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Ms. Cheryl Niemi
Department of Ecology, P.O. Box 47600,
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ICL-IP America Inc. and related affiliates, (ICL) is a leading manufacturer of flame-retardant chemicals, which play a critical role in reducing the impact of fires on people, property and the environment. The company produces a wide variety of organo-halogenated, phosphorus, and inorganic compounds used in all major market sectors.

As a Responsible Care® company, ICL takes great pride in the products we supply for public safety and the key role in meeting fire safety requirements protecting consumers. We would like to share our insights regarding the Department of Ecology's (DoE) proposed restrictions of organo-halogenated flame retardants (OFRs) in electronic casings as part of the S*afer Products for Washington* directive in the attached comments. We specifically request that regulations, in their current state, should not be promulgated, and strongly recommend further review.

Sincerely,

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OFRs

OFRs are an especially important type of flame-retardant system, representing over 1/3 of the total global flame-retardant market. These chemicals uniquely work in the gas phase stopping combustion process above the fuel source. Bromine is the best halogen for flame retardant purposes and has a rich history of use. **Fire scientists have long considered OFRs to be the most efficient and robust approach for increasing ignition resistance and decreasing heat release for the widest variety of plastics, e.g. ABS, HIPS, polyolefins, polyesters, PMMA. In some plastics brominated flame retardants (BFRs) may be the only flame-retardant system that can help manufacturers meet fire safety standards**. The market importance of these chemistries should not easily be dismissed.

Regulation of OFRs as a Class

We have deep concerns about DoE's underlying conclusions that OFRs can be grouped as a single class for regulatory purposes. The chemical structure for OFRs varies widely and halogen type/content can be vastly different between OFRs. Chemical and toxicological properties are demonstrably different even between chemicals with the same family structure. It is a well-known scientific fact that even a small change in a molecule such as the position of one atom or an optical isomer, can result in very different toxicological properties.

Washington DoE is not the first regulatory body to consider this challenge. On January 29, 2014, through its Design for the Environment (DfE) program, EPA released a final alternatives assessment for one OFR, decabromodiphenyl ether (decaBDE). EPA considered 29 alternative flame-retardant solutions, both OFRs and non OFRs. It is readily seen that there are alternatives to decaBDE without issue. In 2015, some of this same effort was picked up by the U.S. Consumer Product Safety Commission (CPSC) in response to a public petition to regulate additive, non-polymeric OFRs in specific consumer product applications. **The petition notably did not include polymeric or reactive OFR solutions.** Subsequently CPSC asked the National Academy of Sciences (NAS) to recommend a regulatory approach for OFRs. In developing the approach for organo-halogen flame retardants, the Committee created an inventory of 161 OFRs, and identified more than 1,000 analogue chemicals (i.e., chemicals with similar functional, structural, and predicted biological activity). **A key conclusion of the Committee is that OFRs cannot be treated as a single class**. Rather, the Committee identified 14 subclasses of OFRs, based on chemical structure, physicochemical properties of the chemicals, and predicted biologic activity.

In addition to the activities, mentioned above, EPA is fully engaged on the evaluation of individual OFR chemicals. EPA's Integrated Risk Information System (IRIS) includes health hazard assessments for several FRs; and recent work under the Toxic Substances Control Act (TSCA), as amended by the Frank R. Lautenberg Chemical Safety for the 21st Century Act, includes FRs, including OFRs.

Despite the plethora of global federal activity and authoritative reviews Washington DoE has decided to pursue a different path regarding hazard outcomes. The conclusion all OFRs are hazardous is derived from a simple analysis, which leverages a few “data rich” chemicals to characterize all of them. The report points to the GreenScreen® tool as the foundation with additional non-regulatory based source information to conclude that OFRs can be grouped as a single class, and that they are all too hazardous for electronic casings applications. **We believe this is an inherently flawed approach to regulatory management and is even more so when applied to a vast group of chemicals like OFRs.** The following are our specific concerns:

