It is the IAFF's position that this exposure contributes to the reason that our members have a significantly higher incidence rate of certain types of cancer.

The National Institute for Occupational Safety and Health (NIOSH) recently conducted a landmark study of cancer among U.S. fire fighters that included data from over 30,000 career fire fighters employed between 1950 and 2010. The research found that fire fighters compared to the general United States population had statistically significant increases in both diagnosis and death from certain cancers.

The IAFF supports banning the use of toxic flame retardants that are known to, or found to be carcinogens that contribute to cancer and have additional negative effects on the health of our members. The IAFF also supports efforts to remove toxic flame retardants from upholstered furniture and other products, and supports efforts requiring manufacturers of such products to utilize alternative technologies in lieu of toxic chemicals.

Given the increasing body of evidence that indicates the persistence, bio-accumulation and potential health concerns of these fire retardants, we believe the health risks associated with the use of these chemicals is greater than the fire risk without using these chemicals. This is even more factual with the use of advanced fire safety technology that is in place today to include sprinkler systems, smoke and fire detection systems, and modern early warning

devices. In addition, it's widely known that there has been a significant reduction in the use of tobacco products across the United States which has contributed to the reduction in fires across the United States.

There are two key ways to impact the use of toxic flame retardants in products. One is through the standard-setting process, since flame retardant chemicals are commonly used as a means of complying with these test requirements. The other is through regulation of the chemicals themselves, by banning or restricting the use of specific flame retardants. These strategies can be most effective in combination, since restricting use of one hazardous flame retardant cannot guarantee that future flame retardants will be safe for human and environmental health.

On the standard-setting front, one of the most broad-based reforms has been the adoption of the smoldering standard California TB-117-2013. The IAFF and our California State Affiliate, the California Professional Fire Fighters, have actively advocated for years to change the California Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation Technical Bulletin 117. We strongly support the change to TB-117 2013 which now creates a toxic free fire safety option. This new testing option mirrors today's fire safety problem, utilizing barriers to slow the spread of a smoldering fire. Several manufacturers and distributors are now offering furniture that's free of flame retardants to include Ikea, Create and Barrel, Ashley Furniture and Macy's, and several health care institutions to include Partners Healthcare and Kaiser Permanente have pledged to only purchase upholstered furniture that's free of flame retardants.

However, there is an effort on the horizon at the National Fire Protection Association (NFPA) that could potentially impact this modern toxic free option. We are concerned with the approach that's being taken at NFPA to create a new open flame standard. The Main Task Group that is working on this draft standard is moving towards proposing to adopt California TB-133, a large open flame test that would require the application of an increase in the use of flame retardants in residential upholstered furniture.

The IAFF has one representative on the NFPA Fire Tests Committee. This committee has been developing a draft standard titled NFPA 277, Standard Methods of Tests for Evaluating Fire and Ignition Resistance of Upholstered Furniture Using Ignition Source. We have made our position clear that due to the known and unknown health hazards associated with the chemicals used to meet an open flame test, the Fire Test Committee and Main Task Group will need to consider the health and safety of Fire Fighters and the public within the process of this proposed standard. We have made both the Main Task Group and the Fire Test Committee aware of our position on Toxic Free Fire Safety by utilizing a modern approach to include a combination of barriers on upholstered furniture, residential and commercial sprinkler systems, and modern early warning fire and smoke and fire detection systems.

We will continue to attempt to participate in this process that is heavily weighted towards proposing the adoption of a new open flame test for upholstered furniture. And we will

continue to urge this Commission to adopt TB 117-2013 as a mandatory national flammability standard for residential furniture.

Even if this Commission adopts TB 117-2013 as a mandatory national standard, that will not solve the problem of toxic flame retardants in furniture. That is because while compliance with TB 117-2013 can be achieved without flame retardant chemicals, the standard does not *prohibit* the use of these chemicals. In addition, TB 117-2013 would not address use of flame retardants in electronic enclosures. For this reason, we very much hope the Commission grant the Petition to ban additive organohalogens in consumer products which will have a broad impact on fire fighters and the public across the United States.

In closing, over the years deceptive practices and misuse of data by the companies that produce toxic flame retardants have mislead the public in the name of fire safety. The IAFF will continue to fight for the elimination of these toxic chemicals. I thank the Commission for allowing first responders to have a voice in protecting our job environment while still maintaining the highest level of fire protection for the citizens we protect every day.

Luis A. Torres
Director of Policy and Legislation
League of United Latin American Citizens

December 9, 2015
Luis Torres
Policy Director
League of United Latin American Citizens (LULAC)
Testimony Before the U.S. Consumer Product Safety Commission

RE: Petition for Rulemaking to Protect Consumers and Children from Toxic Flame Retardant Chemicals in Four Categories of Household Products

Thank you for the opportunity to address you today.

With approximately 132,000 members throughout the United States and Puerto Rico, the league of United Latin American Citizens (LULAC) is the largest and oldest Hispanic Organization in the United States. Headquartered in Washington, DC, with 1,000 councils nationwide,our programs, services and advocacy address the most important issues for Latinos, meeting critical needs of today and the future.

On July 18, 2009, thousands of LULAC members from across the country gathered for our National convention. At this event, our membership voted for and adopted a resolution on environmental justice which among many things affirms that environmental justice demands the right for Latinos and all communities, to participate as equal partners at every level of decision making.

Furthermore, the resolution asserts that Latino communities in the United States have: a right to be safe from harmful exposure; a right to prevention; a right to know what we're exposed to; a right to participate in decision making processes that have implications for our communities; and a right to protection and enforcement of policies that promote and safeguard the well-being of workers, families and communities.[1]

As of 2013, there are 54 million Hispanics in the U.S. which comprise 17 percent of the total U.S. population. The average age of a Latino(a) is 28 years old.[2] While our community is young, robust and growing, from the local to the national level, we are consistently under attack by efforts that seek to deprive our children, workers and families of dignity and justice and the right to participate in and influence the democratic process.

---

[1] LULAC, Resolution - Declaration of the Principles of Environmental Justice and Environmental Bill of Rights in Latino Communities in the United States. Available at http://www.lulac.net/advocacy/resolutions/2009/resenv03.html
[2] Statistical Portrait of Hispanics in the United States, 1980 – 2013. Pew Research Center. Available at: http://www.pewhispanic.org/2015/05/12/statistical-portrait-of-hispanics-in-the-united-states-2013-key-charts/

Whether it's Sheriffs that racially profile our community, lawmakers that propose to deprive our U.S. born children of citizenship and the right to be counted, or Governors that want to suppress our right to vote, at a minimum, and on so many fronts, we have been able to identify and challenge our adversaries.

I sit before you today, not just on behalf of LULAC but with a tremendous responsibility to millions of Latinos who cannot be here today to take a stand against toxic exposure. This time we are dealing with an invisible and insidious assailant that threatens the sanctuary that is our home and hinders our community's ability to defend itself.

As an organization that advances the economic condition, educational attainment, political influence, housing, health and civil rights of Hispanic Americans, we are increasingly concerned about exposure to toxic chemicals and its impact on the health and quality of life of Latinos. From the womb to households, workplaces and communities, fighting to reduce toxic exposure in our communities is intrinsically tied to our mission.

The science indicates that the highest human levels of harmful flame retardant chemicals in the general population have been found in young children from low-income communities and communities of color.[3]

In particular, the 2003-2004 National Health and Nutrition Examination Survey ("NHANES") conducted by the Centers for Disease Control and Prevention ("CDC"), found at least one form of organohalogen flame retardants in 97 percent of the study participants. [4] This biomonitoring study also showed that:

- Mexican Americans and non-Hispanic blacks had higher levels of flame retardants than the non-Hispanic white population.
- Teenagers (ages 12 to 19) had higher body burdens than adults for all flame retardants measured.

What we know is that exposure to organohalogen flame retardant chemicals can lead to serious health problems such as reduced IQ, disruption of hormones, cancer and reproductive impairments. These exposures threaten the health and educational attainment of our children and in doing so, their prospects for the future and economic

---

[3] Quirós-Alcalá, L.; Bradman, A; Nishioka, M.; Harnly, M.E.; Hubbard, A.; McKone, T.E.; & Eskenazi, B. (2011). Concentrations and loadings of polybrominated diphenyl ethers in dust from low-income households in California. Environment International, 37(3):592-96. doi: 10.1016/j.envint.2010.12.003.

[4] Sjödin, A.; Wong, L.; Jones, R.S.; Park, A.; Zhang, Y.; Hodge, C.; Dipietro, E.; McClure, C.; Turner, W.; Needham, L.L.; & Patterson Jr., D.G. (2008). Serum concentrations of polybrominated diphenyl ethers (PBDEs) and polybrominated biphenyl (PBB) in the United States population: 2003-2004. Environmental Science & Technology, 42(4), 1377-84. doi: 10.1021/es702451p.

condition. Education is a key to social mobility yet exposure to flame retardant chemicals is robbing our children of their potential.

A 2012 study of Mexican-American children in the state of California found that children who live in areas with limited access to safe outdoor play spaces tend to have higher levels of the toxic flame retardant chemicals in their blood.[5] While this information may be new to us, what isn't new is the fact that nearly half (45%) of the nation's Latino population lives in 10 metropolitan areas in the states of California, New York, New Jersey, Texas, Illinois, Florida and Arizona.[6]

When you consider the urban areas where nearly half of our community lives, and combine that with findings that show that racial/ethnic minorities and low-income people have less access to green spaces like parks, or recreational programs than those who are White or more affluent,[7] what that signals to us is that minority and low-income children are spending more time indoors, and instead of being safe, their exposure to flame retardants chemicals is heightened.

For Latino households, immigrant and non-immigrant alike, what good does it do to operate under the assumption that if you work hard and study, you will change your circumstances and be able to provide yourself and future generations with more opportunities and an improved quality of life.

If we continue to allow toxic flame retardant chemicals to invade our home, we are deluding Latinos and all families into believing that we are safe in our home and on equal footing as those who can afford to "live green" and purchase their way out of toxic products.

This is not an option for Latinos who have a median annual personal income of $21,900 and $41,000 in median household income. Furthermore, despite increases in health coverage, Latinos continue to have the highest uninsured rate of any racial or ethnic group within the U.S., at 19.9 percent compared to 11.8 percent for Blacks, 9.3 percent for Asians and 7.6 percent for non-Hispanic Whites. When you take into account economic status with health insurance coverage, you can begin to imagine how our

---

[5] Bradman, A.; Castorina, R.; Sjödin, A.; Fenster, L.; Jones, R.; Harley, K.; Chevrier, J.; Holland, N.; Eskenazi, B. (2012). Factors Associated with Serum Polybrominated Diphenyl Ether (PBDE) Levels Among School-Age Children in the CHAMACOS Cohort. Environmental Science & Technology, 2012. 46 (13), 7373-7381. doi: 10.1021/es3003487

[6] Motel, S.; & Patten, E. Characteristics of the 60 Largest Metropolitan Areas by Hispanic Population. Pew Research Center. 19 September 2012. Available at: http://www.pewhispanic.org/2012/09/19/characteristics-of-the-60-largest-metropolitan-areas-by-hispanic-population/

[7] Abercrombie, L. C., Sallis, J., Conway, T., Frank, L. D., Saelens, B. E., & Chapman, J. E. (2008). Income and racial disparities in access to public parks and private recreation facilities. American Journal of Preventative Medicine, 34(1), 9–15.

community is already limited in its ability to protect itself from toxic exposure and deal with the health impacts associated with it. [8]

Our families should not have to know what "organohalogen flame retardants" are or that there are toxic chemicals that do not stay inside the products manufacturers put them in.

We shouldn't have to worry about flame retardant chemicals "off-gassing" from children's products, furniture, mattresses and the casings around electronics into our homes, entering our bodies and persisting in our system.

When you look at our demographics and the range of socioeconomic factors affecting us, I am hopeful that I've provided you with a deeper understanding of our community and the sense of urgency I feel as I sit before you today.

Our members have submitted public comments on this petition and I have done my part. Now it is up to you.

You have the power to protect our community and the League of United Latin American Citizens (LULAC) urges you to take swift action to ban these harmful and pervasive chemicals.

---

[8] For information on the uninsured, see Table 5, P15, *Health Insurance Coverage in the United States: 2014* at: https://www.census.gov/content/dam/Census/library/publications/2015/demo/p60-253.pdf

Maureen Swanson, MPA
Healthy Children Project Director
Learning Disabilities Association of America

Learning Disabilities Association of America

National Headquarters
4156 Library Road
Suite 1
Pittsburgh, Pennsylvania 15234
Phone: 412-341-1515
Fax: 412-344-0224
E-Mail: info@LDAAmerica.org

Statement of Maureen Swanson, Learning Disabilities Association of America
On the Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants
Docket No. CPSC-2015-0022
U.S. Consumer Products Safety Commission Public Hearing

December 9, 2015

Thank you Chairman Kaye and Commissioners for the opportunity to comment on the Petition requesting rulemaking on products containing organohalogen flame retardants. My name is Maureen Swanson and I direct the "Healthy Children Project" for the Learning Disabilities Association of America (LDA). LDA is the oldest and largest national volunteer organization advocating for children and adults with learning disabilities, with chapters in more than 40 states. LDA's leaders and members are teachers, parents, health professionals, and people with learning disabilities.

The Learning Disabilities Association is also submitting written comments in support of the proposed rule, in conjunction with partner organizations including the American Association on Intellectual and Developmental Disabilities, Autism Society of America and The Arc.

We are witnessing an alarming increase in neurodevelopmental disorders that cannot be fully explained by changes in awareness or diagnosis. One in six children in the United States has a reported developmental disability including autism, attention deficit hyperactivity disorder, and other learning and developmental delays. In 2000, the National Academy of Sciences stated that environmental factors, including exposures to toxic chemicals, in combination with genetics, contribute to at least a quarter of all neurodevelopmental disabilities in the United States.

In the 15 years since that NAS report, scientific evidence that toxic chemical exposures increase children's risks for neurodevelopmental disorders, including autism and ADHD, has reached a critical mass. In response, major scientific and medical associations, including American Academy of Pediatrics, The Endocrine Society, National Medical Association and the American College of Obstetricians and Gynecologists have issued powerful statements affirming the links between toxic chemical exposures and problems with learning and behavior.

Research in the neurosciences has identified "critical windows of vulnerability" during fetal development and early childhood, when the brain is especially at risk from toxic chemicals, even at extremely low exposure levels. Mounting scientific evidence clearly demonstrates that babies and young children are regularly exposed to halogenated flame retardant chemicals, and that those exposures pose an unreasonable risk of serious and lasting harm to brain development.

Halogenated flame retardants cross the placenta to the fetus and are detected in umbilical cord blood and in breast milk. Because of their size and weight, rapid rate of growth and development, metabolism and behaviors, babies and children are likely to experience higher chronic exposures to halogenated flame retardants than adults.

These chemicals migrate from furniture, electronics enclosures, mattresses and baby products into dust, and are then ingested by young children. A 2011 study of baby products found that 80% of the items tested contained halogenated flame retardants; while a 2014 study of 40 daycares and preschools in California found halogenated flame retardants in 100% of dust samples at the facilities.

What do these constant exposures to halogenated flame retardants mean for the fetus and young children? Do they matter?

The science on polybrominated diphenyl ethers and neurodevelopment answers that question.

In the last five years, three separate studies of hundreds of pregnant women and children – in New York, Ohio and California – have resulted in strikingly similar findings: children more highly exposed to PBDE flame retardants prenatally have lower IQ scores, cognitive delays and attention problems. The decrements in IQ scores persist through the children's school years.

Many halogenated flame retardants are structurally similar to thyroid hormones, which are essential to healthy brain development. Earlier this year, scientists with the Endocrine Society reviewed evidence on PBDEs and concluded that PBDE exposures interfere with thyroid hormones. Recent studies of halogenated flame retardants that have replaced PBDEs show these chemicals also can disrupt thyroid hormones and pose serious risks to brain development.

In plain English, these chemicals change babies' brains. If we wait another decade for epidemiological studies showing evidence of harm in children from the replacement flame retardants before we take action, then it will be too late, and another generation of children will be suffering the consequences and struggling in school.

Chemical manufacturers add halogenated flame retardants to products without having to identify the chemicals or test them for health effects, although these chemicals are similar in structure to known neurodevelopmental toxicants. I'd like to briefly highlight several examples of "replacement" halogenated flame retardants that present increasing concerns and unreasonable risks to brain development, while emphasizing that many other untested halogenated flame retardants may pose similar risks.

The chlorinated tris flame retardant chemicals are notorious. In the late 1970s, TDCPP was one of several halogenated "tris" flame retardants banned from use in children's pajamas in light of grave risks to children's health. Instead of halting production and use of TDCPP, manufacturers instead added this toxic chemical to other children's products, mattresses and furniture. A recent study found that TDCPP was the most commonly detected flame retardant in baby products containing polyurethane foam.

In 2011, scientists found that TDCPP, as well as other "tris" flame retardants, may affect neurodevelopment with similar, or even greater, potency than chemicals already known or suspected to be neurotoxic.

Firemaster 550 is the second most commonly detected flame retardant in polyurethane foam used and sold in the U.S. FM550 is in furniture and baby products, including nursing pillows and changing pads. Two of FM550s main components, TBB and TBPH, are brominated compounds and high production volume chemicals that migrate from products into house dust.

In 2012, research implicated FM550 as an endocrine disrupting chemical, with potential adverse effects at levels much lower than the "no observable adverse effects" level reported by the manufacturer. The study suggests that FM550 disrupts thyroid hormones, and may harm the developing brain.

As an advocate for children and adults with learning and developmental disabilities, and as a parent, I cannot imagine why we would allow this class of toxic chemicals – that are ineffective in preventing fires – to continue to be manufactured and used in products.

Halogenated flame retardants migrate from products into dust, and are ingested by young children. They cross the placenta, build up in the body and in breast milk. Halogenated flame retardants are structurally similar to PCBs and also to thyroid hormones. So it seems likely that this entire class of chemicals may affect brain development. Why would we have our children be the guinea pigs to determine that for sure?

Restricting a few flame retardant chemicals at a time is a failed approach that results in unreasonable and increased risks to children's health and development. We urge the CPSC to issue the proposed rule and end the cycle whereby chemical makers replace one halogenated flame retardant with another.

Thank you.

Daniel Penchina
The Raben Group
Breast Cancer Fund

Testimony from the Breast Cancer Fund
Petition for Rule Making Regarding Organohalogen Flame Retardants in Consumer Products
Daniel Penchina, Principle, The Raben Group

RE: Docket No. CPSC-2015-0022
Presented December 9, 2015

My name is Daniel Penchina and I am testifying today on behalf of the Breast Cancer Fund to speak in support of the petition to ban the sale of four categories of consumer products — children's products, furniture, mattresses and electronic casings — if they contain non-polymeric, additive organohalogen flame retardants. I appreciate the opportunity to speak with you today.

The Breast Cancer Fund is a national non-profit organization committed to preventing breast cancer by reducing exposure to chemicals and radiation linked to the disease. Today, an astonishing 1 in 8 women will be diagnosed with breast cancer in her lifetime, a number that has risen significantly in the past four decades. We base our policy work on a foundation of sound, peer-reviewed science showing increased risk of breast cancer from exposure to chemicals, including carcinogens and endocrine-disrupting compounds (EDCs) like some organohalogen flame retardants.

The Breast Cancer Fund has long advocated for the removal of phthalates from toys and child care articles based on the science showing links to numerous negative health impacts, including association with cancer and endocrine disruption. Organohalogen flame retardants raise many of the same concerns. This class of chemicals has been associated with serious health problems such as cancer, cognitive and behavioral changes, reproductive impairments, and endocrine disruption. Studies show that flame retardants migrate out of products, into our homes and ultimately into our bodies. Biomonitoring studies have found these toxic chemicals in urine, blood, breast milk and even in the umbilical cord blood of newborns.

While the health concerns of flame retardants, particularly organohalogen flame retardants are clear, there are numerous studies that show no appreciable fire safety benefit. The use of sprinkler systems, naturally flame resistant fabrics and barriers, and self-extinguishing cigarettes provide effective alternatives to chemical flame retardants.[1]

The Science – Links to Breast Cancer

One of the primary groups of organohalogen flame retardants is polybrominated diphenyl ethers or PBDEs. PBDEs are structurally similar to the polychlorinated biphenyls (PCBs); known carcinogens[2] that have been banned since the 1970's yet still persist in the environment.

PBDEs have been used extensively in both consumer and industrial products.[3]Although both penta- and octa-BDEs have been banned in the European Union and have not been produced in the United States since 2004, products containing them remain throughout the world. Due to the persistent nature of these chemicals, PBDEs are found ubiquitously in the environment and are detected in air, dust, soil and food, wildlife and humans. The 2003-2004 National Health and Nutrition Examination Survey conducted by the CDC found that 97% of the study participants were exposed to at least one PBDE.[4] Higher exposures have been found among those with lower socioeconomic status and among communities of color. [5,6] Exposures at sensitive stages of development have been shown to have the highest impact on human health, which leads to serious concerns about exposures among pregnant women and children.

Organohalogen flame retardants are endocrine-disrupting compounds, exerting effects on a number of hormonal systems, including androgens, progestins and estrogens. The major system affected by PBDEs —the thyroid hormone—has a prominent role in regulating brain development.[7] As a result the most well-studied health outcome related to PBDE exposure is brain development. [8,9]

Very few data directly address the possible effects of PBDEs on breast cancer risk. However, *in vitro* studies have shown associations between at least some PBDEs and promotion of the proliferation of human breast cancer cells.[10] Recent studies indicate that penta-BDE can counteract the anti-cancer effects of Tamoxifen in cultured breast cancer cells.[11] Finally, some studies suggest that PBDE's disrupt mammary gland development, an early endpoint linked to increased risk of later life breast cancer.[12] Clearly more data is needed in the area of breast cancer risk, but the existing evidence is deeply concerning.

