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POLYISOCYANURATE INSULATION MANUFACTURERS ASSOCIATION

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RE: Draft Identification of Priority Products Report to the Legislature
Insulation Products Containing Organohalogen Flame Retardants

The Polyisocyanurate Insulation Manufacturers Association (PIMA) is pleased to submit the following comments in response to the Department of Ecology's (Ecology) Draft Identification of Priority Products Report to the Legislature (Report). These comments specifically address the proposed prioritization of "insulation products containing organohalogen flame retardants" and explains why this product category is not an appropriate selection under the Safer Products for Washington Program (Program).

I. About Polyisocyanurate Insulation:

Polyisocyanurate (polyiso) is a commonly used thermal insulation for the building envelope (roof, wall and below ground). Polyiso is a rigid foam product available in various thicknesses and sizes. Polyiso is a closed-cell, thermoset plastic formed by combining polymeric methylene diphenyl diisocyanate (pMDI), polyol and other ingredients such as flame retardants. Polyiso insulation products are manufactured for specific end uses, which include the following applications:

- **Roof insulation:** Installed above the roof deck for low or steep slope roof structures.
- **High density roof cover board:** Protection board installed on top of exterior roof insulation layers to improve the durability of roof systems.
- **Wall insulation:** Installed on the exterior of wall framing members as a continuous insulation layer. Installed below ground on the exterior of foundation walls or floor slabs. Specialized products may be installed exposed to the interior of buildings (e.g., warehouse walls, industrial buildings, and certain residential applications). Products may also be installed as part of interior assemblies like traditional insulation materials and covered by interior finish materials such as drywall. Low-VOC certified products may be specified for interior applications.

Polyiso insulation is selected based on its industry-leading R-value (or its ability to resist heat transfer between indoor and outdoor environments). This performance results in significant energy savings and greenhouse gas emission reductions. As a thermoset plastic, polyiso insulation delivers excellent fire performance, which allows the products to be used in a wide variety of

modern building assemblies. Depending on the facer type, polyiso insulation also provides design professionals with the ability to specify the product as an air and water resistive barrier. This helps to eliminate the need for additional building products and ensure buildings and homes resist the negative impacts of air and moisture infiltration (e.g., air pollutants, dust, mold, etc.).

In addition to its building performance advantages described above, today's polyiso insulation products deliver numerous environmental and health benefits. For example, polyiso insulation is manufactured with a blowing agent characterized by low global warming and non-ozone depletion potential. This provides construction professionals with a high performance, low embodied carbon insulation option. Many polyiso insulation products have earned independent, third-party certification for low VOC performance. These low-VOC certifications often rely on the standards established by the California Department of Public Health and are recognized by leading green building programs like the USGBC's LEED® Program. Finally, as stated previously, buildings that are well-insulated and air-sealed using products like polyiso insulation result in more comfortable, healthier indoor environments.

II. Polyiso Insulation Products and Flame Retardants

As a thermoset plastic, polyiso insulation delivers inherent resistance to fire ignition and spread of flame. To meet regulatory requirements for fire performance such as those established by the Washington State building code, flame retardants are added to the polyiso product formulation to achieve event greater resistance to fire. Products like polyiso insulation must meet baseline requirements for fire performance as well as application specific requirements such as those that apply to roof assemblies or exterior wall assemblies.

Today, the most used flame retardant for the manufacture of polyiso is tris(chloropropyl) phosphate (TCPP). While TCPP is an additive flame retardant that is combined with other raw materials during the manufacturing process, it is incorrect to assume that TCPP can freely migrate from the strong, closed-cell polymer matrix of polyiso products. The concentration of flame retardants in a product will vary based on the product type and other factors such as product thickness. According to the industry-average Environmental Product Declarations published by PIMA, the average concentration of TCPP in polyiso products ranges from 3.8% to 6.4%.

Manufacturers may offer for sale products manufactured using an alternative flame retardant technology that is characterized as being a non-halogenated reactive flame retardant. An example of this technology is VeriQuel® R100 – a phosphorus-rich reactive flame retardant produced by ICL. While an alternative exists to the use of TCPP in polyiso products, legitimate questions exists as to whether this alternative could be a commercial substitute for all polyiso products considering the volume of polyiso products manufactured today as well as other factors such as the timeline for commercializing insulation products using new flame retardant formulations.

III. "Organohalogen Flame Retardants" Overly Broad as Priority Chemical

Organohalogen flame retardants (OFRs) refers to a broad class of chemicals, not a specific chemical or technology. As a result, nominating OFRs as a priority chemical under the Program is inappropriate. First, regulating a class of chemicals as a single substance ignores scientific differences between chemistries that belong to the broader class. Specifically, according to a report by the National Academy of Sciences, Engineering and Medicine, OFRs should not be regulated as a single class of chemicals.[1] Rather, OFRs should be assessed in smaller subclasses based on their chemical structure and potential health effects to a provide more accurate approach to hazard assessment.

Second, regulating an entire class of chemicals as a single substance makes it impractical for regulators and manufacturers to assess the viability and suitability of safer alternatives that share certain characteristics to the class. In the case of OFRs, a class approach would exclude safer alternatives as designated by the U.S. Environmental Protection Agency.