1. **DoE’s approach lacks transparency**. The DoE does not clearly define the hazard endpoints, human or environmental, showing how over 75 commercial chemistries rise to the definition of needing to be removed from commerce.
2. **DoE’s conclusion is not aligned with any other global regulatory environment** in approach or outcomes.
3. **GreenScreen® and other cited sources have not been adopted by regulatory authorities anywhere in the world**.
    a. These tools are market-based and are often lacking proper outcomes due to their lack of access to business confidential data sets, and in practice have had limited value with respect to driving innovation and step change solutions for a lot of chemistries.
    b. In practice it is hard for companies to select the “best” chemistry when GreenScreen® outcomes are at the same level. In many cases to make the best choice manufacturers need to consider the application risk based on the hazard profile, something DoE will not consider in their recommendations.
    c. These authoritative sources have inherent bias restrictions against OFRs, as halogens are often arbitrarily deemed to be bad no matter the data.
    d. These tools penalize the persistent nature of OFRs, a quality the market greatly values because in many applications flame retardants need to last and perform over a long product use cycle, work in different climates, etc. <u>OFRs are many times the only option for maintaining long-term fire safety and mechanical properties in harsh environments</u>. This is of extreme importance in emerging market applications like electrical car/NEVs, charging stations, consumer green energy storage battery sources, and consumer solar applications.

Finally, the draft recommendations fail to consider the difference between additive, reacted and polymeric flame retardants. Flame retardants can be liquids or solids that can be physically incorporated into a material (additive) or chemically transformed to create a new fire-resistant material (reactive). The report recognizes these differences exist but then ignores the value of these solutions towards eliminating exposures by arguing risk doesn’t matter. Polymeric flame retardants have large molecular weights and are not bioavailable and therefore should not pose a hazard. Likewise, reactive flame retardants are ones which have been reacted with other chemicals in the matrix they are treating and similarly should not be bioavailable and not pose a hazard. Failure to make this distinction means that many effective flame retardants will be eliminated needlessly: no net public health benefit is likely.

Alternatives to OFRs

The DoE report confidently identifies alternatives to OFRs and notes that several OPFRs meet the minimum criteria for safer product designs or that manufacturers can use non-flammable metals in their product designs. Regarding OPFRs the report says "To identify safer alternatives, we used existing alternative assessments and also the TCO Certified Accepted Substance List. The TCO Certified Accepted Substance list contains flame retardants that score as BM-2 or better in GreenScreen® assessments." There are several problems with these conclusions:

1. **The TCO list** of accepted substances is a narrowly used platform that **specifically excludes halogenated flame retardants no matter their GreenScreen® score.** Using this platform as a guide to alternatives ignores the inherent bias of leveraging pseudo authoritative tools that reinforce the departments own biases.

2. The report also references PINFA marketing literature as confirming of feasible and available "safer" alternatives. **PINFA is a marketing trade association and ICL IP is a member company. PINFA is promoting competitive FRs in a somewhat narrow landscape of applications and we don't believe that should be an authoritative reference for regulatory purposes**. Reading PINFA materials more thoroughly would also reveal that in some applications OPFRs are not workable solutions. Ironically in some applications, e.g. furniture, PINFA member products are banned along with some OFRs.

3. **The report causally ignores the fact that OPFRs are not direct substitutes for OFRs in casing applications**. Replacement also demands a change in polymer system. This is no small matter as it relates to product cost, design, consumer acceptance and circularity.

4. Polymers have different pros and cons for specific product designs. ABS, HIPS, PC and PC-ABS plastics are commodity type plastics for real reasons. They are not the same and while they can be competitive in some applications they are not in others. Color, impact strength, environmental performance etc. are all factored into what makes a good product and why a manufacturer choses one polymer or another. **When polymers need to meet fire standards this in turn defines the choice of flame retardant, the polymer and flame retardant need to work together to make a product**. The report lacks many important facts about what works and why and should not contain any definitive statement on alternatives. It is a very shallow look at the complications with which the market can adopt a ban on OFRs, without effective alternatives. **The Department's analysis must meaningfully consider the efficacy of alternative chemicals and any product redesign**. If a replacement chemical or redesigned product poses an increased fire risk or flame-retardant exposure, or waste stream impact etc. to a product that is currently available, then the new product is not "safer."

5. **Ironically some of the alternatives identified by Ecology as "safer" are on authoritative lists or are being evaluated by regulatory bodies for restrictions**. TPP and RDP are examples of chemistries under current EU and or EPA evaluation.

6. **The DoE suggests alternatives that score a GreenScreen® Benchmark 2 are acceptable but in the case of OFRs the same outcome is not acceptable**. In its desire to find acceptable alternatives, the Department has applied a lower level of scrutiny to alternatives. This is likely to lead to regrettable – or, at best, needless and costly – substitution.