Even as PBDEs are being used less often as fire retardants in common consumer products, there is now evidence that the chemicals being used as substitutes – including Firemaster 550, a common substitute – are increasingly contaminating our environment.[13, 14] Although the physiological effects of exposures to Firemaster 550 have not yet been studied extensively, one study demonstrated that feeding mother rats low doses during pregnancy and lactation led to changes in behavior, weight gain and earlier puberty in female pups.[15] Earlier puberty in females is a known risk factor for breast cancer. Other flame retardant substitutes also show toxicity, including chlorinated tris (Tris (1,3-dichloro-2-propyl) phosphate (TDCPP) and TCEP (Tris (2-chloroethyl) phosphate), which are both on the State of California's list of substances "known to cause cancer."[16]

Taken as a whole, the science indicating the connection between exposures to organohalogen flame retardants and numerous negative health outcomes is extremely well documented and provide a solid scientific basis for the Commission to act to ban the sale of these products categories. We would be happy to provide any of the studies cited here.

Firefighters

Firefighters are particularly at risk of exposure to flame retardant chemicals. In a study of 101 California firefighters, their PBDE levels were one of the highest found in any general US population between 2010 and 2012.[17] Studies have also found that exposures to flame retardants and their by-products, which can penetrate protective gear, likely contribute to firefighters having a much greater risk of contracting cancer, heart and lung disease, and other debilitating diseases.

Faced with concerns about multiple cases of premenopausal breast cancer among their ranks, San Francisco female firefighters have partnered with the Breast Cancer Fund, Commonweal, and scientists at University of California Berkeley and Silent Spring Institute to study their exposure to organohalogen flame retardants and other chemicals linked to breast cancer. Results of this study are expected next year. The only study to assess breast cancer risk among female firefighters found more than a 2.5-fold increase in breast cancer risk among women firefighters aged 50-55 years; research also suggests slightly elevated risk for male breast cancer among male firefighters.[18]

The most effective way to product our first responders is to remove these chemicals from products in the homes they fight to save.

CPSC Must Act

It is imperative that the Commission act and not rely on the EPA to take action under the Toxic Substances Control Act (TSCA) to protect consumers from these dangerous exposures. TSCA has long

been acknowledged as failing to protect public health. Under the law, only 5 chemicals have been regulated out of 85,000 chemicals registered for use in commerce. Even when the EPA has initiated safety reviews of specific chemicals, the chemical industry has been extremely adept at delaying any final action, sometimes for decades. The health of the American public and the children being exposed to organohalogen flame retardants today cannot wait for this unworkable system. The Commission must act now to remove these chemicals from the categories of consumer products included in the petition.

The continued sale of household products made with these chemicals place women, children, firefighters, and other vulnerable populations at risk of breast cancer and numerous other negative health impacts. The Breast Cancer Fund strongly urges the Commission to ban the sale of the consumer products covered by the petition that contain dangerous and ineffective organohalogen flame retardants.

Thank you for the opportunity to comment.

---

[1] Shaw, S. (2010). Halogenated flame retardants: do the fire safety benefits justify the risks?. *Reviews on environmental health*, *25*(4), 261-306.

[2] IARC Known Carcinogens Available Online: http://monographs.iarc.fr/ENG/Classification/latest_classif.php Accessed December 2, 2015.

[3] Costa, L., Giordano, G., Tagliaferri, S., Caglieri, A., & Mutti, A. (2008). Polybrominated diphenyl ether (PBDE) flame retardants: environmental contamination, human body burden and potential adverse health effects. ACTA Biomed, 79, 172–183.

[4] Sjodin, A.; Wong, L.; Jones, R.S.; Park, A.; Zhang, Y.; Hodge, C.; Dipietro, E.; McClure, C.; Turner, W.; Needham, L.L.; & Patterson Jr., D.G. (2008). Serum concentrations of polybrominated diphenyl ethers (PBDEs) and polybrominated biphenyl (PBB) in the United States population: 2003-2004. Environmental Science & Technology, 42(4), 1377-84. doi: 10.1021/es702451p.

[5] Petreas, M., Nelson, D., Brown, F. R., Goldberg, D., Hurley, S., & Reynolds, P. (2011). High concentrations of polybrominated diphenylethers (PBDEs) in breast adipose tissue of California women. Environ Int, 37(1), 190–197.

[6] Windham, G., Pinney, S., Sjodin, A., Lum, R., Jones, R., Needham, L., ... Kushi, L. (2010). Body burdens of brominated flame retardants and other persistent organo-halogenated compounds and their descriptors in US girls. Environ Res, 110(3), 251–257.

[7] Costa, L., Giordano, G., Tagliaferri, S., Caglieri, A., & Mutti, A. (2008). Polybrominated diphenyl ether (PBDE) flame retardants: environmental contamination, human body burden and potential adverse health effects. ACTA Biomed, 79, 172–183.

[8] Costa, L., & Giordano, G. (2007). Developmental neurotoxicity of polybrominated diphenyl ether (PBDE) flame retardants. Neurotoxicology, 28, 1047–1067.

[9] Talsness, C. (2008). Overview of toxicological aspects of polybrominated diphenyl ethers: A flame-retardant additive in several consumer products. Environ Res, 108, 158–167.

[10] Meerts, I., Letcher, R., Hoving, S., Marsh, G., Bergman, A., Lemmen, J., ... Brouwer, A. (2001). In vitro estrogenicity of polybrominated diphenyl ethers, hydroxylated PBDEs, and polybrominated bisphenol A compounds. Environ Health Persp, 109, 399–407.

[11] Li, Z. H., Liu, X. Y., Wang, N., Chen, J. S., Chen, Y. H., Huang, J. T., ... & Chen, D. J. (2012). Effects of Decabrominated Diphenyl Ether(PBDE-209) in Regulation of Growth and Apoptosis of Breast, Ovarian, and Cervical Cancer Cells. Environmental health perspectives, 120(4), 541-546.

[12] Kodavanti PR, Coburn CG, Moser VC, MacPhail RC, Fenton SE, et al. Developmental exposure to a commercial PBDE mixture, DE-71: neurobehavioral, hormonal, and reproductive effects. Toxicol Sci. 2010; 116:297–312. [PubMed: 20375078]

[13] Dodson, R.E., Perovich, L.J., Covaci, A., Van den Eede, N., Ionas, A.C., Dirtu, A.C., Brody, J.G., & Rudel, R.A. (2012). After the PBDE phase-out: A broad suite of flame retardants in repeat house dust samples from California. Environ Sci Tech,46, 13056-13066.

[14] Patisaul, H. B., Roberts, S. C., Mabrey, N., McCaffrey, K. A., Gear, R. B., Braun, J., ... & Stapleton, H. M. (2013). Accumulation and endocrine disrupting effects of the flame retardant mixture Firemaster® 550 in rats: an exploratory assessment. Journal of biochemical and molecular toxicology, 27(2), 124-136.

[15] Patisaul, H. B., Roberts, S. C., Mabrey, N., McCaffrey, K. A., Gear, R. B., Braun, J., ... & Stapleton, H. M. (2013). Accumulation and endocrine disrupting effects of the flame retardant mixture Firemaster® 550 in rats: an exploratory assessment. Journal of biochemical and molecular toxicology, 27(2), 124-136.

[16] Proposition 65 Available Online: http://oehha.ca.gov/prop65.html. Accessed December 2, 2015.

[17] Park, J. S., Voss, R. W., McNeel, S., Wu, N., Guo, T., Wang, Y., ... & Petreas, M. (2015). High exposure of California firefighters to polybrominated diphenyl ethers. Environmental science & technology, 49(5), 2948-2958.

[18] Daniels, R. D., Kubale, T. L., Yiin, J. H., Dahm, M. M., Hales, T. R., Baris, D., ... Pinkerton, L. E. (2014). Mortality and cancer incidence in a pooled cohort of US fire fighters from San Francisco, Chicago and Philadelphia (1950-2009). Occupational and Environmental Medicine, 71(6), 388–397.

Panel 4

Robert Simon
American Chemistry Council and
North American Flame Retardant Alliance

NAFRA Remarks on Petition 15-1
Before the Consumer Product Safety Commission
December 9, 2015

Chairman Kaye and Commissioners, my name is Robert J. Simon, and I am here today representing the American Chemistry Council and its North American Flame Retardant Alliance.[i] NAFRA members include Albemarle Corporation, Chemtura Corporation/Great Lakes Solutions, and ICL Industrial Products who are the leading producers of flame retardants (including, but not limited to, organohalogenated flame retardants) that are used in a wide variety of industrial and consumer applications.

NAFRA members companies represent the cutting edge of fire-safety chemistry and technology, and are dedicated to improving fire safety performance in a myriad of end uses.

We would like to emphasize that our industry has a strong commitment to safety and product stewardship. As members of the American Chemistry Council, NAFRA companies implement Responsible Care®, the chemical industry's world-class environmental, health, safety and security performance initiative. This includes third party verification and implementation of the new ACC Responsible Care Product Safety Code which goes beyond regulatory requirements and obligates chemical manufacturers to manage the safety of their chemical products, from inception to end-of-life. Overall, we support a strong and transparent regulatory system that provides both strong fire protection and chemical safety.

We appreciate the opportunity to testify today and also would like to thank the Commissioners for taking time for the briefings we provided last month on our industry.

I am speaking today in opposition to *Petition HP 15-1 Requesting Rulemaking on Products Containing Organohalogens*, because of its overly broad approach and the detrimental impact on fire safety should CPSC take the regulatory actions requested under the petition.

Overall my testimony emphasizes three key points:

1. **Fire safety is a critical objective for the CPSC and flame retardants are an important tool to help reduce fires, fire deaths and property damage.**

    - The fact is fires have dropped significantly over the past 40 years and a major contributor to the decline in fires and fire deaths since the 1970s was the development of a comprehensive set of fire-safety measures that include flame retardants.

    - Fire, however, still represents a very real danger in the United States, with fire departments responding to a fire every 25 seconds (2013 data).[ii] As reported by the CPSC under the Chairman's 2015 Challenge, there were an estimated annual average of 360,400 fires, 2,170 deaths, 12,720 injuries and $6.49 billion in property loss.

    - The CPSC's own recall data reinforce that fire risk is an important factor consider for product safety. In just the last few years, there have been over 7000 product recalls of consumer products based on fire hazards, including products that are covered by the petition.

- The nature of today's consumer products present greater fire risks than ever before. Our homes and offices have more synthetic materials than they did 30 years ago.

- Flame retardants have been proven effective in preventing fires or if a fire does occur, slowing the fire's progression, giving individuals and families extra time to escape from potentially dangerous fire situations and fire fighters more time to respond.

- As the CPSC knows, there are key existing fire safety standards that have been developed to ensure public safety. Regulation as requested by the petition could undermine the ability of product manufacturers to meet established fire safety standards and thus compromise fire safety.

  - Codes and standards include fire safety measures for a wide variety of applications (e.g., electronics, furniture, consumer products, transportation, building codes).

  - These codes help promote public safety and there is a need for international, national and regional code consistency, so it is critical that the CPSC carefully evaluate the impact of this petition vis a vis existing fire safety codes and standards.

2. **Flame retardants include a broad range of products with differing characteristics, structures and intended uses. A one-size fits all regulatory approach for these substances is not appropriate.**

   - A variety of different chemicals, with different properties and structures, act as flame retardants. A variety of flame retardants is necessary because the materials that need to be made fire-resistant are very different in their physical nature and chemical composition, as are the end-use performance requirements of the final product.

   - It is also important to note that flame retardants are not readily interchangeable. Their areas of application are often specific and substitution can be difficult.

   - The hazard and risk profile of each individual flame retardant compound is different. It is scientifically incorrect to apply the same profile for all.

   - The petition asks for the restriction of substances that a.) have been assessed for their safety by other government agencies and b.) even those that haven't even been developed yet, without full consideration of their actual safety or risk.

3. **The petition does not set forth sufficient facts establishing necessity of issuing a regulation.**

   - The petition is overly broad.

   - The petition lacks scientific rigor and is inaccurate in many of its claims.

   - The Petition does not focus on risk to human health based on reasonably expected exposure.

- The petition does not meet criteria outlined in the Federal Hazardous Substance Act (FHSA) to ban product.

- As noted by the American Chemistry Council and other experts, the petition also fails to take into account existing and ongoing regulations and regulatory assessments of flame retardant chemicals.

Conclusion

Our industry supports a strong, science-based, objective and transparent regulatory system. We urge the Commission to consider the information presented and reject the petition.

Thank you for your time and we would be happy to answer any questions.

---

[i] NAFRA members include Albemarle Corporation, Chemtura Corporation/Great Lakes Solutions, and ICL Industrial Products who manufacture flame retardants used in a wide variety of industrial and consumer applications.

[ii] National Fire Protection Association, "Fires in the U.S.," http://www.nfpa.org/research/reports-and-statistics/fires-in-the-us

Michael Walls
Vice President of Regulatory and Technical Affairs
American Chemistry Council

ACC Remarks on Petition 15-1

Before the Consumer Product Safety Commission

December 9, 2015

Chairman Kaye and Commissioners, my name is Michael Walls, Vice President of Regulatory and Technical Affairs for the American Chemistry Council. The American Chemistry Council (ACC) represents the leading companies engaged in the business of chemistry. ACC members apply the science of chemistry to make innovative products and services that make people's lives better, healthier and safer. ACC is committed to improved environmental, health and safety performance through Responsible Care®, common sense advocacy designed to address major public policy issues, and health and environmental research and product testing. The business of chemistry is an $801 billion enterprise and a key element of the nation's economy. It is the nation's largest exporter, accounting for fourteen percent of all U.S. exports. Chemistry companies are among the largest investors in research and development. Safety and security have always been primary concerns of ACC members, and they have intensified their efforts, working closely with government agencies to improve security and to defend against any threat to the nation's critical infrastructure.

The ACC appreciates the opportunity to testify today and look forward to additional opportunities to provide information to the Commission on overall chemical safety and chemical regulation.

I am speaking today in opposition to *Petition HP 15-1 Requesting Rulemaking on Products Containing Organohalogens*, because of its overly broad approach and what we see as an inappropriate application of the Federal Hazardous Substance Act.

Overall my testimony emphasizes two key points:

1. **The substances that are the subject of the petition have already been or are currently being reviewed for their safety by EPA under a comprehensive regulatory system in place to assess and regulate chemicals.**

    - The CPSC has a clear role to play in regulating consumer products, but this petition would have the CPSC duplicate the existing work of EPA to assess the safety of chemicals.

    - The chemical industry is one of the most heavily regulated in the United States. In the U.S., more than a dozen federal laws govern the safe manufacture and use of chemicals, primary among them is the Toxic Substances Control Act (TSCA). Flame retardants on the market today, like all chemicals, are subject to review by the U.S. Environmental Protection Agency (EPA) under TSCA, as well as by other national regulatory agencies around the world.

        - EPA has taken regulatory actions to impose restrictions on about 1,200 chemicals via its authorities under TSCA.

        - EPA and other government authorities have already determined that some of the chemistries impacted by the petition do not present a significant risk to human health or the environment.

- EPA is currently reviewing others under the TSCA Work Plan Program.

- New developed substances are subject to rigorous evaluation under TSCA before they can be manufactured commercially. In the U.S., this includes requirements for companies to submit "pre-manufacture notices" to the EPA with information on physical/chemical characteristics, any available health or environmental effects data, and anticipated use and exposure information, including any information on potential byproducts and disposal. As part of this process, the EPA can prohibit the manufacture of the new substance entirely, impose restrictions on its use, or require additional testing at any time.

- In EPA's continued implementation of TSCA, it is identifying priority chemicals for assessment. On March 1, 2012 EPA published its Existing Chemicals Program Strategy in which it announced its work plan for assessing 83 priority substances.

  - Specifically relevant to this petition, is the fact that as part of this process, EPA is conducting updated assessments of over 70 flame retardants. This includes many of the chemicals covered by the petition.

  - Furthermore, as part of this process, EPA has identified approximately 50 flame retardants that it says are unlikely to pose a risk to human health.

  - Given that these assessments, which are intended to assess specific uses and exposure information, are already underway, we think it would be important for Commission to consider this information as it assesses flame retardants and before it takes any action on these substances. This is particularly important given the desire to ensure 1.) consideration of the most current scientific information, 2.) efficient use of the limited resources of the CPSC, and 3.) the avoidance of duplication with other federal agencies.

- TSCA confers authority on EPA to broadly regulate chemicals, including all the uses cited under the petition. EPA has the resources and expertise to evaluate chemicals and address the concerns that the Commission may have based on the petition.

  - To implement TSCA, EPA has developed extensive expertise in toxicology, exposure assessment and risk assessment of chemicals which is required to address any unreasonable risks posed by chemicals under their conditions of use.

- ACC is on record in strong support of legislation to further enhance TSCA. TSCA reform will provide EPA even stronger authorities to regulate chemicals more systematically, using the best available science to prevent unreasonable risks from chemicals under their intended conditions of use.

  - Regulatory action pursuant to the petition would undermine what Congress is trying to achieve with reform of TSCA by creating precedent for conflicting regulatory decisions by two separate Federal agencies on the uses of the same chemicals.

2. The petition advances an inappropriate and troubling application of the FHSA and should be rejected.

- The petition is overly broad. The petition addresses at least 25 distinct chemicals and four types of products that include not dozens but hundreds of product categories. The hazard and risk profile of each of these chemicals is different and grouping them together into categories is neither appropriate nor scientifically accurate.

- The petition does not meet criteria outlined in the Federal Hazardous Substances Act (FHSA) to ban products.

  - The FHSA permits CPSC to regulate consumer products that because of toxicity, irritation, sensitization, or other characteristics, may cause substantial personal injury or substantial illness during or as a proximate result of any customary or reasonably foreseeable handling or use.

  - To ban, the statute requires:

    - a clear determination that the substance under evaluation is a "hazardous substance" and a "banned hazardous substance;
    - a finding that other efforts by CPSC or the industry would not be protective for the public; and
    - a detailed analyses and findings must be made concerning costs and benefits.

  - The Petitioners ignore the complexities of product evaluations. Whether a product is harmful depends on multiple factors including its chemical ingredients, how those chemicals are integrated into the product and react with one another, and the degree to which the consumer is exposed to that chemical.

    - Petitioners treat all organohalogen flame retardants collectively as a single chemical species regardless of the available science to the contrary on individual flame retardant characteristics.

    - The mere presence of a chemical seems to be the petitioners' primary focus – i.e., presence anywhere and at any level is viewed as unacceptable – this is not scientifically accurate and does not take into account actual exposure presented by the proposed banned product.

- The CPSC is to regulate products that result in injury and death because of the product's design, and because of the product's *foreseeable* use by consumers in real life settings.

  - The petitioners do not present such a case.

Conclusion

Thank you for your time and we would be happy to answer any questions.

Matthew S. Blais, Ph.D.
Director, Fire Technology Research Laboratory
Southwest Research Institute

Fire Safety and Fire Retardants

Dr. Matthew S. Blais
Fire Technology Department
Southwest Research Institute

Outline

- Fire Facts
- Fire Safety
- Standardized Fire Testing and Understanding the Results
- Impact of Fire Retardants
- Ignition Source Size
- Proving a Negative
- Conclusions

Fire Facts

- The best fire is the one that never happens
  - Billions in Damage in US every year
  - Thousands of lives lost
  - 4th leading cause of accidental death ages 1-4, 129 deaths in 2013
  - 3rd leading cause of accidental death ages 5-9, 87 deaths in 2013
  - 7th leading cause of accidental death ages 65+, 1103 deaths in 2013
- Properties of fire
  - All fires of solid materials produce toxic gasses –CO is the killer
  - All fire except arson start small and grow based on fuels and oxygen available
  - The slower the fire grows, the longer the escape time for occupants
  - Heat release rate is a measure of how fast the fire is burning and the damage potential of the fire

Fire Safety

- Fire Safety is best when it is composed of multiple layer
  - Sprinklers, compartmentalization, inherently flame resistant construction, contents protected from ignition.
  - Consumer items:
    - Made of materials that resist ignition
    - Isolate potential ignition sources from combustible components

Fire Safety

- Fuel load in homes
  - Use of polymers
    - In everything from electronics to furniture
    - Have a very high energy content , and burn rapidly
  - Electronics
    - Batteries – extremely high energy density
    - Small, portable, numerous – ignition source
    - Large, usually stationary – big fuel load

Standardized Fire Testing

- Measure specific properties, achieve specific ratings, there are hundreds of variants
  - Fire Spread, smoke development (E-84, NFPA 286, ISO 9705 etc.)
  - Ignitability – NFPA 701, UL 94, FVMSS 302
  - Smoke and Toxicity – ASTM E662/E800, etc.
  - Heat Release Rate, Ignition time (ASTM D7309, E1354)
  - Specific heat, ignition temperature, heat content (bomb calorimetry, DSC/TGA, etc.)
- Not a measure of fire behavior but a specific property, understand the test and understand the result to ensure proper application of the Data.

Impact of Fire retardants

- Mode of action
  - prevent ignition from small ignition source
  - Slow the rate of fire growth
  - Reduce the pHHR
- Prevent item from becoming 1st ignited
- Create a very slow fire that is a non-event
  - Example IEEE 500W needle burner, plastic casing on televisions – V1 rating (V0 would be better)

Example No FR – FR, Small Ignition

- 500 W Bunsen burner
- Similar to a large candle flame or a lighter
- FR tv from US market is a non-event
- Non FR television from Brazil pHHR 450 kW

Ignition Source Size

- Smoldering – no open flame heat source
- Small Open Flame Source Energy from 50 to 500 W – simulate small source ignition from open Flame
- Medium source 19 kW – CAL TB133 wad of newspapers
- Large ignition source:
  - Radiant – cone, radiant panel
  - Burner – 60 kW, 100 kW, 160 kW (room corner tests)

Proving a Negative

- Fires that don't happen don't get reported
- If FR's reduce fires, then fewer fires happen – difficult to de-convolute other sources in Fire reduction
- Experimental design can influence outcomes
- Important to control variables that influence results, direct comparisons can be effective if all of the parameters are matched but one, this parameter is then controlled to show the difference in materials performance

Conclusions

- SwRI's Fire Technology Department is a non-profit fire testing laboratory, the lab performs thousands of tests per year on materials, we do not advocate for specific materials or customers.
- Fire Retardants do prevent ignition from small ignition sources, recommend raising the ignition standards not decreasing them. We know that fire kills, and fire safety is especially important for children and seniors.

Thomas G. Osimitz, Ph.D., DABT, ERT
Principal Scientist at Sciences Strategies, LLC

Testimony of Thomas G. Osimitz, PhD, DABT, ERT
Testimony on Petition 15-1
Before the Consumer Product Safety Commission

December 9, 2015

Introduction

Chairman Kaye and Commissioners, thank you for the opportunity to speak with you today.

My name is Thomas Osimitz. By way of background, I have a doctorate degree in toxicology and am certified in toxicology by the American Board of Toxicology (DABT) and am also a European Registered Toxicologist (ERT).

As most of you know, toxicology is the study of the adverse effects of chemical, physical, or biological agents on people, animals, and the environment. Toxicologists are scientists trained to investigate, interpret, and communicate the nature of those effects.

I have spent over 30 years as a toxicologist examining the safety of a wide range of chemicals primarily used in products that consumers, including children, come into contact with. An important component of my work, in addition to understanding the hazard, or inherent toxicity of chemical and its potency, is the scientific estimation of exposure. It is through consideration of both hazard and exposure that one can estimate risk: the likelihood at an adverse effect will be manifest. I have experience with various ways to assess risk and with the approaches that different regulatory agencies and governments have taken in this regard.

I am here to offer my independent perspective on the Petition under consideration. I want to point that under the auspices of the American Chemical Council, I am Chair of the Science Advisory Council (SAC) of the North American Flame Retardant Alliance (NAFRA). The SAC has independent scientists from both human health and toxicology as well as from fire science (understanding the complex nature of fire and how to prevent its start and escalation).

This is an important, yet very complex topic. I believe that we have common ground in the mutual desire to protect human health and the environment and to provide the benefits of flame retardants when demonstrated. Given this, using the best science, how do we best focus our efforts for maximum public good?

Key Points

I would like emphasis two important points regarding the Petition:

1) Need to examine the flame retardants (FRs) as individual chemicals and not group them their assuming that they have identical toxicological and environmental fate properties;
2) Importance of considering exposure potential and risk.

Need for Examination of Chemicals Individually

If we just focus on hazard and environmental fate, it is important to keep in mind that each FR has its own constellation of properties. The USEPA's Design for Environment hazard assessment for FRs used in flexible polyurethane foam (2014) presents tables that show these properties for the various FRs.

I am familiar with much of the published literature on various flame retardants, including the organohalogens. I would like to comment of the toxicology of the organophosphate flame retardants, with particular attention to TCPP. To start with, the naming of these molecules, while it conforms to a convention that chemists understand (TCCP, TCEP, TDCPP) can be confusing. It is tempting to group them all together, referring to them as simply "tris" and treat them as identical with respect to their health and environmental properties. That is too simple of a solution and may lead to the unnecessary restriction of a chemical that lacks the undesirable properties that have led to the elimination of other chemicals.

In contrast other molecules to which it is structurally related and with which it is often discussed, TCPP is not considered neurotoxic (toxic to the nervous system) nor is it toxic to the reproductive system. Speaking in regulatory terms, it is not "classified" as a CMR (carcinogen, mutagen, or reproductive toxicant) or a PBT (persistent, bioaccumulative, toxic chemical). This is important, because it those properties: CMR, PBT that have led to the elimination from commerce of several of the other flame retardants.

Speaking more broadly, while data on some of the flame retardants show the potential for adverse effects as certain exposure levels (usually in laboratory toxicology studies) it is not the case that:

> "Human exposure to all studied organohalogen flame retardants is associated with long-term chronic health effects…"

It may be true that, at sufficiently high dose levels in animal toxicology studies, adverse effects may occur. But that does not necessarily translate into adverse effects in humans. The purpose of toxicology studies is not only hazard identification (what effects are possible, short of lethality), but also dose-response assessment. It is the dose response assessment that helps to answer the all important question "What are the effects, if any that occur at lower doses?' and "Is there a level at which no effects are notes (the threshold)?"

Thus, I encourage you not to treat all of the organohalogens of equal concern.

Importance of Considering Exposure Potential and Risk

Risk to humans and/or the environment is a function of both toxicity, a property inherent to the chemical, and the extent of exposure that a human or environmental species receives. We are exposed to many chemicals, both natural and synthetic, every day that have inherent toxicity, but because of the level of exposure and our body's ability to detoxify many of these chemicals, risk is low or nonexistent.

Understanding and mitigating risk is something that we all do every day in daily life. Few human activities, whether it's driving a car or flying are without some element of risk. The same is true for exposure to chemicals. Regulation clearly on the basis of hazard, or inherent toxicity will result in the elimination or de-selection in the market of chemicals for which the actual risk to human based on exposure, is very low.

I mentioned that we all form our own risk assessments every day, whether knowingly or otherwise. Various commonly ingested foods cooked and otherwise contain known rodent carcinogens, naturally occurring. Many of these chemicals were tested the animal studies for carcinogenicity and have been shown to cause cancer in such toxicology studies. Moreover, many are likely to be found in biomonitoring of human fluids and tissue. Most of the people in this room are exposed to these chemicals from oral ingestion.

In the addition, the State of Washington clearly points out that with respect to their list of chemicals of high concern to children that:

> "As required by the law, chemicals on the list are toxic and have either been found in children's products or have been documented to be present in human tissue (blood, breast milk, etc.). However, the mere presence of these chemicals in children's products does not necessarily indicate that there is a risk of harm."

Likewise, the CDC emphasizes this in their recent report (Centers for Disease Control (CDC), 2009):

> "The presence of an environmental chemical in people's blood or urine does not mean that it will cause effects or disease. The toxicity of a chemical is related to its dose or concentration, in addition to a person's individual susceptibility. Small amounts may be of no health consequence, whereas larger amounts may cause adverse health effects."

Priorities for action should be established for individual chemicals of the basis of hazard, dose-response and risk.

Significance of Published Risk Assessments

I have mentioned the importance of doing risk assessments. Several examples of risk assessments have been done on flame retardants by government agencies. With regards,

to TBBPA, the first was conducted by the European Chemicals Bureau, part of the European Commission. This focused on human health aspects of TBBPA and was published in 2006. In addition to a very thorough review of the hazard data available at the time, the Bureau reviewed in great detail potential exposures to workers, occupationally exposed to the chemical as well as people exposed in the environment and from consumer exposures. The document is highly quantitative and considers all aspects of potential risk. The conclusion of this assessment with regard to consumer exposures, was:

> "There is at present no need for further information and or testing and for risk reduction measures beyond those which are being applied already."

The most recent government assessment of TBBPA was one conducted by Environment Canada and Health Canada published in November 2013. Again, much like the European Union assessment this document details not only hazard but also a variety of potential exposures to the environment and to humans. Among their conclusions is that:

> "Based on the adequacies of the margins between upper bounding estimates of exposure to TBBPA and critical effect levels, it is concluded that TBBPA does not meet the criteria under paragraph 64(**c**) of CEPA 1999 as it is not entering the environment in a quantity or concentration or under conditions that constitute or may constitute a danger in Canada to human life or health."

Most recently, Colnot, et al. (2014) reviewed the available toxicology data on TBBPA as well as the most recent exposure data (including dust exposures) and concluded:

> "Measured concentrations of TBBPA in house dust, human diet and human serum samples are very low. Daily intakes of TBBPA in humans were estimated to not exceed a few ng/kg bw/day. Due to the low exposures and the low potential for toxicity, margins of exposures for TBBPA in the human population were between $6x10^4$ (infants) to $6x10^7$ (adults). Exposures of the general population are also well below the derived-no-effect-levels derived for endpoints of potential concern in REACH."

Referring back to TCPP. TCPP has been through all required health and safety testing procedures and is approved for use worldwide. I have reviewed much of the data that supports the safety of TCPP. Most significant is the 400 plus page European Union Risk Assessment Report, a document that I consider to be the most comprehensive and carefully done assessment of TCPP. They carefully performed a risk assessment for consumer exposure for TCPP concluded that at present there is no need for further information and/or testing and no need for risk reduction measures beyond those which are being applied. This finding was reaffirmed in a 2011 independent study done for the EU Consumer and Health Authorities (DG-SANCO).

Finally, the USEPA, under its TSCA Work Plan Chemicals Program, is conducting updated assessments of over 70 flame retardants, many of which are organohalogens.

This evaluation is carefully considering hazard data on each chemical individually as well as exposure potential.

Thus, it is important to consider all of the various risk assessments either published or underway as they provide a wealth of science-based data on which to base any regulatory actions.

Summary

I encourage you not to treat all of the organohalogens as being of equal concern. A careful analysis will show that they are not. Rather, they should be assessed individually of the basis of hazard, dose-response and risk.

Thank you very much for the opportunity to speak with you today and I would be glad to answer any questions.

Chris Cleet, QEP,
Director of Environment and Sustainability
Information Technology Industry Council

ITI-CTA Oral Comments on docket ID number CPSC-2015-0022; Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants

December 9, 2015

Chairman Kaye, Commissioners Adler, Buerkle, Mohorovic, and Robinson, the technology and electronics sectors, represented by the Information Technology Industry Council (ITI)™ and the Consumer Technology Association (CTA)™ **thank the Commission for the opportunity to provide** comments on the petition requesting a rulemaking on products containing organohalogen flame retardants (OFRs).

My name is Chris Cleet, and I am the Director of Environment and Sustainability at ITI. My background is in chemistry and environmental science, and I have been working on materials, product stewardship, and sustainability issues for the technology and electronics sectors for over ten years.

I am testifying today on behalf of both ITI and CTA. ITI and CTA are trade associations representing numerous manufacturers and retailers of a wide range of components, computers, televisions, video display devices, wireless devices, MP3 players, printers, printed circuit boards, networking, and other electronic equipment. **Essentially, our members are the manufacturers of "electronic devices"** mentioned in the petition.

Our member companies have long been recognized for their commitment and leadership in innovation and sustainability, often taking measures to exceed regulatory requirements on environmental design, energy efficiency, and product stewardship, which includes consumer safety.

Given our shared goals and commitment to consumer safety, and our scientific and technical experience in product safety, we respectfully request that the Commission deny this petition and opt not to initiate a rulemaking. In my testimony I will discuss how the petition before you is overly broad, insufficiently justified in its claims, and its goals are already being met through numerous other voluntary and government initiatives. The action proposed is unneeded, unnecessarily expansive, and could do more harm than good. There are serious concerns that merit examination on how the proposed ban is unlikely to generate any clear environmental and health improvements, and may actually compromise consumer safety.

The Consumer Product Safety Improvement Act (CPSIA) includes comprehensive certification requirements for banned materials. A rule banning OFRs in high tech and electronic products will impose unprecedented regulatory challenges with no clear link to consumer benefit or safety. Instead, the technology and electronics sectors support continuing participation in existing and proven industry and government led initiatives, which provide methods to reduce the use of OFRs while maintaining product integrity and enhancing consumer safety.

The Petition is Unnecessary as the technology and electronics sectors are leading the effort to reduce the use of OFRs and still ensure consumer safety

Consumer safety is always a top priority for the electronics industry. Not only is it a moral imperative, it is also essential to our bottom line—without it, we would lose the confidence and trust of our consumers.

The technology and electronics sectors have been voluntarily phasing out OFRs in electronic devices for years when and where technology, science, and advances in new material developments support the change. For example, our sectors phased out the use of octaBDE decades ago and we are phasing out the few remaining uses of decaBDE (we never used pentaBDE). That said, it is important to recognize that flame retardants are essential for consumer safety.

Industry efforts such as the IEEE 1680.x family of standards have incentivized manufacturers to remove additive brominated and chlorinated flame retardants from the products covered in those standards, and there are many other industry efforts underway that we detail further in our written comments.

Additionally, as part of our sector's continuing commitment to the environment, human health, and consumer safety, our companies continually reassess the use of all of the materials in our products. Substances used in an electronic product have been selected due to their unique physical and chemical properties. We work to substitute materials that could pose potential concerns once we identify compounds that are suitable and effective to use and that offer an improved environmental, health, and safety profile.

Improved techniques and technologies available today enable the accurate evaluation of potential human and environmental effects of chemicals in their intended use, and help manufacturers select the best substances to minimize the potential for introduction of regrettable substitutions in consumer products. We believe that applying these measured and data-based approaches, rather than imposing a one-size fits all blanket ban, represents the proper way to address issues related to some OFRs. We will continue our longstanding work to identify preferable substitutes that meet or exceed the performance of existing flame retardants.

The Petition is overly broad and could do more harm than good

The petition asks the CPSC to initiate a rulemaking that could ban the use of an entire class of compounds. For the Commission to issue a rulemaking on this broad of a scale is unprecedented. While the Commission has issued rulemakings that range across many products, such as small parts or magnets, these rules apply to a single type of potential hazard. To our knowledge, the Commission has never issued a rule that covers an entire class of compounds with diverse physical and chemical properties.

Now is not the time to break that precedent. Barring proof that substantiates adverse toxicological similarities across an entire class of compounds, the Commission should reject any proposed widespread ban. While there is evidence that the toxicologies of certain OFRs are similar (e.g., as in DecaBDE and bis(pentabromophenyl) ethane, and PBDEs in general), the petition does not provide a demonstrable link across the entire class of OFRs necessary to justify restricting hundreds of OFR substances.

There are two important reasons, from both a scientific and policymaking perspective, why a rulemaking this broad is impractical. First, OFRs vary by chemistry and physiochemical properties. While some OFRs with similar structures can be grouped together, each type of OFR would need to be evaluated individually. Second, the term "electronic devices" covers thousands of different types of products, and that term must be clearly defined before it can be considered for regulation as a class. Testing, tracking and certifying compliance with a ban under CPSIA on dozens to hundreds of substances in an undefined class of products is a herculean task. The overly broad petition would create a huge regulatory burden without a clear increase to consumer safety.

The Petition may compromise consumer safety

Potential fire hazards in high tech and electronics products are routinely managed using well established best design practices and appropriate material selections, in accordance with applicable product standards. These product standards prescribe the appropriate level of flame resistance in accordance with how the materials are used and how the product operates. While the use of flame retardant compounds is not required by any national law or regulation, there are very stringent fire safety laws, specifications and standards for electronics, and the use of certain flame retardants gives manufacturers the ability to design products that meet the safety and performance demands of the market. The safe and practical use of flame retardants gives manufacturers flexibility to meet design requirements, making our products lighter, more durable, and more efficient, while still maintaining a high degree of protection from fire or shock.

An outright ban of these chemicals will have the unintended consequence of altering the proven approach that has long ensured the fire safety of electronic products. If OFRs are banned as an entire class of compounds, the path forward for new products with respect to fire safety will be very unclear. Today, because of strict fire safety standards and innovative uses of materials, experts can determine with a high degree of certainty if a fire originated in an electronic device, as current electronic enclosures do not typically contribute fuel as an ignition source; when exposed to a common open flame, such as a candle, they melt and self-extinguish.

Conclusion

In summary, I would like to thank the Commission again for the opportunity to provide comments today. ITI and CTA believe that the petition being considered is overly broad and fails to justify the need for the Commission to initiate a rulemaking.

Specifically, the petition fails to recognize and account for the highly varied and unique characteristics of the compounds used for fire safety that the petition attempts to include in a single class, and it further fails to characterize the health hazards it claims exist with each compound in the overly broad class. The petition also fails to acknowledge the contribution that this class of compounds has made to the excellent fire safety record of electronics, nor does it address the increased potential fire risks to consumers and the public should the Commission ultimately act upon this petition.

Finally, the petition fails to acknowledge the wide-ranging industry efforts underway to substitute OFRs where it makes scientific and technical sense and is feasible to do so. We believe that a combination of existing industry and government efforts to assess the hazards and appropriate substitutes for these materials, rather than declaring them as "banned hazardous substances," is the correct way to address the health issues that have arisen with some OFRs.

Therefore, the technology and electronics sectors, represented by ITI and CTA, respectfully request that the Commission dismiss this petition and not initiate a rulemaking on the products and compounds listed in the petition. In addition to our testimony today, ITI and CTA will be submitting detailed written comments. Both myself and Allison Schumacher of CTA are happy to answer any of the Commission's questions.

Tim Reilly
Clariant Corporation
(Charlotte, NC)

Oral Comments to United States Consumer Product Safety Commission

[Docket No. CPSC-2015-0022]

Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants

Oral comments of Timothy Reilly on behalf of Clariant Corporation (Charlotte, North Carolina)

Hearing Date: December 9, 2015 (Bethesda, MD)

Introduction:

My name is Tim Reilly. I have a technical marketing position involving flame retardants at Clariant Corporation (Charlotte, North Carolina). I have worked for Clariant for thirty-two years including fifteen years in pigments and additives manufacturing.

Clariant Corporation is the North American subsidiary of the Swiss based global specialty chemical company Clariant.[1] Clariant has 17,000 employees including almost 2,000 personnel here in North America.

Clariant is a leading producer of halogen-free phosphorus based flame retardants. Our Exolit® brand products are used to impart flame retardancy to thermoplastics, thermosets, elastomers, adhesives and coatings. Some of our unique products are widely used in green electronic consumer products such as laptops, hand held devices and other electrical and electronic equipment. The environmental and hazard profile of these products can be found in the public domain such as the U.S. EPA Design for Environment (Dfe) Alternatives Assessment.[2]

Today, the main focus of my comments involve:

Meeting Fire Safety requirements with an improved Environmental, Health & Safety Profile

Clariant maintains that it is possible to have an increased level of fire safety, while simultaneously protecting human health and the environment. The two requirements can indeed co-exist.

I would like to provide several examples where industry has provided acceptable technical solutions for the replacement of certain organohalogens which have the potential to evaporate or migrate out of products. These alternative flame retardants represent applications where is it is possible to replace a significant volume of such semi-volatile organohalogen flame retardants.

Examples:

1) **Furniture – polyurethane foam (CA TB 117-1975)** [3]**:** a halogen-free flame retardant has been used in commercial applications to meet this open flame test. The flame retardant becomes bound and part of the polyurethane matrix and therefore belongs to the category "reactive" flame retardants. There is no flame retardant migration from the polymer, therefore no impact on human health and the environment.

2) **Interior Automotive – polyurethane foam (FMVSS 302)**[4]: TDCP has been used in interior automotive applications (e.g. headliners, seating). As an alternative, a halogen-free reactive flame retardant can be used. Again, the flame retardant becomes bound into the polyurethane structure. It provides increased fire protection and does not migrate.

3) **Building & Construction – Polyisocyanurate (polyurethane) Roofing Board Insulation [UL Class A - UL 790/ASTM E 108][5]:** Currently, many thousands of tons of organohalogens (e.g. TCPP) are used for insulation in buildings throughout North America. A commercial technical solution already exists using a reactive halogen-free flame retardant. The Johns Manville Company won a green building award during 2014 with this first-to-market halogen-free insulation board. It is now possible for the building industry to replace TCPP.

4) **Building & Construction – Rigid Polystyrene Foam Thermal Insulation (ASTM E84)[6]:** Industry now has the technology to replace thousands of tons of the organohalogen HBCD in building & construction applications. This alternative technology was invented by Dow Chemical Company and licensed by three different flame retardant manufacturers. In this instance, a brominated "polymeric" alternative was used. Due to its molecular size, this additive FR chemical does not migrate.

5) **DecaBDE replacement - Electronic Housings & other applications (UL 94 & other fire test requirements)[7]:** Under agreement with the U.S. EPA, the manufacturers of DecaBDE have agreed to phase out this FR chemical. In various applications, halogen-free flame retardants have successfully replaced DecaBDE (e.g. backcoating of textiles, various thermoplastic applications). For electronic enclosures, the polymers HIPS or ABS are often used necessitating the use of halogenated FRs to pass UL 94 V0 test. However, if the OEM manufacturer chooses either the polymer alloy PC/ABS or PPE/HIPS for the same enclosure, then halogen-free solutions are possible. [8]

6) **Mattresses - Polyurethane Foam (16 C.F.R, section 1633, CA TB 129)**: There has been recent work done as part of a joint industry/academia/government project using commercially available halogen-free flame retardants to meet fire tests requirements for selected applications including mattresses. Currently, this work is ongoing and presently under a non-disclosure agreement. Formulations continue to be optimized and full scale fire testing continues. Some promising results have been achieved to date. The goal is eventual commercialization.

Conclusion:

I have provided some examples from the North American market where semi-volatile organohalogens can be replaced by alternate technologies. It is possible to have an increased level of fire safety while simultaneously protecting human health and the environment.

Clariant supports many of the aspects of the petition related to migration of semi-volatile organohalogens from consumer articles. For some applications, authors of future fire tests might consider inclusion of a maximum VOC/migration level requirement.

Clariant supports maintaining a high level of fire safety in consumer products either by use of alternative flame retardant chemicals or inherently fire retardant materials. For any future rulemaking, we urge the CPSC to consider these alternative technologies for fire safety. This will keep the door open for continued R&D investment and innovation by our industry.

Thank you.

Tim Reilly

Technical & Business Development Manager

Clariant Corporation, BU Additives

Corporate Office: Charlotte,NC USA

timothy.reilly@clariant.com

Websites (BU Additives & Exolit Flame Retardants):www.additives.clariant.com , www.exolit.com

References:

1 Clariant website: www.clariant.com
2 U.S. Environmental Protection Agency Design for the Environment: http://www2.epa.gov/saferchoice/design-environment-alternatives-assessments
3 Natural Foam Technology website: http://www.naturalfoams.com/wp/wp-content/uploads/2014/06/Special-Reprint-Natural-Foams-Technology-PU-Magazine-August-2014_0.pdf
4 Clariant website: http://www.clariant.com/en/Solutions/Products/2014/03/18/16/31/Exolit-OP-560
5 Johns Manville website: http://www.jm.com/en/building-materials/commercial-roofing/insulation-and-coverboards/ENRGY-3-E/
6 Dow Chemical: http://www.plasticsnews.com/article/20130722/NEWS/130729992/dow-chemical-licenses-polymeric-flame-retardant-technology
7 U.S. Environmental Protection Agency Design for the Environment (re. Decabrom Alternatives): http://www2.epa.gov/saferchoice/design-environment-alternatives-assessments
8 Pinfa website: http://pinfa.org/images/core/brochures/PINFA_EE_brochure_3rd_Edition_2010-11.pdf

Panel 5

Rachel Weintraub
Legislative Director and General Counsel
Consumer Federation of America

Consumer Federation of America

December 9, 2015
Statement of Rachel Weintraub,
Legislative Director and General Counsel, Consumer Federation
Before the
U.S. Consumer Product Safety Commission
Public Hearing on Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants [Docket No. CPSC–2015–0022]

I appreciate the opportunity to provide comments to you on the petition of the American Academy of Pediatrics, American Medical Women's Association, Consumer Federation of America, Consumers Union, Green Science Policy Institute, International Association of Fire Fighters, Kids in Danger, Philip J. Landrigan, M.D., M.P.H., League of United Latin American Citizens, Learning Disabilities Association of America, National Hispanic Medical Association, Earth Justice and Worksafe submitted to the Consumer Product Safety Commission (CPSC) urging the CPSC to adopt mandatory standards under the Federal Hazardous Substances Act to protect consumers from the health hazards caused by the use of non-polymeric, additive form, organohalogen flame retardants in children's products, furniture, mattresses and the casings surrounding electronics.