7. **The statute defines a "safer alternative" as "an alternative that is less hazardous to humans or the environment than the existing chemical or chemical process."** The legislature did not limit the hazards to those Ecology believes are posed by the priority chemical itself, and Ecology's current criteria for "safer" alternatives does not appear to adequately account for the same body of hazards as OFRs. <u>OPFRs are also additive chemistries that literature reveals can end up in house dust, electronic surface wipes, and hand wipes.</u>

8. **The DoE ignores market realities regarding OPFRs**. Phosphate rock, a building block for OPFRs, is considered by the EU Commission report to be subject to "high supply risk" because of concentrated production in three main countries (China, Morocco, USA), with high "corporate concentration" in production (small number of producer companies with large market share). **The implications for OPFRs has been on recent display as China cut back on P4 output to curb energy use and emissions, the corresponding impact was global OPFR shortages.** Phosphate is also an energy consuming production process and has a large carbon footprint. **Bromine sources for OFRs are vast and BFR polymer systems have a relatively low carbon footprint when compared to OPFRs polymer systems.** It is also notable that OFRs in certain plastic streams promise greater circularity in both mechanical and chemical physical recovery processes.

Definition of an Electronic Case:

Ecology's utilization of volume of electronics as a proxy for potential exposure is not accurate and should <u>not</u> be the basis for determining priority products. DoE is proposing to restrict OFRs in device casings and enclosures for electronic and electric equipment – including but not limited to TVs, laptops, mobile phones, kitchen appliances, washing machines, irons, coffee makers, vacuum cleaners, hair dryers, appliances, power tools, and various other electronic and electric devices including those intended for industrial applications. The vagueness of the case definition covers vastly different products and/or parts that do not uniformly use the same types of flame retardants, plastics, are wildly different in size, operate in different climates (outside vs inside), etc. The report does not provide significant evidence plastic housings of the example products have OFRs in them or how the use of them create a significant source of OFR exposure to people or the environment. The referenced environmental, human and dust science exposure relates to long banned OFRs that had many uses beyond electronic casings. The report goes further to suggest surface wipes of electronics showing OFRs was an indication of potential exposure, however this finding is not necessarily an indication of emissions as OFRs are uniformly distributed in the plastic they should be at those surfaces.

The proposed regulation is equally flawed in that it ignores the fundamental fire risk scenarios of all these products and if manufacturers can maintain robust product safety in these designs without OFRs. Incredulously the report states "We determined the function provided by the OFRs is not always necessary for the performance of the priority product." This is inaccurate. In many products cases are designed to be an actual fire barrier between an internal ignition failure and possible spread not just something that makes a easier to carry or look nice. OFRs are used in these applications to stop the case from igniting and to contain internal ignition, this in turn protects the public from bigger fires and related injuries.

Electronics by design have all the elements for fires to occur – plastic fuel, electric ignition, and environmental oxygen. Any regulation that makes it harder to achieve or discourages manufacturers to seek the most robust product safety is inherently flawed. Consumers in the United States enjoy the highest standards for fire safe products in the world; as enforced by federal agencies, including CPSC, fire marshals, and code officials. While it may be true some large manufactures can accommodate dramatic changes in the regulatory landscape, smaller manufacturers may be inclined to forgo the addition of flame retardants in their products and take the fire risk when standards do not demand they do it.

In summary ICL would like to reinforce the importance of this topic. In the CPSC's latest consumer fire report, (2016-2018), the following data was revealed:

The fire and fire loss estimates presented in this report pertain to unintentional residential structure fires and civilian casualties. The estimates are:

- 351,900 fires, 2,410 deaths, 10,370 injuries and $6.36 billion in property losses in 2016;
- 362,600 fires, 2,230 deaths, 10,060 injuries, and $7.07 billion in property losses in 2017;
- 371,600 fires, 2,460 deaths, 10,740 injuries, and $7.56 billion in property losses in 2018; and
- an estimated annual average of 362,000 fires, 2,370 deaths, 10,390 injuries and $7 billion in property losses over the 3-year period from 2016 through 2018.

Residential and commercial products related to consumer uses, e.g. electronics with casings, are a component of this data either as first to ignite or as secondary items to burn. This data should serve as a reminder that fire is still a significant public health threat; and a threat that disproportionately affects underserved or economically disadvantaged communities, the elderly and the young. We believe Washington State should take a more robust and complete approach to assessing alternatives that considers product design factors, innovation, circularity, and equivalent performance to effectively achieve the Safer Program goals. Careful consideration of these issues above is particularly relevant for future phases of the Safer Products program and any proposed regulations.