I am Rachel Weintraub, Legislative Director and General Counsel at Consumer Federation of America (CFA). CFA is a non-profit association of approximately 280 pro-consumer groups that was founded in 1968 to advance the consumer interest through advocacy and education.

In my testimony, I will discuss CPSC's legal authority to adopt standards under the Federal Hazardous Substances Act (FHSA) and why labeling under the FHSA is not adequate to protect consumers.

I. CPSC's Legal Authority to Adopt Mandatory Standards Under the Federal Hazardous Substances Act to Protect Children from the Health Hazards Caused by the use of Non-Polymeric, Additive Form, Organohalogen Flame Retardants in Children's Products, Furniture, Mattresses and the Casings Surrounding Electronics

A. Federal Hazardous Substances Act (FHSA)

The CPSC has clear authority to take the actions requested in this petition. The Petition requests that the CPSC adopt mandatory standards under the Federal Hazardous Substances Act to protect consumers from the health hazards caused by the use of non-polymeric, additive form, organohalogen flame retardants in children's products, furniture, mattresses and the casings surrounding electronics.

The FHSA gives the CPSC the authority to require precautionary labeling on hazardous consumer products and to ban products that pose a hazard to consumers when labeling would not adequately protect consumers from the hazard.

The FHSA establishes that in order to ban a product, the CPSC "may by regulation declare to be a hazardous substance . . . any substance or mixture of substances,"[1] which is "toxic,"[2] if such substance "may cause substantial personal injury or substantial illness during or as a proximate result of any customary or reasonably foreseeable handling or use."[3] The FHSA defines "toxic" to mean any substance that has "the capacity to produce personal injury or illness to man through ingestion, inhalation, or absorption through any body surface."[4]

The CPSC's regulation explains that "[s]ubstantial personal injury or illness means any injury or illness of a significant nature. It does not have to be severe or serious but it cannot be an "insignificant or negligible injury or illness."[5] A household product that is determined to be a "hazardous substance" cannot be sold without a warning label, and if a warning label is not adequate – as it is not here – the product cannot be sold.

The FHSA specifically focuses on children's products. The FHSA includes that any "article intended for use by children, which is a hazardous substance, or which bears or contains a hazardous substance in such manner as to be susceptible of access by a child," is automatically deemed a "banned hazardous substance."[6] In the case of a household article classified as a "hazardous substance," but not intended for use by children, the CPSC may classify it as a "banned hazardous substance" despite its labeling, if the CPSC determines that

> notwithstanding [any] cautionary labeling . . . , the degree or nature of the hazard involved in the presence or use of such substance in households is such that the objective of the protection of the public health and safety can be adequately served only by keeping such substance, when ... intended or packaged [for use in the household], out of the channels of interstate commerce.[7]

The CPSC has recognized that the FHSA "defines the term 'toxic' very broadly," and "[t]his broad statutory definition covers both acute and chronic toxicity."[8] While the CPSC regulations and guidelines discuss the particular chronic hazards of cancer, neurotoxicity, and developmental

---

[1] 15 U.S.C. § 1262(a)(1).

[2] 15 U.S.C. § 1261(f)(1)(A)(i).

[3] 15 U.S.C. § 1261(f)(1)(A).

[4] 15 U.S.C. § 1261(g).

[5] 16 C.F.R. § 1500.3(c)(7)(ii).

[6] 15 U.S.C. § 1261(q)(1)(A). Special rules apply to articles like chemical sets that are inherently hazardous if they are appropriately labeled and are intended for use by mature children. *Id.*

[7] 15 U.S.C. § 1261(q)(1)(B).

[8] *Labeling Requirements for Art Materials Presenting Chronic Hazards; Guidelines for Determining Chronic Toxicity of Products Subject to the FHSA; Supplementary Definition of "Toxic" under the Federal Hazardous Substances Act*, 57 Fed. Reg. 46,626, 46,656 (Oct. 9, 1992).

or reproductive toxicity, "*the definition is not limited to these hazards, but includes other chronic hazards.*"[9] The determination of what is "toxic" under the FHSA "is a complex matter requiring the assessment of many factors."[10] There is no formula for what is "toxic," and no requirement that risks meet any particular threshold before regulation is warranted. As the Court of Appeals for the D.C. Circuit has explained: "There is no indication in the language of the [FHSA] or its legislative history that the Commission was bound to develop a precise 'body count' of actual injuries that will be reduced by each regulatory provision."[11]

Non-polymeric, additive form, organohalogen flame retardants pose chronic hazards to consumers because of their physical, chemical and biological properties. These hazards are well documented and include reproductive impairment, neurological impacts, endocrine disruption and interference with thyroid hormone action, genotoxicity, cancer and immune disorders. These adverse health impacts meet the standard established in the FHSA for a toxic substance that has the capacity to produce personal injury or illness to man through ingestion, inhalation, or absorption through any body surface. In addition, through the reasonably foreseeable handling or use of children's products, furniture, mattresses and electronics, consumers can be exposed to these chemicals since they migrate out of the product.

Thus, due to the hazards posed by non-polymeric, additive form, organohalogen flame retardants in children's products, furniture, mattresses and the casings surrounding electronics, CPSC has the authority under the FHSA to declare these products a banned hazardous substance.

B. Courts Interpretation of the FHSA

1. Deference to CPSC

Courts have not questioned the conclusion that a variety of household products containing chemicals, such as Drano (a drain declogger) and Liquid Wrench (a spray lubricant) are "hazardous substances" within the meaning of the FHSA.[12]

---

[9] *Id.* at 46657 (emphasis added).

[10] 57 Fed. Reg. 46,626, 46,657. In 2008, the FHSA was amended to make it easier for the CPSC to issue regulations finding that a substance is a "hazardous" or "banned hazardous" substance. Prior to the 2008 amendments, proceedings for the issuance of regulations under the FHSA were governed by section 701 of the Federal Food, Drug and Cosmetic Act ("FFDCA"). 21 U.S.C. § 371. Some case law suggested that the FFDCA set a high bar for regulation. *Cf. Consumer Fed'n of Am., v. CPSC*, 883 F.2d 1073 (D.C. Cir. 1989) (upholding the CPSC's denial of a petition to ban the use of methylene chloride in household products because it did not meet the FFDCA standard). Since that case was decided, Congress dropped the requirement that FHSA regulations meet the FFDCA's "reasonable grounds" standard. *See* Pub. Law 110-314 § 204(b)(2) (Aug. 14, 2008). Instead, proceedings to ban a "hazardous substance" are governed solely by provisions of the FHSA. 15 U.S.C. § 1261(q)(2) ("Proceedings for the issuance . . . of regulations [related to banning a "hazardous substance"] shall be governed by the provisions of subsections (f) through (i) of section 1262 of this title," except in the event of imminent hazard when more streamlined procedures may apply). The 2008 amendment signifies Congressional intent to make it easier for the CPSC to regulate under the FHSA.

[11] *Forester v. CPSC*, 559 F.2d 774, 788 (D.C. Cir. 1977).

[12] *See Miles v. S.C. Johnson & Son, Inc.*, No. 00 C 3278, 2002 Westlaw 31655188, at *1 (N.D. Ill. Nov. 25, 2002) ("CPSC has determined that sodium hydroxide, the primary ingredient in Drano, is a hazardous substance."); *Wagoner v. Exxon Mobil Corp.*, 832 F. Supp. 2d 664, 668 (E.D. La. 2011) ("Defendant does not argue that its Liquid Wrench product contains a banned hazardous substance"); *cf. Leibstein v. LaFarge N. Am., Inc.*, 689 F. Supp.

Courts have also given significant deference to the CPSC's determinations that a product is a "hazardous substance." For example, the Second Circuit Court of Appeals agreed with the CPSC that foam spray paint (essentially food-colored shaving cream) intended for use by children is a "hazardous substance" under the FHSA.[13] The court "defer[red] to the agency's interpretation of the substantial injury requirement" because it was not arbitrary, capricious or manifestly contrary to law.[14] The court emphasized that the statute only required that the product "may cause" substantial injury, and did not require that the product would "likely" cause injury.[15]

2. Precedent for Regulating Classes of Products Under the FHSA

The Petition requests that the CPSC ban a class of flame retardants in four product categories. There is solid precedent for regulating classes of products under the FHSA. In *Toy Manufacturers of America, Inc. v. CPSC*, 630 F.2d 70 (2d Cir. 1980), a trade association of toy manufacturers challenged a rule issued under the FHSA, which banned toys intended for use by young children that present choking hazards because of small parts. The toy industry argued that the FHSA was intended to deal only with specific, individual articles, and "not with a broad range of products at the same time."[16] The court soundly rejected this argument, saying: "Certainly, nothing in the FHSA explicitly limits the employment of its banning procedures to situations involving only individual products . . . ."[17] The court went on to note that "[t]he legislative history appears clear in favoring general prescriptive regulations of *the broadest, most comprehensive type* and would favor case-by-case proceedings only where such general prescriptive regulations prove impossible."[18] The court relied on language from the FHSA legislative history in which the Senate Report states:

> It is intended that most determinations made by the (CPSC) will be in the form of general prescriptive rules, further amplifying the definition of . . . hazardous substances where necessary.[19]

The class of organohalogen flame retardants in the product categories described in the Petition is like small parts in toys: these chemicals are intrinsically dangerous by virtue of their inherent characteristics. Consumer products in the four categories at issue pose hazards when they

---

2d 373, 381 (E.D.N.Y. 2010) (it is undisputed that cement product is a "hazardous substance" because it is corrosive).

[13] *United States v. Articles of Banned Hazardous Substances Consisting of an Undetermined Number of Cans of Rainbow Foam Paint*, 34 F.3d 91 (2d Cir. 1994).

[14] 34 F.3d at 97.

[15] *Id.* at 97-98.

[16] 630 F.2d at 74.

[17] *Id.*

[18] *Id.* (citation omitted) (emphasis added).

[19] S. Rep. No. 91-237, 91st Cong., 1st Sess. 5 (1969).

contain any organohalogen flame retardant because of the intrinsic tendency of these semi-volatile chemicals to migrate out of products and attach to other media, such as house dust. Thus, for purposes of being a "hazardous substance" under the FHSA, each foreseeable way that these four categories of products are used, including, handling, mouthing, lying on and within, sleeping on, sitting in, playing with, or watching (as in a television) can pose a risk of harm to consumers if organohalogen flame retardants are added to these product categories during manufacturing. Indeed, the products may cause substantial personal injury or substantial personal illness as a result of their mere presence in the household, which is plainly a foreseeable handling or use.

It doesn't make sense for CPSC to regulate a product containing one organohalogen flame retardant only to see the same product manufactured with another flame retardant with the same physico-chemical properties.[20] Based on the understanding that the FHSA "favor[s] general prescriptive regulations of the broadest, most comprehensive type and would favor case-by-case proceedings only where such general prescriptive regulations prove impossible,"[21] and that there is strong evidence documenting that all chemicals in this class – due to their physico-chemical properties – are toxic and may cause substantial injury or illness, consumer products containing organohalogen flame retardants as a class must be understood as "hazardous substances" within the meaning of the FHSA.[22]

C. CPSC has a Documented History Under the FHSA of Addressing Chemical Hazards in Consumer Products

The CPSC has regulated certain products containing specific chemicals under the FHSA due to the hazards posed by those chemicals. The request in this petition is consistent with those previous actions. CPSC found that a number of substances are determined to be "banned hazardous substances"[23] because "they possess such a degree or nature of hazard that adequate cautionary labeling cannot be written and the public health and safety can be served only by keeping such articles out of interstate commerce"[24]

CPSC banned "[m]ixtures that are intended primarily for application to interior masonry walls, floors, etc., as a water repellant treatment and that are extremely flammable,"[25] "[c]arbon

---

[20] The fact that sulfuric acid is a single chemical, not a chemical class, and that drain openers is a single product category are irrelevant distinctions for purposes of this Petition. The CPSC's expressed preference for remedying consumer risk without inviting a similarly risky product as its replacement is just as applicable here as with the drain openers.

[21] 630 F.2d at 74.

[22] Under the authority of the FHSA, products containing several chemical substances have been found to be "hazardous substances," requiring labeling. These include: diethylene glycol; ethylene glycol; products containing 5% or more benzene; methyl alcohol; turpentine; toluene, and xylene. When the FDA (which administered the FHSA at the time these regulations were adopted) first proposed to regulate products containing these chemicals as "hazardous substances," it said it was doing so based on "human experience" and "together with opinions of informed medical experts." 28 Fed. Reg. 2686, 2686 (Mar. 19, 1963).

[23] 16 CFR 1500 17
[24] 16 CFR 1500 17
[25] 16 CFR 1500 17(1)

tetrachloride and mixtures containing it (including carbon tetrachloride and mixtures containing it used in fire extinguishers), excluding unavoidable manufacturing residues of carbon tetrachloride in other chemicals that under reasonably foreseeable conditions of use do not result in an atmospheric concentration of carbon tetrachloride greater than 10 parts per million,"[26] "products containing soluble cyanide salts, excluding unavoidable manufacturing residues of cyanide salts in other chemicals that under reasonable and foreseeable conditions of use will not result in a concentration of cyanide greater than 25 parts per million,"[27] and [g]eneral-use garments containing asbestos (other than garments having a bona fide application for personal protection against thermal injury and so constructed that the asbestos fibers will not become airborne under reasonably foreseeable conditions of use).[28]

Therefore, it is clear that the CPSC has banned chemicals in consumer products that have posed various risks to consumers since labeling would have been inadequate to protect the public health.

This Petition requests that the CPSC follow that precedent and use its authority under the FHSA to ban children's products, furniture, mattresses and the casings surrounding electronics containing non-polymeric, additive form, organohalogen flame retardants due to the hazards they pose to consumers.

II. Labeling Products Indicating that they Contain Non-Polymeric, Additive Form, Organohalogen Flame Retardants Would Not Adequately Protect the Public Health

Under the authority of section 2(q)(1)(B) of the Federal Hazardous Substances Act, the Commission may "declare" as "banned hazardous substances" "articles because they possess such a degree or nature of hazard that adequate cautionary labeling cannot be written and the public health and safety can be served only by keeping such articles out of interstate commerce."[29] The FHSA clearly provides the CPSC with the authority to ban products containing a toxic hazardous substance if a label would not be adequate. Our request in the petition meets this threshold.

The hazards posed by non-polymeric, additive form, organohalogen flame retardants could not be effectively addressed by a label. First, consumers are not aware of the potential hazard and when the hazard is not obvious, a warning label would not be effective. More importantly, there is no particular type of use, condition, or behavior that a consumer could take to avoid adverse health impacts from exposure to these flame retardants. Knowledge of a potential health hazard, alone, without a clear alternative, will not provide consumers with sufficient information nor options to effectively limit their exposure. Knowledge could increase consumer awareness of health impacts but without clear alternatives to products, may lead to consumer confusion in this context.

---

[26] 16 CFR 1500 17 (2)
[27] 16 CFR 1500 17(5)
[28] 16 CFR 1500 17(7)
[29] 16 CFR 1500.17(a)

Significantly, when addressing a product safety hazard, "the safety hierarchy" establishes a recommended approach. "The basic sequence of priorities in the hierarchy consists of three approaches: first to design it out, second to guard, and third to warn."[30] If a product poses a safety hazard to consumers, the first and most effective step is to eliminate the hazard from the product. The second step in the hierarchy is to guard a consumer from the hazard posed by the product. "Personal protective equipment such as rubber gloves and goggles, barricades on the highway, and bed rails on the side of an infant's crib are examples of physical guards."[31] It is unlikely that guarding against the migration of flame retardants from consumer products is feasible.

The lowest level of the hierarchy is warning consumers of the potential hazard. "Warnings are third in the priority sequence because they are generally less reliable than design or guarding solutions."[32] "Warnings are generally most effective when the user is new to the task and especially when the user already believes that risk exists. On the other hand, warnings are least effective when there is no perceived risk. In other words, they are most likely to fail in the very circumstances where they are most needed."[33]

Consumers do not perceive that there is a risk of flame retardant exposure when they are using consumer products. This is the circumstance determined to be the least effective to warn against. Thus, addressing the adverse health impacts from the use of certain flame retardants in children's products, furniture, mattresses and the casings surrounding electronics through the use of warning labels would not adequately serve the public health and safety of consumers.

III. Conclusion

In conclusion, under the Federal Hazardous Substances Act, the Consumer Product Safety Commission has explicit authority to protect consumers from the health hazards caused by the use of non-polymeric, additive form, organohalogen flame retardants in children's products, furniture, mattresses and the casings surrounding electronics.

The FHSA gives the CPSC the authority to require precautionary labeling on hazardous consumer products and to ban products that pose such a significant hazard to consumers that labeling would not adequately protect consumers from the hazard. Warning consumers of hazards would not adequately protect consumers from the adverse health impacts of non-polymeric, additive form, organohalogen flame retardants in children's products, furniture, mattresses and the casings surrounding electronics.

Courts have deferred to the CPSC when the CPSC has acted to ban substances in consumer products under the FHSA and courts have affirmed that the CPSC not only has the authority but

---

[30] Kenneth R. Laughery, Michael S Wogalter, "The Safety Hierarch and Its Role in Safety Decisions," available on the web at http://www.safetyhumanfactors.org/wp-content/uploads/2011/12/3141augheryWogalter2010.pdf

[31] Ibid at 1.

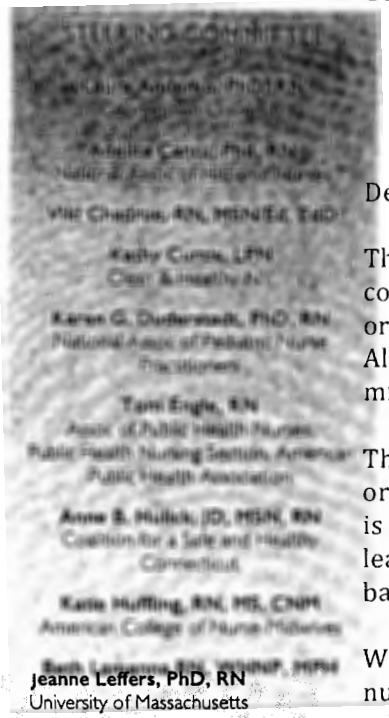
[32] Ibid.

[33] Marc Green, "Safety Hierarchy: Design Vs. Warnings," available on the web at http://www.visualexpert.com/Resources/safetyhierarchy.html

that it is preferential to regulate a class rather than an individual ingredient or product. Further, CPSC has a history of banning hazardous chemicals in consumer products.

We urge the Commission to use this authority to grant the request made in the Petition to protect consumers from the documented hazards posed by the use of non-polymeric, additive form, organohalogen flame retardants in children's products, furniture, mattresses and the casings surrounding electronics.

Katie Huffling, RN, MS, CNM
Director of Programs
Alliance of Nurses for Family Environments



Statement of Katie Huffling, Alliance of Nurses for Healthy Environments
On the Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants
Docket No. CPSC-2015-0022
U.S. Consumer Products Safety Commission Public Hearing

December 9, 2015

Thank you Chairman Kaye and Commissioners for this opportunity to comment on the Petition requesting rulemaking on products containing organohalogen flame retardants. My name is Katie Huffling and I direct the Alliance of Nurses for Healthy Environments. I am also a nurse and nurse-midwife.

The Alliance of Nurses for Healthy Environments is the only national nursing organization that focuses solely on environmental health issues. Our mission is to promote healthy people and healthy environments by educating and leading the nursing profession, advancing research, incorporating evidence-based practice, and influencing policy.

We have over 3000 members throughout the country. Our members include nurses from all walks of our profession – hospital-based, public health, school-based, academics, and advanced practice, to name a few. Nurses are the most trusted profession and we take our duties very seriously when providing education to patients and working to prevent disease.

The main work of our organization occurs through the generous volunteer work of our nurses. Through our policy and advocacy work group these nurses have led engagement of health professionals on the serious issues related to flame retardants and health. Our work has been guided by the American Nurses Association's Resolution Nursing Practice, Chemical Exposure and Right-to-Know which advocates a course of action that reduces the use of toxic chemicals, "demands adequate information on the health effects of chemicals and chemicals in products before they are introduced on the market, and creates more streamlined methods for [toxic] chemicals to be removed from use." Based on this Resolution, nurses need to advocate for consumer products that are free of toxic chemicals as part of their standard of practice.

I am highly concerned that pregnant women, the growing fetus, and our children are being exposed to halogenated flame retardants every day. It's my job to help women have the healthiest pregnancies possible. As such I recognize the importance of having normal levels of thyroid hormones during pregnancy and monitor for symptoms of thyroid dysfunction so that action can be quickly taken if an abnormality is found. That this class of flame retardants are structurally similar to thyroid hormone and have been shown to disrupt thyroid function is highly concerning. Thyroid disruption during pregnancy can have a negative impact on fetal brain development as well as

other poor pregnancy outcomes. With 1 in 6 kids in the US now facing the lifelong challenge of developmental disabilities such as autism and attention deficit hyperactivity disorder we need to seriously address chemicals that could be a component of this alarming trend.

I am also concerned with the effects of halogenated flame retardants on fertility. Elevated PBDE levels in human breast milk has been correlated with cryptorchidism as well as decreased testes size and decreased sperm counts. As infertility is increasing in this country, we need to be addressing these possible chemical origins.

As a nurse midwife I'm frequently asked which products are safe to use with their baby. Which nursing pillow would I recommend? What's the best crib to buy? Due to the limited information we have on many of the flame retardants addressed in the Petition, it can be very challenging as a provider to offer advice on the safest products. This is especially frustrating when it's been shown that these toxic chemicals are not even providing added flame protection.

When speaking with my pediatric nurse colleagues, they have described how they have many ways we can counsel parents to reduce risks of fire such as having working smoke detectors and not smoking in the house but they have no meaningful advice to give to parents on how to reduce the risks of kids' exposures to flame retardants. Manufacturers are able to add halogenated flame retardants to their products without labeling nor testing them for health effects.

I am encouraged to see that electronic cases are included in this proposal. Kids now play with smartphones and other electronics seemingly before they can even walk. Since halogenated flame retardants aren't chemically bound to the cases, they can easily transfer to the children's hands and skin and into their bodies. By banning the use of halogenated flame retardants in the cases we can limit this important exposure source.

This entire class of halogenated flame retardants all have a similar molecular structure and all are likely to react similarly in the human body. Our next generation deserves to be able to grow up healthy and free of these toxic chemicals. Let's not make the mistake of regrettable substitutions and adopt the current proposal to restrict these unnecessary and health harming class of flame retardants.

Thank you,

Katie Huffling, MS, RN, CNM
Director of Programs
Alliance of Nurses for Healthy Environments

Kathleen A. Curtis, LPN
Executive Director
Clean and Healthy New York

Testimony to the Consumer Product Safety Commission in Support of Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants

KATHLEEN A. CURTIS, LPN
EXECUTIVE DIRECTOR, CLEAN AND HEALTHY NEW YORK
PAST COORDINATOR, ALLIANCE FOR TOXIC-FREE FIRE SAFETY
MEMBER, NYS TASKFORCE ON FLAME RETARDANT SAFETY
[redacted]
[redacted] (518) 708-3922

CLEAN & HEALTHY NEW YORK

Flame Retardant Experience/Expertise

CLEAN & HEALTHY NEW YORK

- Led work to pass NY ban of penta- and octaBDE, create Task Force on Flame Retardant Safety to explore availability of safer, cost- and performance-effective alternatives to decaBDE
- Led work to pass first-in-nation ban on TCEP, a carcinogenic chlorinated tris, and subsequent expansion of law to include TDCPP
- Coordinated the Alliance for Toxic Free Fire Safety 2006-2014 (toxicfreefiresafety.org), helped shepherd federal decaBDE phaseout, significant market shifts, and several state-level bans
- One of two advocates (with NYSPFFA) participating in NYS Taskforce on Flame Retardant Safety from 2005-2013

Historic Actions by States (1)

CLEAN & HEALTHY NEW YORK

- Since 2004, 12 states have passed 29 chemical-specific, product-specific flame retardant bills

• Four in California • Two in Hawaii • One in Illinois • Four in Maine • Four in Maryland • Two in Michigan	• Two in Minnesota • Three in New York • Two in Oregon • One in Rhode Island • Two in Vermont • Two in Washington

Historic Actions by States (2)

- 14 bills introduced in ten states in 2015 –
  - Alaska
  - California
  - Connecticut
  - Delaware
  - Massachusetts
  - New York
  - North Carolina
  - Ohio
  - Rhode Island
  - Washington
- More policies addressing specific chemicals in specific products in new locations anticipated in 2016, some will pass and become law

State Actions Only Go So Far

CLEAN & HEALTHY NEW YORK

- Twelve states have phased out specific toxic flame retardants from specific consumer products, including upholstered furniture
- Some of these states have acted several times, addressing replacement chemicals after PBDE phase-out
- Replacement chemicals and combinations are much less tested than banned chemicals, yet have similar structure and hazard profiles
- We're on a toxic treadmill, with no end in sight
- CPSC could fix this inadequate chemical-by-chemical approach by acting on the petition to ban all halogens from upholstered furniture

States Examine Alternatives

CLEAN & HEALTHY NEW YORK

- Illinois Environmental Protection Agency (2006)
  DecaBDE Study: A review of available scientific research
  www.epa.state.il.us/reports/decabde-study/available-research-review.html
- Maine Department of Environmental Protection (2007)
  Brominated flame retardants, Third annual report to the Maine legislature
  www.maine.gov/dep/waste/publications/legislativereports/documents/finalrptjan07.pdf
- Minnesota Department of Health (2006) Decabromodiphenyl ether
  www.health.state.mn.us/divs/eh/hazardous/topics/toxfreekids/pclist/decabde.pdf
- New York State Department of Health (2013)
  Report of the NYS Task Force on Flame Retardant Safety
  www.health.ny.gov/environmental/investigations/flame/docs/report.pdf

State Findings (Examples)

CLEAN & HEALTHY NEW YORK

- NYS Taskforce on Flame Retardant Safety Report concludes:
  - Evidence of liver, thyroid, endocrine and reproductive effects
  - Debromination of decaBDE into more toxic/bioaccumulative congeners, and
  - Magnesium hydroxide, Resorcinol bis(diphenyl Phosphate), boric acid are less toxic
- IL Taskforce Report determined:
  - DecaBDE breaks down in the environment and organisms
  - These breakdown products can be harmful to humans and animals
  - Available, affordable alternatives exist
    - Appear to be safer than decaBDE while still meeting fire safety standards

Continued Use of Flame Retardants

- Safe Sofas and More campaign (30 groups concerned about flame retardants) report *Flame Retardants in Furniture, Foam, Floors -- Leaders, Laggards, and the Drive for Change*, showed flame retardant chemical use by upholstered furniture, mattress, and carpet padding makers
- Survey conducted April – November 2015
- Report released December 1, 2015, found at http://media.wix.com/ugd/a2c2a6_d711fbd12db640c1bbc4b5471c4b2d98.pdf

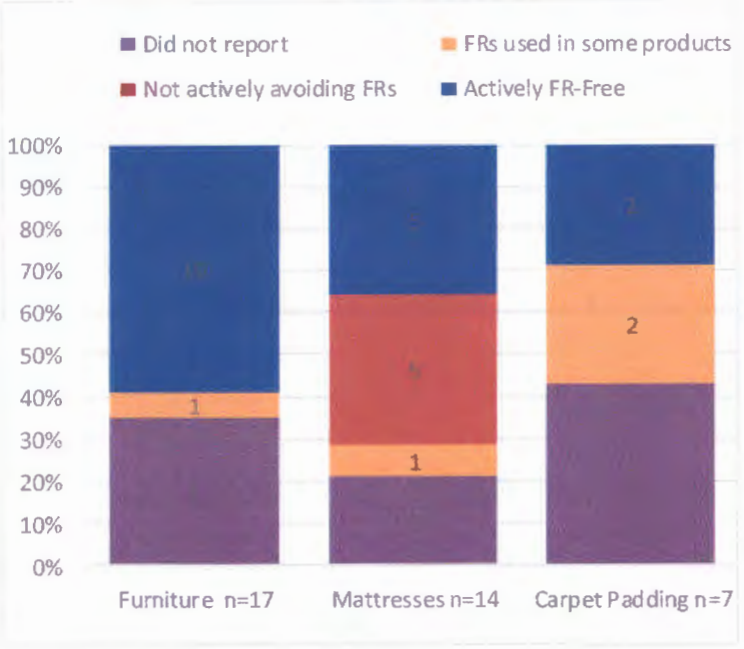
Safe Sofas and More Findings

CLEAN & HEALTHY NEW YORK

- Furniture – 17 companies surveyed, 11 disclosed
  - 10 reported sourcing FR chemical-free materials in all products
  - 1 reported sourcing FR chemical-free materials domestically, not imports
  - 6 did not disclose via website, customer service, response to letter
- Mattresses – 14 companies surveyed, 11 disclosed
  - 5 reported being FR-chemical free
  - 4 reported FRs in foam
  - 1 disclosed specific FRs avoided, wouldn't assert FR-free
  - 1 had 2 brands FR-free, 2 brands not

Carpet padding consequences

- 7 companies surveyed, 4 disclosed
  - 2 FR-free because of rubber instead of foam
  - 2 offer FR-free lines (gormet)
- 85-90% from post-consumer or post-industrial waste
- Carpet Cushion Council documented ongoing presence of PBDEs for a decade after 2004 phase-out
- Legacy of toxic chemicals stays in homes



Washington State Reporting

CLEAN & HEALTHY NEW YORK

- The Washington State Children's Safe Products Act requires reporting of a list of 67 toxic chemicals in children's products, several of which are flame retardants
- Reported chemicals include decaBDE, TBBPA, TCEP and TDCPP
- Between 6/1/2012 and 12/2/2015, flame retardant chemical use in children's products was reported 217 times
- baby car/booster seats, soft toys, baby swings, baby play pens, electronic toys and baby carriers

Conclusions

CLEAN & HEALTHY NEW YORK

- State actions to ban certain flame retardants, while important, are not enough to avoid exposure and protect public health
- State taskforce reports clearly show there are alternatives to halogens that are affordable, available and effective
- Additive flame retardants are still being reported in upholstered furniture, mattresses, infant and toddler products, and electronics, the four categories covered under the petition request
- ***For these reasons and those stated by other supporters today, Clean and Healthy New York strongly supports prohibiting the sale of products that contain halogenated flame retardant chemicals***

Jeff Gearhart, Research Director
Ecology Center, Ann Arbor, Michigan

From:	Jeff Gearhart
To:	Stevenson, Todd; CPSC-OS
Cc:	Eve C. Gartner
Subject:	Public hearing on the Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants
Date:	Friday, December 04, 2015 11:56:03 AM

VIA EMAIL

Todd A. Stevenson, Secretary
Consumer Products Safety Commission
Washington, DC

RE: Public hearing on the Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants

Dear Mr. Stevenson:

This letter is to request the opportunity to make an oral presentation at the Commission's public hearing on the Petition Requesting Rulemaking on Products Containing
Organohalogen Flame Retardants, December 9, 2015 on behalf of the American Sustainable Business Council.

The Ecology Center is a Michigan-based environmental organization that works to create safe and healthy communities by overcoming the environmental sources of poor health. Our environmental health work focuses on market transformation of the materials economy for a healthier, more livable planet. HealthyStuff.org is a research lab and database of hazardous chemicals in consumer products and the environment.

As Research Director of HealthyStuff.org I have conducted sampling of 1,000's of consumer products for chemical hazards include flame retardants. I would like to present testimony on the need to eliminate the use of halogenated flame retardants.

My testimony will include:

- Overview of use and presence of halogenated (HFR's) and non-halogenated flame retardant us in both furniture and a wide range of consumer products;

- Review status and viability of manufacturers to eliminate HFRs;

- Review of approaches being used by companies to achieve compliance with FR standards with reduced or no use of halogenated FR's;

- Present data on implications of the historical and continued use of HFR's on recycled polymer feedstock which is being used in new consumer products.

I look forward to the opportunity to present testimony n these issues. Please let me know if you any questions.

Sincerely,

Jeff Gearhart

Research Director
Ecology Center
Ann Arbor, Michigan

--

Jeff Gearhart | HealthyStuff.org Research Director
Ecology Center
339 E. Liberty St., Suite 300 | Ann Arbor, MI 48104
jeffg@ecocenter.org | www.ecocenter.org
Office 734-369-9276

Bryan McGannon
Policy Director
American Sustainable Business Council

AMERICAN
SUSTAINABLE
BUSINESS
COUNCIL

December 4, 2015

VIA EMAIL

Todd A. Stevenson
Secretary
Consumer Products Safety Commission
Washington, DC

RE: Public hearing on the Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants

Dear Mr. Stevenson:

This letter is to request the opportunity to make an oral presentation at the Commission's public hearing on the Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants, December 9, 2015 on behalf of the American Sustainable Business Council.

Following is a summary of the brief comments I intend to make:

The American Sustainable Business Council advocates for policy change at the federal and state level that supports a more sustainable economy. The Council spans a growing network of business associations across the United States, which in turn represents over 200,000 businesses and 325,000 business executives, owners, investors, and others. Additional members include individual businesses committed to advocating for a sustainable economy.

ASBC communicates to businesses, policy makers, and the media how a sustainable economy based on triple bottom line principles (people, planet, and profit) is good for business and good for America in the public debate.

Of the many issues that create a sustainable economy, toxic chemical reform is and has been a top priority for our organization. We have been active in federal and state advocacy in this space and have mobilized businesses through our Companies for Safer Chemicals project.

The focus of my comments will be that business community supports the restriction of halogenated flame retardants (HFRs) and are demonstrating that business can succeed, if not thrive, without using these toxic chemicals.

I will briefly discuss the findings in ASBC's scientific polling about small business owners' attitudes towards cleaner and safer products and attitudes towards regulation. These findings can be found here: http://asbcouncil.org/toxic-chemicals-poll.

TEL 202.595.9303
1401 NEW YORK AVE, NW
SUITE 1225
WASHINGTON DC 20005

ASBCOUNCIL.ORG

From there I will discuss how businesses in our network are demonstrating leadership by not using or moving away from products that include HFRs, and the challenges businesses face with the issue of regrettable substitution. These examples will include Naturepedic, Hackensack University Medical Center and the Sustainable Furnishings Council.

Thank you for the opportunity. Please feel free to contact me with any questions.
Sincerely,

Bryan McGannon
Policy Director
202-650-7678
bmcgannon@asbcouncil.org

Panel 6

Vytenis (Vyto) Babrauskas, Ph.D.
Fire Science and Technology, Inc.

Comments in support of Petition to ban four product categories containing halogenated flame retardants

Dr. Vytenis (Vyto) Babrauskas

Fire Science and Technology, Inc.

Preliminary engineering note: Flame retardant effectiveness

- Qualitatively, whether FRs are, or are not effective, depends on the ratio: $\frac{\text{amount of FR chemical}}{\text{volume of flames present}}$
- This explains why FR chemicals are often highly effective in the case of small-scale fire tests (Bunsen burner type tests) yet are ineffectual for a real-scale fire.
- A special concern for the case of upholstered furniture:
  - The original ignition may be a small flame, but this ignites the fabric, not the foam. Flames from the burning fabric get large, and by that point a large flame, not a small flame, is presented to the foam underneath.

FSTI

Is there a benefit from flame retardants (FRs) in these product categories?

Fires are started by two main sources

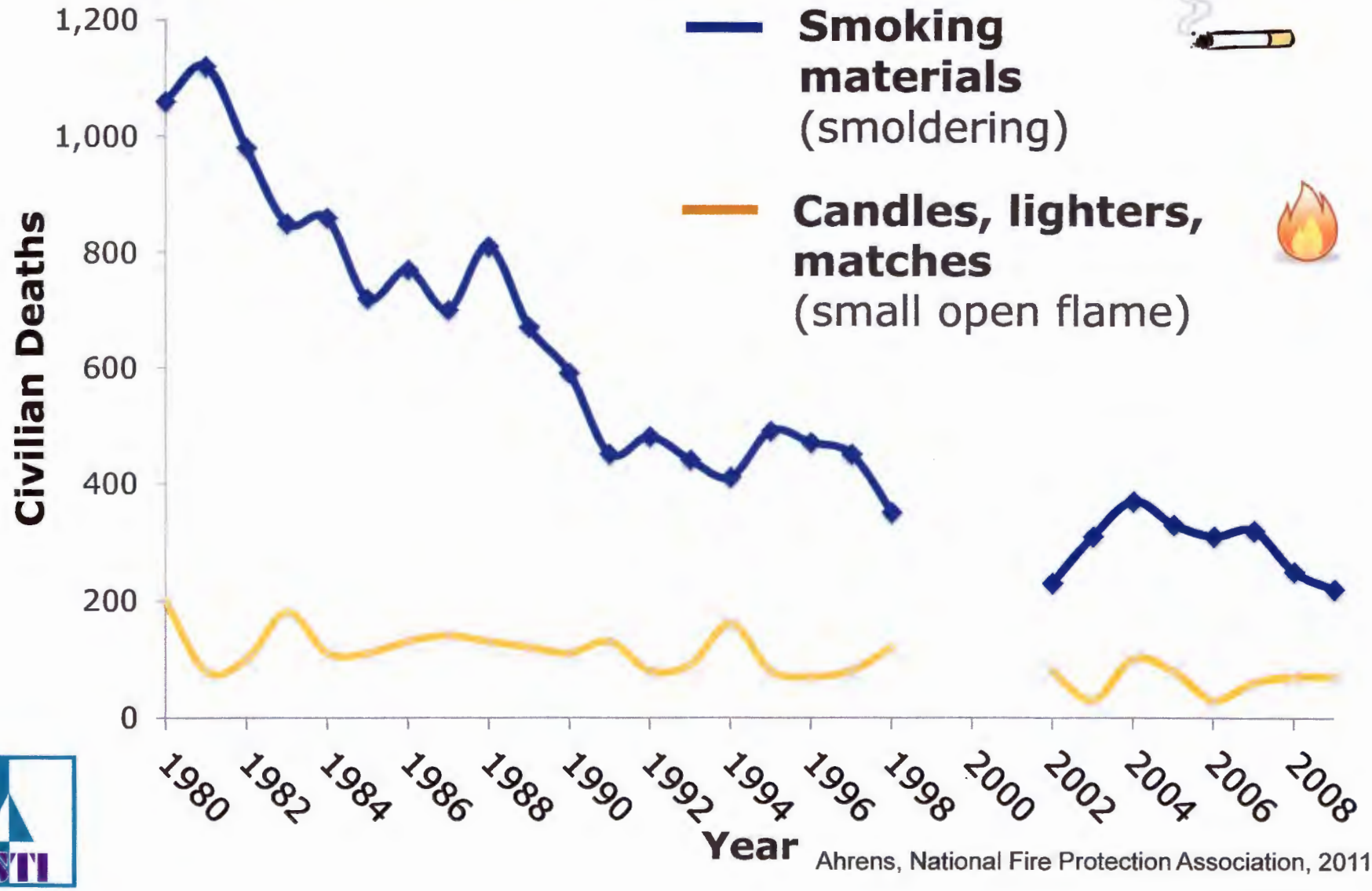
Smoldering

Cigarettes

Other smoking materials

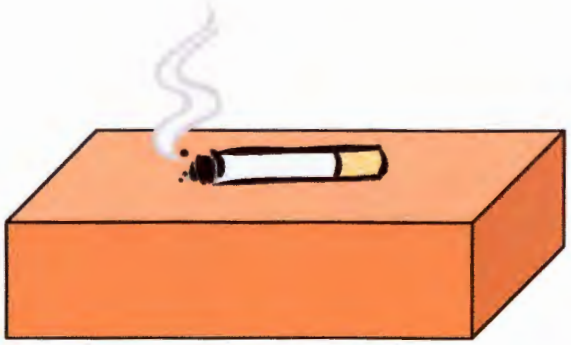
Small open flame

Open flames, small problem for furniture



No meaningful fire safety benefit from FRs in residential upholstered furniture

- Adding viable amounts of FRs to foam does not reduce the severity of fires
- TB117-2013 addresses smoldering ignition, which is the leading cause of furniture fire deaths
- CPSC study found FRs can reduce resistance to smoldering ignition for fabrics, interliners, and foam



15 times longer escape time?

Industry claims of former CA flammability standard for upholstered furniture, TB117-1975, giving "15 times more escape time" are made based on a study (Babrauskas et al. 1988) where:

- The room consisted 100% of FR products—possible for NASA, not viable for consumers (an FR *New York Times*??)
- The density of the foam was 3 or more times greater than the density of typical residential furniture foam
- The FR content in the foam was 10 times higher

(Babrauskas, V. et al. 1988. Fire Hazard Comparison of Fire-Retarded and Non-Fire-Retarded Products (Spec. Publ. SP 749), [U. S.] Natl. Bur. Stand., Gaithersburg MD)

FRs do *not* reduce the severity of fires

...when used in loadings normal for consumer goods

Table 5

Effect of Padding Type for Specimens With Similar Fabrics

Specimen	Peak $\dot{Q}$ (kW)	Time to Peak (s)	Padding	Fabric
F21	1970	280	California Foam	Polyolefin
F25	1990	260	Non-California Foam	Polyolefin

- No change in heat release rate with TB117 foam.

Babrauskas, V., et al., 1982, Upholstered Furniture Heat Release Rates Measured with a Furniture Calorimeter (NBSIR 82-2604), [U. S.] Natl. Bur. Stand., Gaithersburg MD

No meaningful fire safety benefit from FRs in mattresses and mattress pads

16 CFR 1633

Goal: minimize or delay flashover

met by using fire barrier technologies

16 CFR 1632

Goal: prevent smoldering ignition

met by selecting smolder-resistant fabrics

FSTI

No meaningful fire safety benefit from additive FRs in electronics enclosures

- Impractical and expensive to use additive FRs in electronics enclosures at high enough loads to be effective.
- Risk of external ignition of electronics is insignificant.
- Fire statistics show no significant difference in fire incidence in countries where FRs are used in TV enclosures, versus those where they are not.

FSTI

Additive FRs in electronics enclosures do not save lives…

- 10 TV fires per million TVs in the US, where FRs are used (NFPA, 1997)

versus

- 6 TV fires per million TVs in Europe, where FRs are not used (UK DTI, 1996)

FSTI

...Additive FRs in electronics enclosures do not save lives

- 0.13 fire deaths per million TVs in the US (where FRs are used) (Hall, 2002)

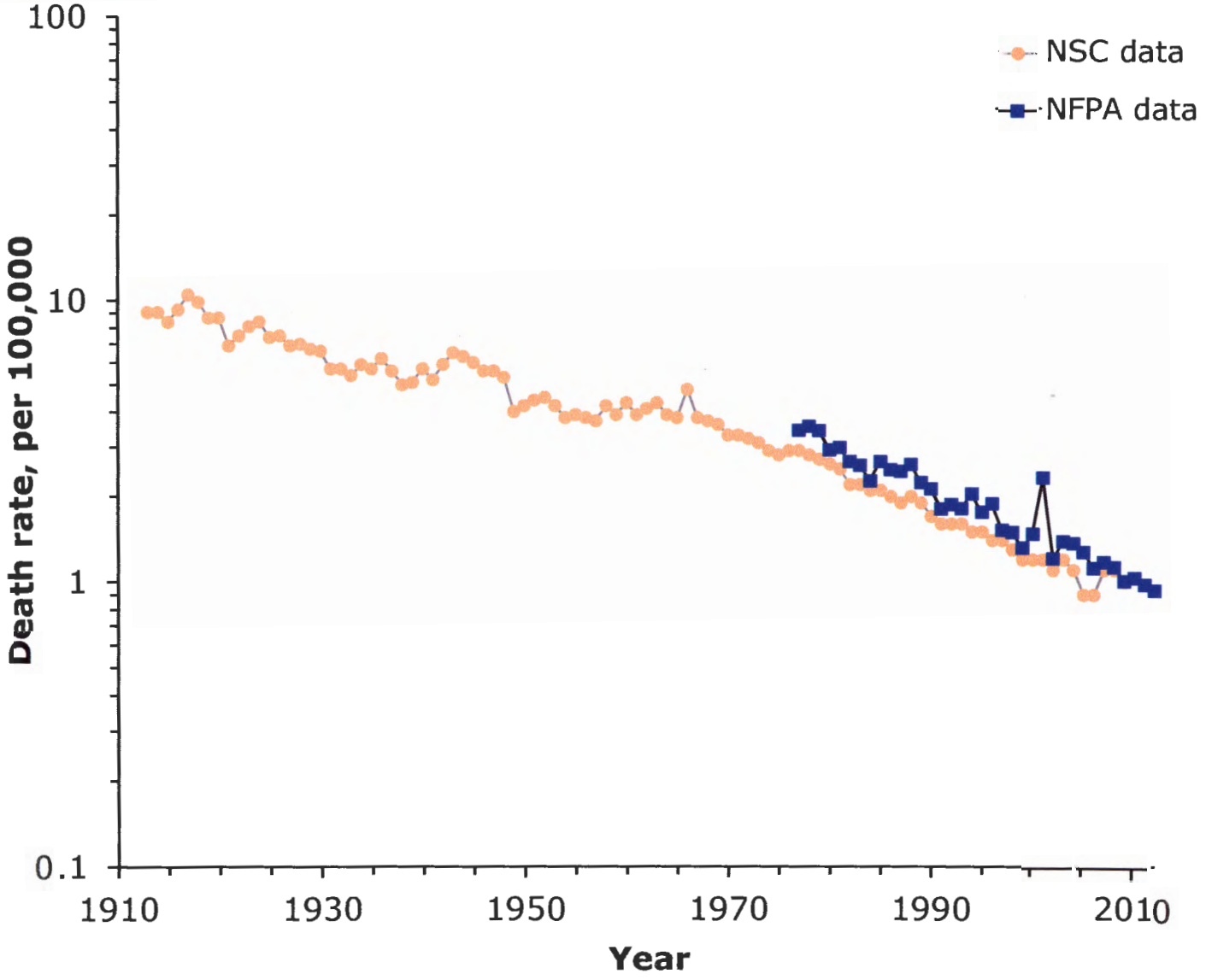
versus

- 0.007 fire deaths per million TVs in Europe (where FRs are not used) (Grand & Wilkie, 2000)

No meaningful fire safety benefit from FRs in children's products

- No significant fire risk (e.g. 2010 BEARHFTI exemption)
- No significant fire safety benefit from added FRs
- Significant health risk to children from exposure to halogenated FRs

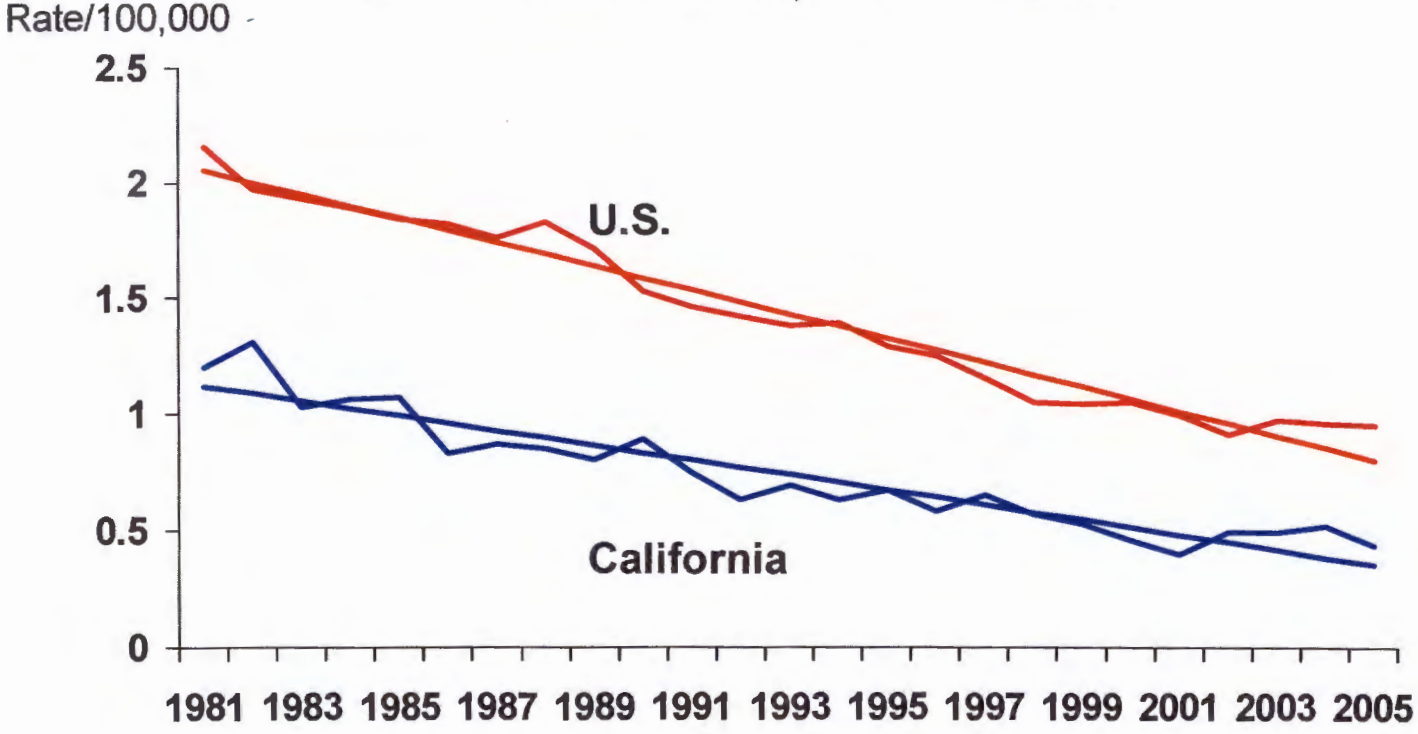
Total civilian fire deaths are steadily decreasing



Decrease in fire deaths not related to FRs:

Adoption of TB117-1975 did not cause a downward shift

Residential Fire and Flame Death Rates in U.S. and California, trend data with linear estimation line,1981-2005



Source: WISQARS, Centers for Disease Control and Prevention

Prepared by: California Department of Public Health, EPIC Branch

The factually-supported conclusions:

- FRs can significantly improve the fire behavior of materials only at very high loadings, as used in certain military, government, or industrial applications, but **not at the loadings used in consumer goods**.
- Modest FR loadings can help pass some small-flame tests, but are **ineffective when larger flames are involved**, as in most realistic scenarios.
- The use of additive FRs in these product categories provides **no meaningful fire safety benefit.**

Thus, the potential health risk to consumers from use of these chemicals is not warranted.

Recommendation

CPSC should grant the Petition to ban four product categories containing halogenated FRs

Questions?

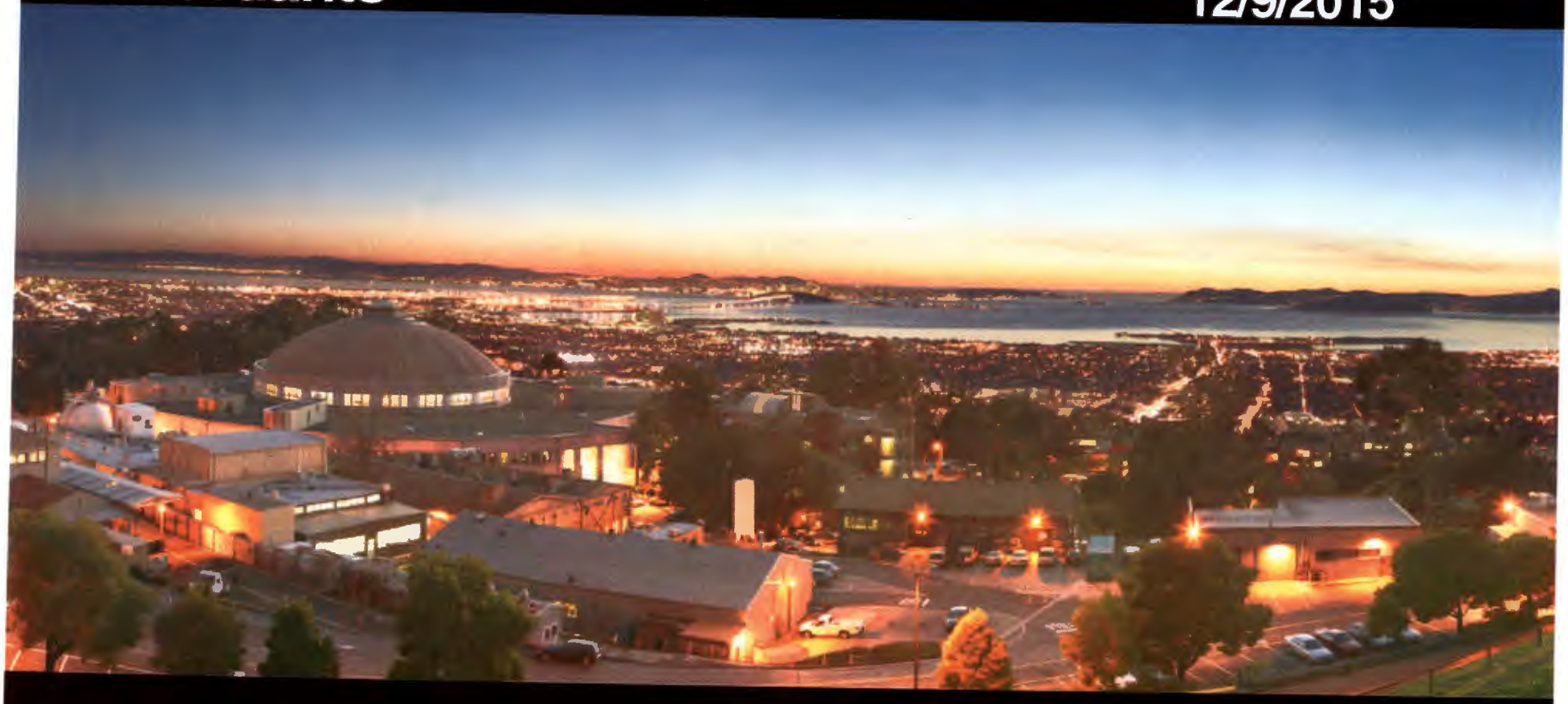
vytob@doctorfire.com

www.doctorfire.com

Donald Lucas, Ph.D.
Lawrence Berkeley National Laboratory

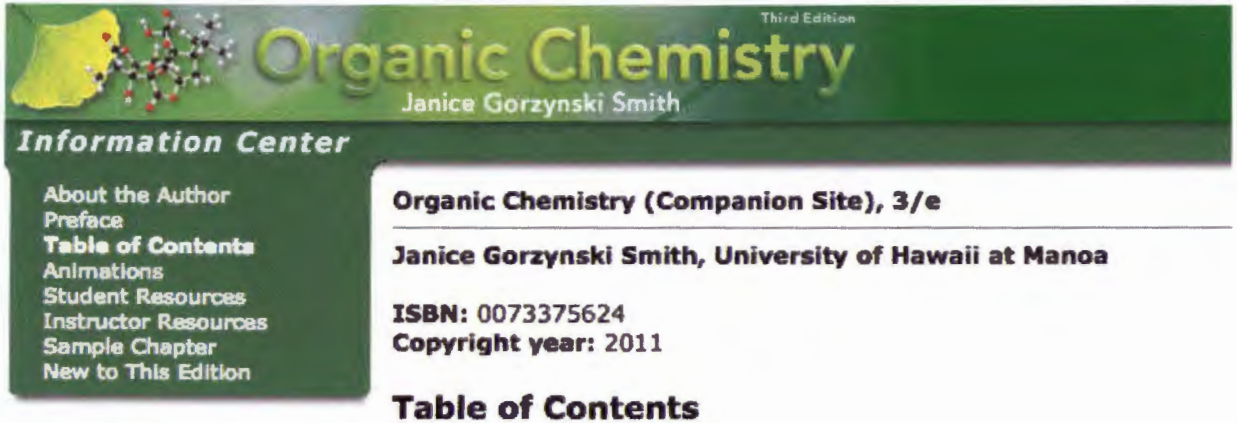
Comments regarding Petition to ban four product categories containing organohalogen flame retardants

12/9/2015



Donald Lucas, Ph.D.
Lawrence Berkeley National Laboratory

The science of chemistry tells us that structurally similar chemicals tend to have similar properties



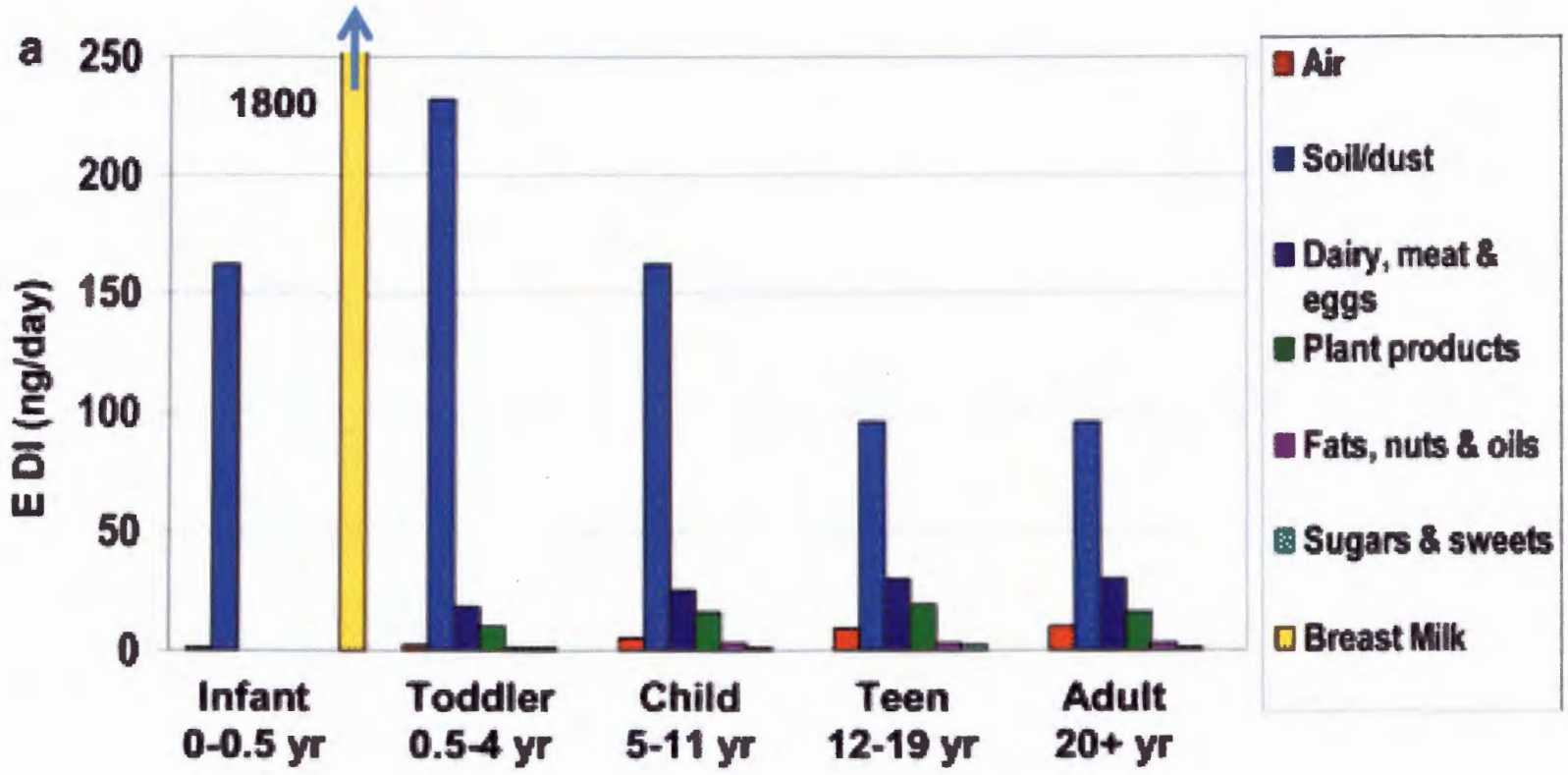
Non-polymeric organohalogen flame retardants have similar physicochemical properties

- Semi-volatility (SVOCs)
- Environmental persistence
- Preferred partitioning in fat (lipophilic)
- Potentially increased chemical reactivity leading to toxicity
- Halogen atom production at high temperatures
- Toxic impurities and combustion byproducts (e.g. dioxins and furans)

Organohalogen flame retardants become a problem when used in products in additive form

- They migrate out of products into indoor air and dust
- Consumers are exposed mostly by:
  - ingesting the contaminated dust
  - touching products and dust, followed by hand-to-mouth transfer

Dust and soil are the major exposure pathway for organohalogen flame retardants



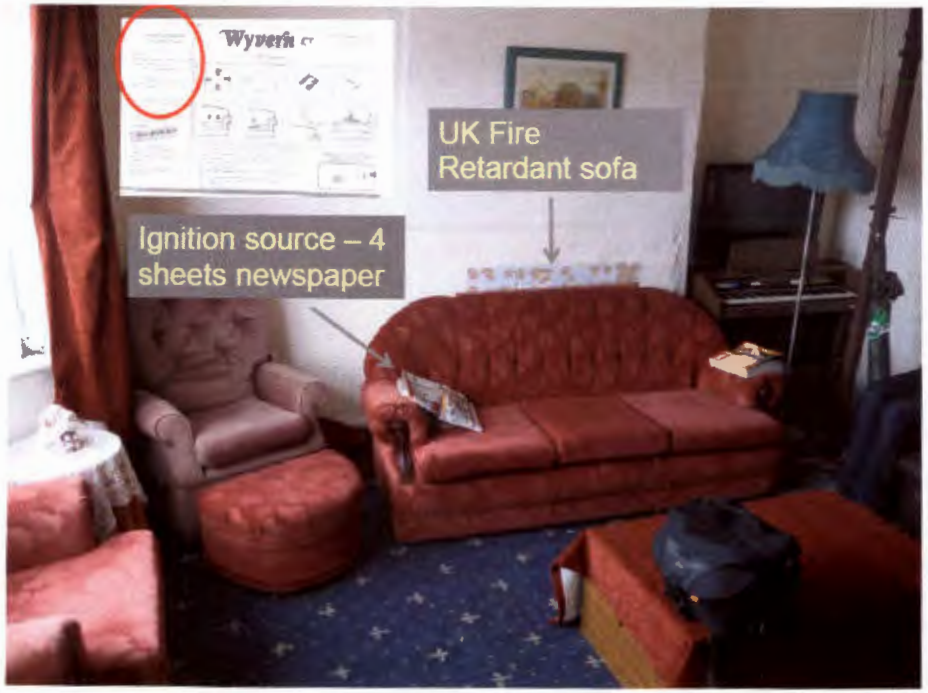
Jones-Otazo et al. (2005) *Environ Sci Technol*

Organohalogen flame retardants pose hazards when they burn in a fire

- Firefighters, first responders, and fire victims can be exposed to more irritant gases, soot, smoke, and carcinogens

Organohalogen flame retardants fail to work in many realistic fire scenarios

- They may prevent ignition by small flames, but not toxic smoke-producing smoldering combustion
- They cannot prevent ignition by larger flames



Courtesy of Prof. Richard Hull, UCLAN

Conclusions

- Inherent properties of organohalogen flame retardants pose human health hazards
- Organohalogen flame retardants fail to offer meaningful fire protection but can increase fire toxicity
- Regulating non-polymeric additive organohalogen flame retardants together makes scientific sense
- Recommend the CPSC grant the Petition

Jennifer Sass, Ph.D.
Senior Scientist
Natural Resources Defense Council

NRDC

NATURAL RESOURCES DEFENSE COUNCIL

December 3rd, 2015

Comments from Jennifer Sass, PhD

Senior Scientist, Natural Resources Defense Council

Professorial Lecturer, George Washington University

On the Petition Requesting Rulemaking on

Products Containing Non-polymeric Additive Organohalogen Flame Retardants,

Docket No. CPSC-2015-0022

Thank you for the opportunity to present my comments to the CPSC in support of the petition by Earthjustice asking the CPSC to declare that certain products are banned hazardous substances if they contain any non-polymeric, additive organohalogen flame retardant.

I am a senior scientist in the health program at the Natural Resources Defense Council (NRDC). I have been with NRDC for fifteen years, since 2001, and have worked on the federal review and regulation of hazardous chemicals for that whole time. I am also a Professorial Lecturer at George Washington University Milken Institute School of Public Health Department of Environmental and Occupational Health, a position I have held since 2008. In my professional work I publish in scientific journals, testify in Congress, serve on federal advisory committees, provide public statements in response to media queries, and collaborate with scientific and non-scientist experts to strengthen the regulation of toxic chemicals so as to prevent or reduce harm to people and the environment.

In addition to being a scientist and policy expert, like most of you, I am also a parent and a consumer. Today, I come before you in all of these roles. I have carefully reviewed the excellent scientific statements by the petitioners and supporters, and the policy implications of the petition. And, I have a dusty house, despite my best efforts, that is doubtless contaminated with toxic organohalogen flame retardants coming from the way-too-many consumer products that fill each room.

I am very alarmed by the overwhelming evidence for some members of the organohalogen class of chemicals to have adverse effects on systems that are critical to normal human development and function. For example, pentabromodiphenyl ether (pentaBDE) has been shown to be toxic to thyroid, endocrine, and neurological systems. PentaBDE is now banned in many states, and since 2006 was supposed to have been phased out of use in residential seating furniture and baby products. Since the supposed phase out we have learned even more about how terribly toxic pentaBDE is (Petition page 11, 12; Costa and Giordano, 2007; Chevrier et al, 2010; Betts 2010; Herbstman et al 2010; Gascon et al 2011; Stapleton et al, 2011; Eskenazi et al 2013). A similar situation is true for octaBDE (used in plastics for personal computers and small appliances) and decaBDE (used in plastic electronic enclosures and furniture fabrics), both of which are now banned in many states, and supposed to be phased out for many uses. Unfortunately, there is no federal rule that prohibits the use of any PBDE or import of any products containing PBDEs, emphasizing how important it is for CPSC to act on recommendations of this petition.

Rather than wait for an over-abundance of proof of harm before taking action for all the other non-polymeric additive organohalogen flame retardants, CPSC should act on the petition to address all the chemicals in this class. What level of proof should be required to address the chemicals for which little or no hazard information is available? It should be the level that supports regulatory decisions that prevent harm.

For the class of organohalogen flame retardants, the work of Dr. Eastmond and colleagues demonstrates that there are sufficient data – either by individual chemical testing, or by applying standard read-across techniques – to show that the whole class is hazardous and may cause substantial personal injury or illness. His laboratory screened approximately 90 organohalogen flame retardants, about 85 of which were non-polymeric (see statement by Dr. Eastmond in petition). The team used standard search strategies to identify any publicly available toxicity date on all the chemicals, including published studies, government databases, and industry data submissions under the European chemical assessment regulations. US EPA, Health Canada, and European regulatory agencies use these same data based and the information is generally considered reliable.

For cases where information was lacking, Dr. Eastmond's team used standard (Quantitative) Structure-Activity Relationship [(Q)SAR] models that are publicly available in The Organization for Economic Co-

operation and Development (OECD) QSAR Toolbox.[1] The Toolbox is specifically designed to serve this gap-filling function, and is used by state and federal regulatory agencies, industry, academic researchers, and others that must conduct chemical hazard assessments of new and existing chemicals with incomplete data sets. When using these tools, it is standard practice to group chemicals according to their structure. Substances with little or no data are grouped with those substances that share the same or similar structural composition but have more robust data sets (OECD 2007, p. 30). Grouping of all the organohalogen flame retardants together, as Dr. Eastmond's team has done, is an appropriate application of this approach.

It is very concerning to me that Dr. Eastmond's team found that most of the organohalogen flame retardants still lacked enough basic hazard information to run them through the GreenScreen hazard assessment screen or use the EPA Design for the Environment (DfE) screening tools! These are screening level tools – designed to use minimum data sets and accommodate some amount of data gaps.

With little data to go on, Dr. Eastmond's team applied a standard screening tool developed by the Washington State Department of Ecology called Quick Chemical Assessment Tool (QCAT), which requires less data than GreenScreen to screen a chemical. The way the two methods are integrated, if a chemical fails the QCAT (too toxic) it will also fail the GreenScreen.

Dr. Eastmond's research concluded that, "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 based on the criteria described above. The results of our screening show that critical toxicological data are lacking for many OFRs, and that <u>those for which data are available have the potential to pose significant hazards for human or environmental health</u>." (see Eastmond declaration in petition) (underline added for emphasis).

Given how little anyone – even EPA – knows about the hazards of most of the organohalogen flame retardants, and that what we can discern using standard methods appropriately applied indicates that they pose significant hazards to people, what should CPSC do?

[1] The OECD QSAR Toolbox. http://www.oecd.org/env/ehs/risk-assessment/theoecdqsartoolbox.htm

To protect the public from injury or illness, CPSC should make decisions that are health-protective, avoiding false negatives (type I errors) and errors that lead to the underestimation of risk. For that reason, data demonstrating an adverse effect – even a single study in a single test species if the study is well-designed and well-conducted, or reliable read-across information – should be sufficient to take action to protect human health. For example, EPA's minimum criteria for animal data for a reproductive or developmental hazard are data demonstrating an adverse reproductive effect in a single appropriate, well-executed study in a single test species (U.S. EPA, 1996; U.S. EPA, 1991).

If CPSC fails to include all the halogenated organophosphate flame retardants in a ban, then it will be as if those chemicals that have not been tested are presumed to be non-toxic, and this is clearly wrong. The NRC (2009) identified this problem in its Science and Decisions report, "Agents that have not been examined sufficiently in epidemiologic or toxicologic studies are insufficiently included in or even excluded from risk assessments. Typically, there is no description of the risks potentially posed by these agents in the risk characterization, so their presence often carries no weight in the decision-making." (NRC 2009, p. 193) This is a problem that is addressed by this petition.

Importantly, addressing the whole class of chemicals together will avoid regrettable substitutions, such as substituting one toxic organohalogen flame retardant for another. For example, chlorinated Tris (TDCPP) replaced pentaBDE in polyurethane foam in furniture and kids products, even though it is an endocrine disrupting chemical and is associated with lower semen quality in exposed men. For this reason, TDCPP is now banned in children's products and furniture in Maryland, New York State, and Vermont. Likewise, Firemaster 550 replaced pentaBDE, and is now a common contaminant in house dust and is highly toxic, associated in animal studies with weight gain, early onset puberty, cardiovascular disease, and thyroid toxicity, and in men with infertility (Petition, p. 35, 44, 45). One of the components of Firemaster 550, bis(2-ethylhexyl)3,4,5,6-tetrabromophthalate (TBPH) is a structural analog of DEHP, which is listed on California's proposition 65 list as a carcinogen, developmental, and reproductive toxicant; it should never have been approved.

CPSC must also consider its obligation to protect vulnerable and susceptible populations. In a population, there are important differences and variations among individuals that affect their likelihood of developing a disease or other health problem after a chemical exposure. First, there are variations in exposure so some people are exposed to higher levels of a chemical than others, depending on where

they work or live, or what they eat. Second, there is variability due to differences in the population due to factors such as age and genetic makeup, diet, socioeconomic status, or pre-existing disease. This variability results in some individuals being more susceptible to developing a health problem. According to the NRC, "small chemical exposures in the presence of existing disease processes and other endogenous and exogenous exposures can have linear dose response relationships at low doses" (NRC 2009, p. 158), suggesting that there may be no 'safe' exposure level below which negligible or no health effects will occur (a "threshold" of response).

Some individuals have multiple exposure and susceptibility factors which interact to increase their risk from a particular chemical. For example, combinations of exposure during a critical age or stage of development, underlying health conditions, nutritional status, and/or genetic make-up that make it difficult to metabolize the substance, could interact to increase susceptibility.

For the organohalogen flame retardants, all of these conditions converge to create a terrible injustice for communities of low socio-economic status, communities of color, and particularly children from these communities. The highest human levels of harmful flame retardants in the general population have been found in young children from communities of low socio-economic status and communities of color (Quirós-Alcala et al, 2011; Petition p. 24). This is believed to be primarily from exposures to dust that has been contaminated from household products containing organohalogen flame retardants.

Even if a health-protective exposure limit were to be established in an individual, when risk is assessed across a diverse population, there is a diminishing likelihood that a protective threshold limit exists at the population level because some people are more vulnerable than others. This means that there may be no "safe" exposure across a diverse human population for many chemicals. Newer science is finding many examples of chemicals that increase the risk of various non-cancer health effects - such as reproductive harm and neurological effects - at low doses, without any scientifically-identifiable threshold (Grandjean et al, 2008; Grandjean and Landrigan 2006, 2014). The organohalogen flame retardants certainly fall into this category, based on the existing evidence, presented in the Petition and the statements attached to the petition from medical and health experts.

In conclusion, there is more than enough scientific evidence of hazard and exposure to convince consumers and some state regulators that pentaBDE, octaBDE, and decaBDE, "may cause substantial personal injury or substantial illness during or as a proximate result of any customary or reasonably foreseeable handling or use" – the standard of evidence that is required by CPSC to declare a substance or a mixture of substances to be hazardous. CPSC should act on this petition to ban products containing any member of the class of non-polymeric, additive organohalogen flame retardants because of their structural similarity, because they fail standard hazard assessment screens, and because otherwise they will continue to be used in the U.S. and abroad.

Selected References not included in Petition:

Petition (2015). CPSC Petition HP 15-1 Requesting Rulemaking on Products Containing Organohalogen Flame Retardants. Earthjustice. July 1, 2015. https://www.cpsc.gov/Global/Regulations-Laws-and-Standards/Petitions/PetitionHP151RequestingRulemakingProductsContainingOrganohalogenFlameRetardentsJuly12015.pdf

Grandjean P, Bellinger D, Bergman A, et al. (2008). The Faroes Statement: Human Health Effects Of Developmental Exposure To Chemicals In Our Environment. Basic Clin Pharmacol Toxicol. 102(2):73-5.

Grandjean P, Landrigan PJ. (2006). Developmental neurotoxicity of industrial chemicals. Lancet. 16;368(9553):2167-78.

Grandjean P and Landrigan PJ. (2014). Neurobehavioural eff ects of developmental toxicity. Lancet Neurol 2014; 13: 330–38

U.S. EPA. (1996). Guidelines for Reproductive Toxicity Risk Assessment. U.S. Environmental Protection Agency, Risk Assessment Forum, Washington, DC, 630/R-96/009.

U.S. EPA. (1991). Risk Assessment Forum. Guidelines for Developmental Toxicity Risk Assessment. Washington, DC, EPA/600/FR-91/001.

NRC (2008). Phthalates and Cumulative Risk Assessment: The Tasks Ahead. Committee on the Health Risks of Phthalates, National Research Council. National Academies Press, Washington D.C.

NRC (2009). Science and Decisions: Advancing Risk Assessment. National Academies Press, Washington D.C. (The Silver Book)

OECD 2007. Report on the regulatory uses and applications in OECD member countries of (quantitative) structure-activity relationship [(Q)SAR] models in the assessment of new and existing chemicals. http://www.oecd.org/env/ehs/risk-assessment/38131728.pdf

Daniel Rosenberg
Senior Attorney
Natural Resources Defense Council

NRDC

NATURAL RESOURCES DEFENSE COUNCIL

December 3, 2015

SHORT VERSION

Testimony from Daniel Rosenberg
Senior Attorney, Natural Resources Defense Council

On the Petition Requesting Rulemaking on
Products Containing Non-polymeric Additive Organohalogen Flame Retardants,
Docket No. CPSC-2015-0022

Thank you for this opportunity to present my testimony in support of the petition by EarthJustice asking the CPSC to ban specific uses of Non-polymeric Additive Organohalogen Flame Retardants in four types of consumer products.

- My name is Daniel Rosenberg and I am a Senior Attorney in NRDC's Health and Environment Program and the Director of NRDC's Chemical Reform Project.

- The Commission should not defer action to protect the public from organohalogen flame retardants in consumer products on the grounds that other agencies, such as EPA, have authority to regulate these chemicals.

- Granting the petition to ban the sale of consumer products containing organohalogen flame retardants in additive form would not be "redundant" with past, present, or future actions taken by EPA under TSCA.

- Most substances used in commerce were classified as "existing" chemicals when TSCA was enacted, meaning that they were "grandfathered" and have never been required to meet a safety standard under TSCA.

- To date, EPA has taken no regulatory action under Section 6 of TSCA to address a flame retardant (and in fact has only taken such action on a small number of substances – roughly a half dozen out of the 62,000 chemicals originally grandfathered).

- Although EPA has recently embarked on an effort to conduct risk assessments of several "clusters" of flame retardant ingredients – the agency's initiative could take years. Its preliminary steps are significantly flawed and may never be finalized.

- EPA's new chemicals program should not be assumed to have effectively prevented unsafe chemicals – including flame retardant ingredients – from reaching the market.

- A potentially revised TSCA, based upon pending legislation in Congress, will not ensure that EPA will effectively regulate articles or products containing "existing" flame retardant chemicals, or the chemicals themselves.

- Nor will a potentially revised TSCA, based upon pending legislation in Congress ensure that EPA will effectively regulate articles or products containing "new" flame retardant chemicals, or the chemicals themselves.

- The Commission has jurisdiction, authority, and a mission independent of, and not subsidiary to, those of EPA under TSCA.

- CPSC should proceed with granting the petitioners' request and implementing the asked for ban to protect the public.

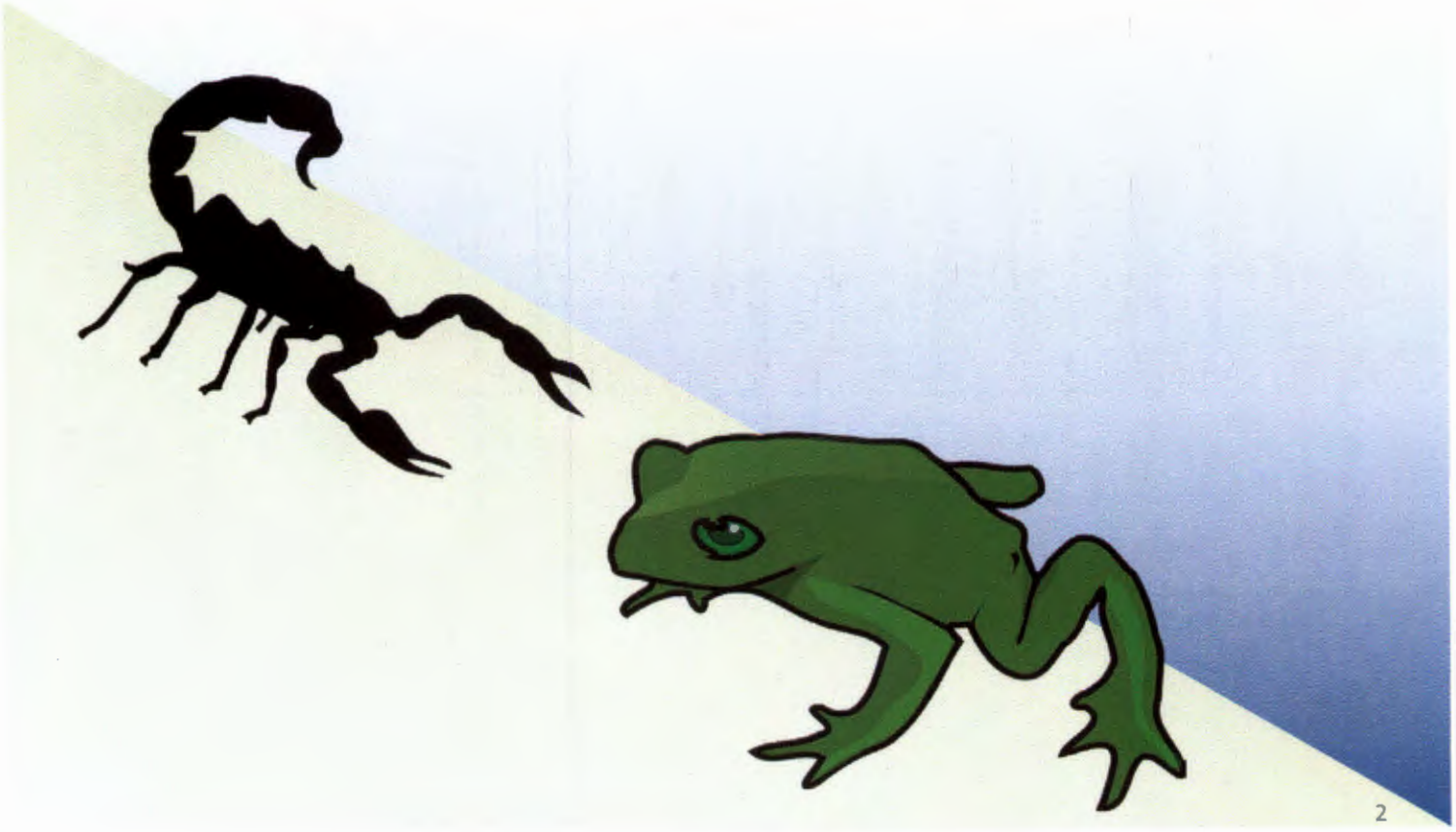
By Phone

Veena Singla, Ph.D.
Natural Resources Defense Council

The class of additive, non-polymeric, organohalogen flame retardant chemicals

Veena Singla, PhD
Staff Scientist, Natural Resources Defense Council
December 9, 2015

"It's in my nature"



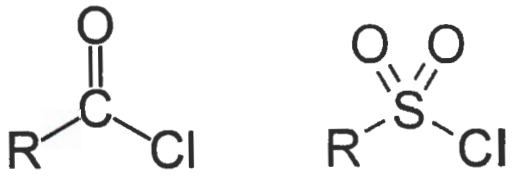
Four key criteria for grouping chemicals together as a class

- ❑ Structural similarity
- ❑ Physical and chemical properties
- ❑ Environmental fate characteristics
- ❑ Toxicity

OECD, *Guidance on Grouping of Chemicals*, 2014

Structural similarity: organohalogen flame retardants share a common functional group

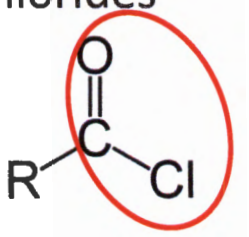
Existing regulatory class based on functional group: the acid chlorides

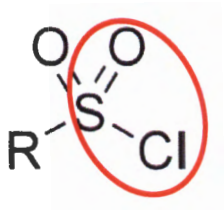


US EPA, *TSCA New Chemicals Program Chemical Categories*, 2010

Structural similarity: organohalogen flame retardants share a common functional group

Existing regulatory class based on functional group: the acid chlorides

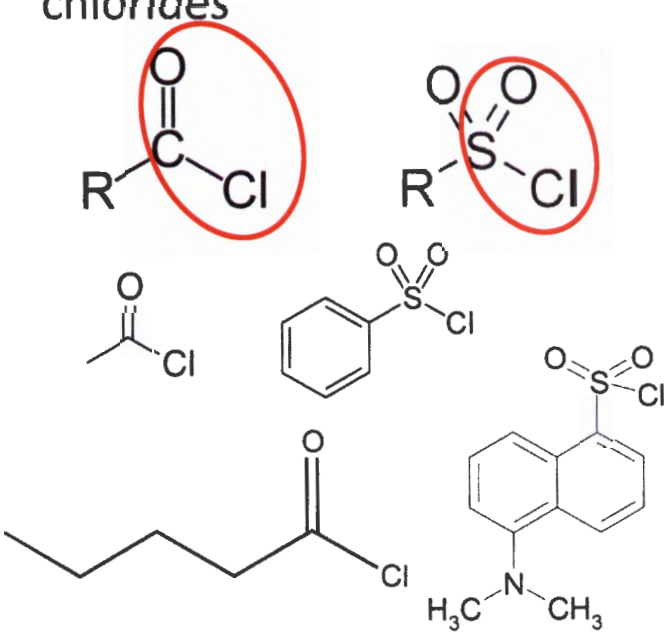




US EPA, *TSCA New Chemicals Program Chemical Categories*, 2010

Structural similarity: organohalogen flame retardants share a common functional group

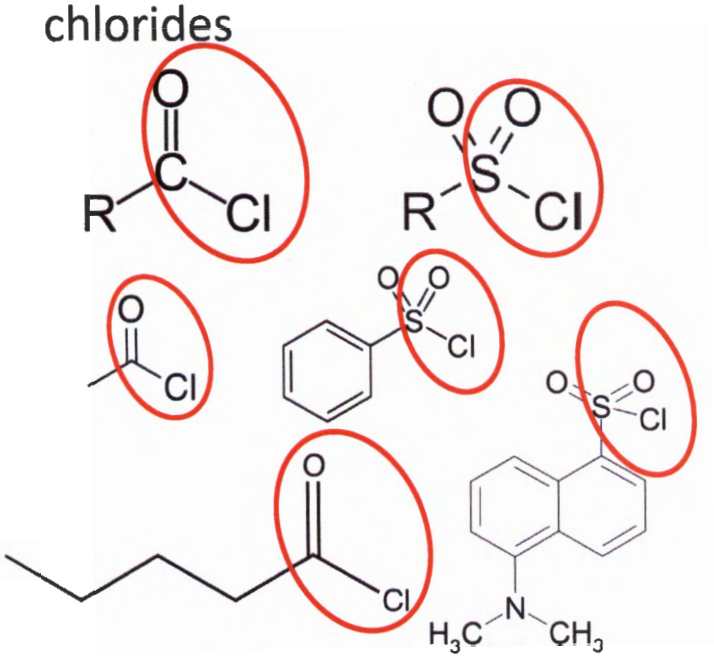
Existing regulatory class based on functional group: the acid chlorides



US EPA, *TSCA New Chemicals Program Chemical Categories*, 2010

Structural similarity: organohalogen flame retardants share a common functional group

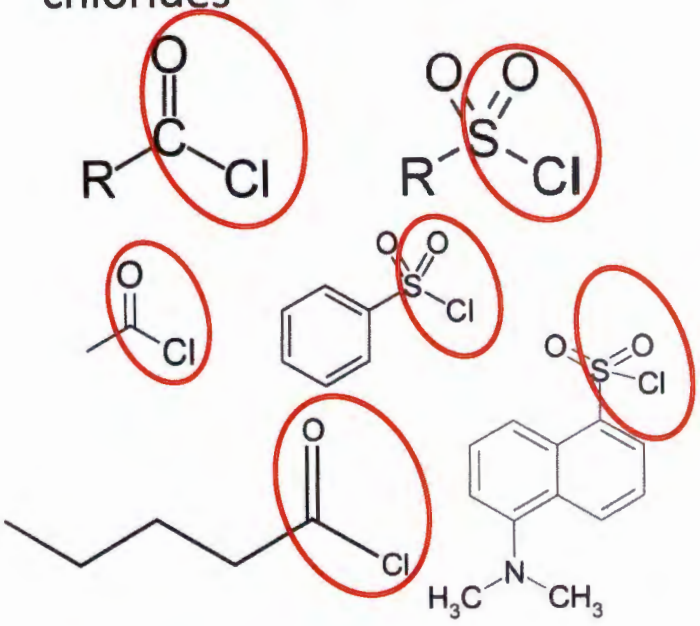
Existing regulatory class based on functional group: the acid chlorides



US EPA, *TSCA New Chemicals Program Chemical Categories*, 2010

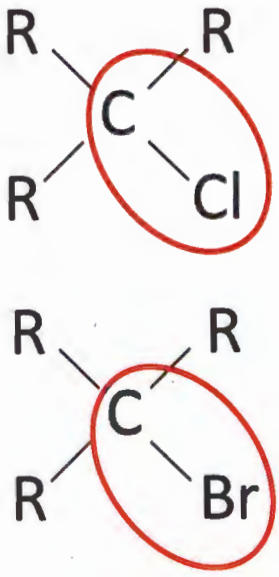
Structural similarity: organohalogen flame retardants share a common functional group

Existing regulatory class based on functional group: the acid chlorides

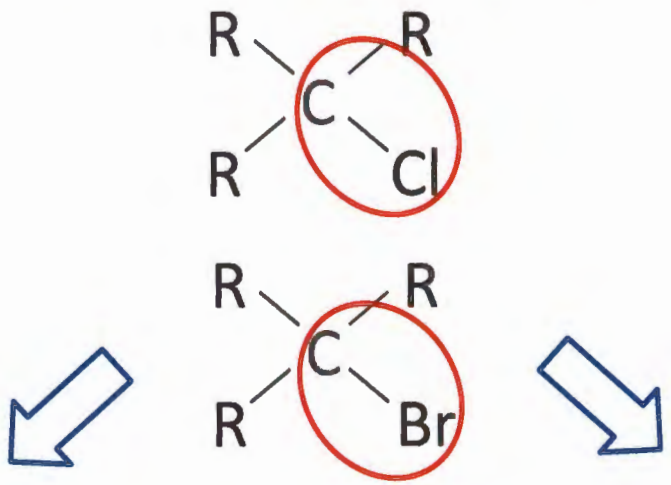


US EPA, *TSCA New Chemicals Program Chemical Categories*, 2010

Proposed class: the organohalogen flame retardants



Physical and chemical properties: organohalogen flame retardants are SVOCs



Boiling point

Semi-Volatile Organic Compounds
SVOC

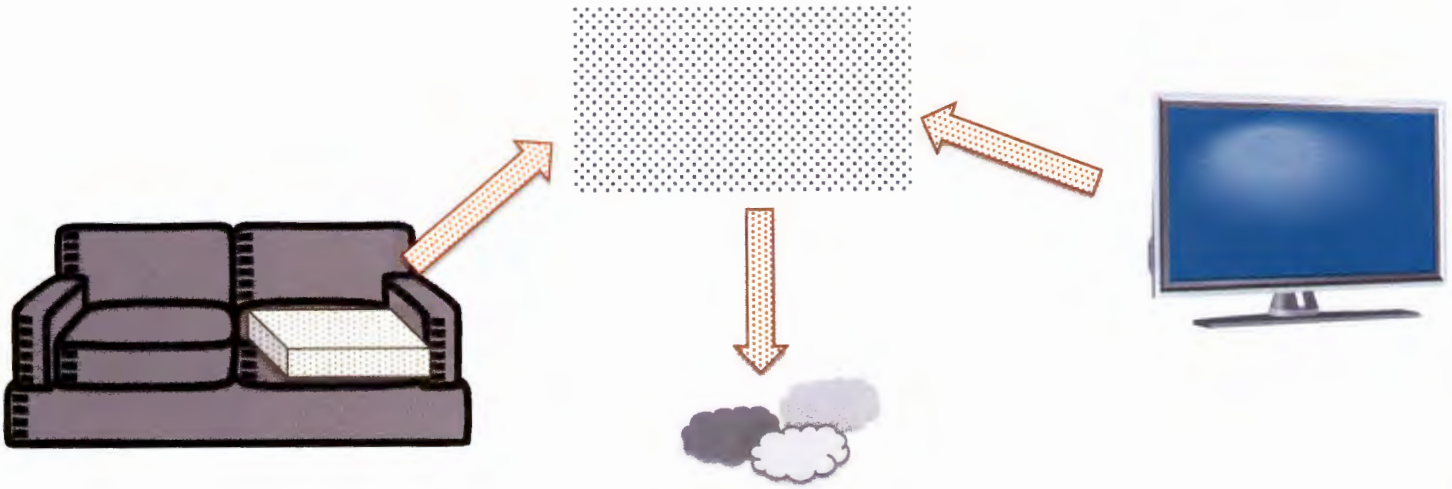
Hydrophobic
Lipophilic

Physical and chemical properties: organohalogen flame retardants are SVOCs

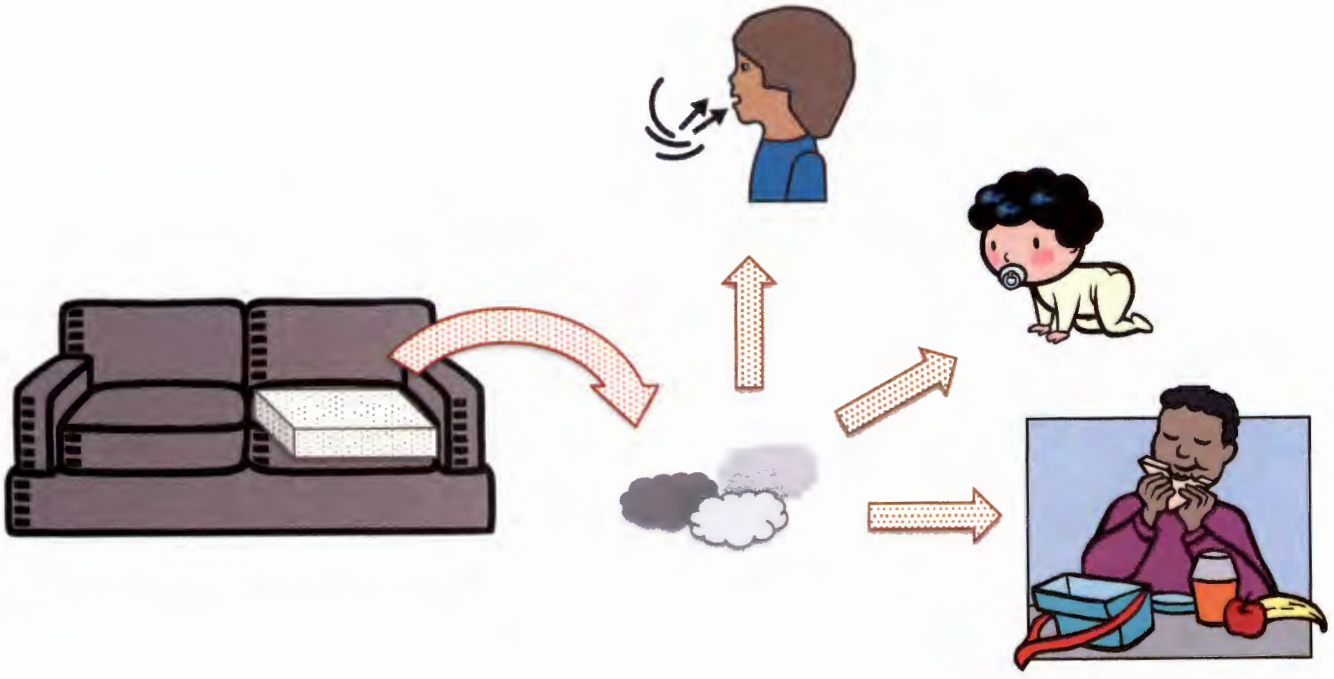
① Not chemically bonded to plastic materials

② Chemicals off-gas Attach to particles in air

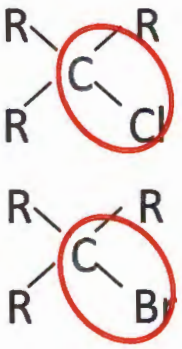
③ Contaminated particles settle in house dust



Physical and chemical properties result in human exposures from air and dust



Environmental fate: organohalogen flame retardants are persistent and bioaccumulative



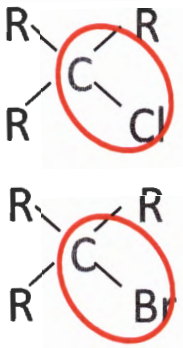
Few natural processes break carbon-halogen bond

Persistent
Indoors and Outdoors

Hydrophobic
Lipophilic

Bioaccumulative

Toxicity: organohalogen flame retardants enter cells, stay there and cause toxicity



Few natural processes break carbon-halogen bond

Do not break down inside cells

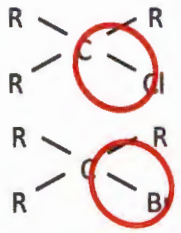
Hydrophobic
Lipophilic

Cross cell membranes

Toxicity Report Card

F

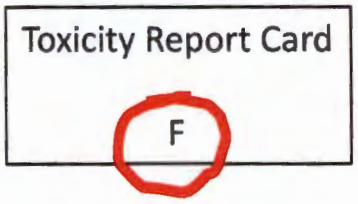
Conclusion: class of organohalogen flame retardants presents risks



✓ Structural similarity

✓ Physical and chemical properties

✓ Environmental fate characteristics



✓ Toxicity

THANK YOU

By Phone

Holly Davies, Ph.D.
Toxics Reduction
Washington State Department of Ecology

Holly Davies, PhD
Washington State Department of Ecology
9 am Dec. 9, 2015

Public Hearing on Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants

I am Dr. Holly Davies from the Washington State Department of Ecology, here today in support of rulemaking under the Federal Hazardous Substances Act to declare the four categories mentioned in the petition that contain additive organohalogen flame retardants be "banned hazardous substances."

Organohalogen flame retardants are a class of chemicals that are toxic to humans and the environment and are found in indoor and outdoor environments as well as in people and wildlife. Additive organohalogen flame retardants are not needed in any of the uses mentioned in the petition because safer chemical and non-chemical alternative exist for all the applications.

Other people will testify in more detail on the toxicity, exposure, and other topics. My testimony will focus on information from Washington State on flame retardants in consumer products, especially children's products, and the availability of safer alternatives. We have completed many studies on flame retardants, including a Chemical Action Plan, environmental monitoring, product testing, and a report to our state legislature.

Our environmental monitoring has shown oragnohalogen flame retardants are widespread in Washington's environment and there is one fish consumption advisory for PBDEs in Washington. The Washington State Departments of Ecology (Ecology) and Health investigated flame retardants in our 2006 Chemical Action Plan (CAP) on Polybrominated Diphenyl Ethers (PBDEs), which is part of our initiative to phase out the use of persistent, bioaccumulative, and toxic chemicals (PBTs).

In 2007, following the recommendation in the PBDE CAP, Washington passed a law (RCW 70.76) restricting the use of PBDEs in certain products sold in Washington state. This was the first ban on Deca-BDE and helped to inform a national agreement in 2009 between manufacturers and the U.S. Environmental Protection Agency (EPA) to stop producing Deca-BDE by the end of 2012. The state ban included other forms of PBDEs, even though manufacturers of Penta-BDE and Octa-BDE had already agreed to voluntarily stop producing these two forms of PBDEs by the end of 2004.

Children's Safe Products Act Reports

In 2008, Washington passed the Children's Safe Products Act (RCW 70.240). This requires manufacturers of children's products sold in Washington to report if their product contains a Chemical of High Concern to Children. This reporting list contains five organohalogen flame retardants (Deca-BDE, TBBPA, TCEP, TDCPP, and HBCD). As of August 2015, manufacturers filed over 33,000 reports of a chemical in a product component and category. These manufacturer reports are publically available in a database.

Only 33 reports were for halogenated flame retardants with the function of "flame retardant." Most were at low levels (under 500 ppm), indicating they are likely present as contaminants. Of these 33 reports, only eleven indicated the chemical was used in the percent level. Ten of these eleven reports were for TBBPA (six as synthetic polymers used in powered non-ride toy vehicles, four as synthetic textiles used in: a baby carrier, a baby play pen, a baby car/booster seat, and a baby swing.) One of these reports was for Deca-BDE in outdoor play structures at the percent level.

Some reports (118) noted that these five chemicals (TBBPA, HBCD, Deca-BDE, TCEP, and TDCPP) were present for functions other than "flame retardant," including contaminants, colorants, or plasticizers. Only a small number were in the percent levels. There were thirteen reports of TBBPA in the percent levels as a colorant in powered non-ride toy vehicles.

I would like to note that we have not confirmed the presence of these organohalogen flame retardants in these product and manufacturers may report different functions or higher levels without penalty.

Product Testing in Washington

Ecology has tested some consumer products for the presence of flame retardants to ensure compliance with our state laws. The test results are publically available in our product testing database and reports.

Ecology tested for flame retardants in general consumer and children's products including seat cushions, mattresses, upholstered furniture, electronics, clothing, and baby carriers. Our product testing results indicate that manufacturers have moved away from PBDEs and are using other organohalogen flame retardants. This supports treating organohalogen flame retardants as a group, as manufacturers are substituting other organohalogen flame retardants.

The majority of samples that contained high levels of bromine did not contain PBDEs (-47, 99, 100, 153, 154, and 209) above detection limits. The presence of high bromine levels and low PBDE concentrations suggested alternative brominated flame retardants were likely used in the products. For example, some foam samples from children's furniture contained concentrations of bromine around 2%, (20,000 ppm). However, total PBDEs were not quantified above 1 ppm in any of the foam samples. Further testing identified Firemaster® 550 and 600, which are commercial mixtures containing organohalogen flame retardants.

TDCPP was the most commonly identified chlorinated phosphate detected in foam, again indicating that alternative organohalogen flame retardants are being used. TCEP, TCPP, and V6 were also detected. The majority of these samples were foam and many were children's products. A few of the components were plastic or fabric. TBBPA and HBCD were also detected in some samples at percent levels, indicating their use as flame retardants. TBBPA was detected in four plastic electrical enclosure components in the percent levels indicating that it was used as an additive flame retardant.

Safer Alternatives

Alternatives assessments have identified safer alternatives to organohalogen flame retardants in the uses described in the petition. An alternatives assessment identifies and compares potential chemical and non-chemical alternatives currently in existence. It is specific to a particular use of a chemical. These assessments ensure that safer alternatives are identified, which prevents regrettable substitutions, when a toxic chemical is replaced with another chemical of equal or greater toxicity concern.

The 2007 Washington State ban on Deca-BDE in residential upholstered furniture and electronic enclosures went into effect after the Departments of Ecology and Health determined there are safer alternatives for those uses. There are also several alternatives assessments by the U.S. Environmental Protection Agency's (EPA's) Design for the Environment (DfE) program.

Ecology and Health determined that chemical flame retardants are not necessary in upholstered furniture. There are barrier fabrics or inherently flame-resistant materials that meet fire safety standards for furniture. EPA's DfE identified safer chemical alternatives for flame retardants used in flexible polyurethane foam in furniture.

Ecology and Health identified a safer alternative to Deca-BDE in electronic enclosures, as did EPA's DfE. EPA has also found safer alternatives for the use of the reactive form of TBBPA in circuit boards and for HBCD used in expandable polystyrene foam for insulation.

Conclusion

In conclusion, organohalogen flame retardants are a class of chemicals that are toxic to humans and the environment and are found in indoor and outdoor environments as well as in people and wildlife. Additive organohalogen flame retardants are not needed in any of the uses mentioned in the petition because safer chemical and non-chemical alternatives exist for all the applications listed. The Washington State Department of Ecology recommends that the CSPC initiate rulemaking under the Federal Hazardous Substances Act to declare certain products with additive organohalogen flame retardants be "banned hazardous substances."

References

U.S. Environmental Protection Agency (EPA), 2014. *An Alternatives Assessment for the flame retardant decabromodiphenyl ether (DecaBDE)*, Final Report 2014, 901 pages.

U.S. Environmental Protection Agency (EPA), 2014. *Flame Retardant Alternatives for Hexabromocyclododecane (HBCD), used in expandable polystyrene foam for insulation*, Final Repor 2014, 230 pages.

U.S. Environmental Protection Agency (EPA), 2014. *Flame Retardants Used in Flexible Polyurethane Foam: An Alternatives Assessment Update,* draft release June 2014, 840 pages.

U.S. Environmental Protection Agency (EPA), 2014. *Flame Retardants in Printed Circuit Boards,* revised 2014, 726 pages.

Washington Department of Ecology, 2006. *PBDEs Flame Retardants in Washington Rivers and Lake Concentrations in Fish and Water*. Publication No. 06-03-027.

Washington Department of Ecology, 2006. *Washington State Polybrominated Diphenyl Ether (PBDE) Chemical Action Plan, Final Plan*. Publication No. 05-07-048.

Washington Department of Ecology, 2009. *PBDE and Dioxin/Furans in Spokane Stormwater* Publication No. 09-03-010

Washington Department of Ecology, 2009. *Alternatives to Deca-BDE in Televisions and Computers and Residential Upholstered Furniture*. Publication No. 09-07-041.

Washington Department of Ecology, 2012. *Evaluation of XRF as a Screening Tool for Metals and PBDEs in Children's Products and Consumer Goods.* Publication No. 12-03-009.

Washington Department of Ecology, 2012. *PBTs Analyzed in Bottom Fish from Four Washington Rivers and Lakes: Hexabromocyclododecane, Tetrabromobisphenol A, Chlorinated Paraffins, Polybrominated Diphenylethers, Polychlorinated Naphthalenes, Perfluorinated Organic Compounds, Lead, and Cadmium.* Publication No. 12-03-042.

Washington Department of Ecology, 2014. *Flame Retardants in General Consumer and Children's Products*. Publication No. 14-04-021.

Washington Department of Ecology, 2015. *Flame Retardants A Report to the Legislature*. Publication No. 14-04-047

Written Comment

Chris Hudgins, Vice President
Government Relations & Policy
International Sleep Products Association

International Sleep Products Association
501 Wythe Street
Alexandria, VA 22314
Main: 703.683.8371
Fax: 703.683.4503
www.sleepproducts.org

Statement of the International Sleep Products Association on Petition Requesting Rulemaking on Products Containing Organohalogen Flame Retardants

The International Sleep Products Association (ISPA) provides the comments below regarding the December 9, 2015 public meeting on the petition requesting rulemaking on products containing organohalogen flame retardants.

ISPA is unaware of any U.S. mattress manufacturers that use organohalogen flame retardants to meet the requirements of 16 C.F.R. Parts 1632 or 1633 (mattress flammability standards that address smoldering cigarette and open-flame ignition risks, respectively), which the Commission has promulgated under the Flammable Fabrics Act.

Nevertheless, ISPA opposes efforts that in effect prohibit the use of entire families of chemicals in consumer products, as Petitioners request. In general, the Commission's regulatory mission is best served through safety standards that contain performance-based safety criteria, as opposed to proscriptive component-based standards that require the use of specific components or ingredients, or that conversely prohibit the use of specific components or ingredients, as Petitioners request.

The Commission's Part 1633 open-flame mattress flammability standard illustrates this point. As it considered its regulatory options, the CPSC could have taken either of two approaches in setting a new mattress flammability standard. It could have taken a proscriptive, or component-based approach that required all new mattresses to contain specific components that were then known to improve the resistance of mattresses to open-flame ignitions (such as the use of filling materials that contain specified fire-retardant chemicals), or prohibited the use in future mattresses of materials that were known at that time to be particularly flammable. Petitioners urge the CPSC to take this type of approach.

Alternatively, the Commission could have (and did) take a performance-based approach that set fire performance criteria that a manufacturer's products must meet, without specifying the exact materials or other means the manufacturer must (or must not) use to meet those performance criteria.[1]

From a policy perspective, the proscriptive approach has the short-term advantage of simplicity: A product that follows the requirements of the regulatory recipe (that is, it contains or excludes the specified component or material) complies with the standard, while one that does not follow the recipe violates the standard.

[1] In both scenarios, products made to comply with either a proscriptive or performance-based standard of course could not violate other relevant safety laws administered by the Commission, including the Federal Hazardous Substances Act, which requires precautionary labeling on the immediate container of hazardous household products to help consumers safely store and use those products, and allows the Commission to ban certain products that are so dangerous or the nature of the hazard is such that the labeling the act requires is not adequate to protect consumers.

But in the pursuit of simplicity, the proscriptive approach has a number of serious drawbacks. First, it stifles innovation. By specifying the use (or prohibition) of certain components or materials, it codifies into the standard a technology that existed at some point prior to the establishment of the standard. It therefore can have the effect of precluding the use of more advanced materials or methods developed at a later point that may be safe and more effective in achieving the safety goal.

Second, it constrains competition. By setting a safety standard that requires one or more product materials or attributes, the proscriptive approach limits creativity and competition to those aspects of a finished product that are not proscribed. In so doing, this approach may constrain the manufacturer in a way that allows it to offer the consumer only a suboptimal product.

By contrast, a performance-based standard encourages both innovation and competition without sacrificing product safety. It incentivizes both a manufacturer and its competitors to develop better and better materials and methods to meet the stated performance criteria. The resulting advancements may allow the manufacturer to meet the performance criteria using less of a given material, to substitute the use of renewable materials in place of other materials, to meet the performance criteria in a way that provides added comfort or other product benefits, to save money, etc. In doing so, the consumer continues to benefit from a defined level of product safety while at the same time enjoying a product that provides added benefits, more comfort, a lower price, etc.

In the case of mattresses and Part 1633, some parties urged the Commission to mandate the use of specific materials or chemicals then in existence in the new mattress flammability standard. Instead, the CPSC chose to set a performance-based standard. As a result, since the final Part 1633 standard was promulgated in 2005 (and went into effect in 2007), the industry has become substantially better at meeting the relevant pass-fail criteria set in the standard. The materials used today to meet the standard are in many cases lighter, more comfortable and less expensive than they were when Part 1633 first went into effect.

Likewise, when deciding whether to ban the use of products containing organohalogen flame retardants as Petitioners request, ISPA urges the Commission to act in a manner that does not stifle innovation or competition. Whether a given chemical is harmful depends on the chemical used and the degree to which the consumer is exposed to that chemical. Therefore, CPSC must first consider whether there is sufficient scientific basis for regulating organohalogen flame retardants. In regulating any chemical, we also urge the CPSC to consider each compound individually.

If the Commission decides that further regulatory action is warranted with regard to individual flame retardants, we urge the agency not to take the proscriptive approach requested by Petitioners by establishing outright bans of products that contain those chemicals. Instead, we urge the CPSC to take a performance-based approach by regulating in a manner that provides sufficient flexibility to allow for the use of restricted chemicals in new ways, consistent with the requirements of the Federal Hazardous Substances Act, that either reduce the amount of the material used or eliminate or limit the risk of human exposure to it. By doing that, the Commission can improve consumer safety in the short term by limiting the current specific uses of given chemicals, while allowing future innovation and competition to develop other alternatives that can benefit consumers.