Third, while OFRs were designated by statute as part of the Program authorization, it is unlikely that the legislature intended Ecology to regulate or categorically ban the entire class of substances. Rather, the legislature delegated the authority to Ecology to review applications of specific chemical substances in specific consumer products. Therefore, we encourage Ecology to assess the hazard profile of individual OFR substances and the risks, if any, presented by the use of the substances in insulation products.

IV. Ecology Mischaracterizes TCPP as a Chemical of Concern

In terms of hazard, existing research does not support the conclusion that TCPP is toxic to humans or the environment based on the concentration levels and applications cited by Ecology. No studies suggest that TCPP is a reproductive or developmental toxin in humans. No studies suggest that TCPP is a human carcinogen. Instead, Ecology relies only on the class affiliation of TCPP as an OFR to suggest that its presence in insulation products presents a risk to humans or the environment.

With respect to the environment, the Government of Canada has conducted a draft screening assessment of TCPP.[2] Canada concluded that TCPP presents a different (and significantly less severe) toxicity profile when compared to other OFRs. This reinforces the need for Ecology to conduct substance-specific assessments of individual OFRs. Based on expected releases of TCPP to the environment, Canada also concluded that the substance has low potential to cause ecological harm. Given the uses of TCPP in Canada are like those in Washington State, the findings are relevant to Ecology's assessment.

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[1] https://www.americanchemistry.com/chemistry-in-america/news-trends/press-release/2019/nasem-report-confirms-organohalogen-flame-retardants-cannot-be-assessed-for-hazards-as-a-single-class

[2] https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/updated-draft-screening-assessment-organic-flame-retardants-substance-grouping-tcpp-tdcpp.html

Related to risk and exposure, the Report appears to equate an additive flame retardant to an emissive one. TCPP is an additive flame retardant. However, TCPP is added into the polymer mixture during manufacture and is expected to remain largely within the polymer bonds of polyiso products. We understand that Ecology is relying on certain micro- or small-scale emissions chamber testing to suggest that TCPP slowly emits from polyiso boards (Kemmlein et al., 2003; Liang et al., 2018). While TCPP emissions were observed in these studies, the Report fails to correlate these observed emissions to any levels that would present harm to humans or the environment. The studies also appear to focus on the conditions under which TCPP emissions may be observed and do not correlate these findings to real world applications of polyiso boards.

Moreover, polyiso products are typically installed on the exterior sides of buildings separated from the indoor environment by other materials or assemblies. The Report does not cite research that suggests TCPP readily emits from polyiso products or is a likely source of indoor exposures of TCPP as an exterior building product. For workers, polyiso products are installed using limited cutting in most applications. Where cutting is required, workers will typically hand cut polyiso onsite (outdoors) immediately before installation.

Finally, the Report fails to consider other sources of TCPP in the economy. While TCPP is used in building insulation, the substance may also be used as an additive in other products or processes due to its viscous properties. The Report also ignores the possibility that TCPP may be incorporated into consumer products that are imported from other countries.

V. Criteria for Priority Products Do Not Support Selection of Insulation Containing OFRs

The following section examines the criteria that Ecology must consider when selecting priority products for the Program (RCW 70A.350.030). While Ecology is not required to give equal weight to each criteria, polyiso insulation containing TCPP is not well supported as a priority product.

A. The estimated volume of a priority chemical or priority chemicals added to, used in, or present in the consumer product.

The concentration of flame retardants as an ingredient for the manufacture of polyiso is not an accurate proxy for exposure to humans or the environment. As explained above, the amount of flame retardant added to the polyiso mixture during manufacture is not related to exposure when the product's physical structure and applications are considered. Moreover, concentration levels and product formulations are designed to allow the polyiso insulation product to pass the applicable fire test standards.

B. The estimated volume or number of units of the consumer product sold or present in the state.

Much like the concentration of the proposed priority chemical, the volume of polyiso insulation sold or present in the state is not an accurate proxy for exposure to humans or the environment. Polyiso is typically installed on the exterior of buildings limiting any potential exposure to indoor environments and occupants. There is no evidence or link between polyiso insulation use and exposure to TCPP for building occupants. Moreover, the use of polyiso insulation, and other

insulation products, is driven by state regulations such as the building energy code. Energy codes are a critical component of the state's climate action plan to reduce the negative environmental impacts associated with energy waste in buildings. Overreliance on volume of the proposed priority product as a criterion may result in Ecology selecting products that do not present risks of harm to humans or the environment.

C. *The potential for exposure to priority chemicals by sensitive populations or sensitive species when the consumer product is used, disposed of, or has decomposed*.

While used as an additive flame retardant, the Report does not include information that demonstrates TCPP readily emits in significant quantities from polyiso insulation products when installed as part of the building envelope. The Report does not cite research that links polyiso insulation as the source of observed indoor concentrations of TCPP. This does not come as a surprise since polyiso insulation products are typically installed as part of exterior building assemblies that are separated from indoor environments, which reduces the likelihood of any potential exposure of TCPP to building occupants or other sensitive subpopulations.

For example, the Report uses "Bi et. al., 2018" to suggest that insulation is a source for TCPP measured during the study. However, the study did not collect information (via questionnaires or in person visits) on the type of insulation used in the homes that were part of the data collection. The Report cites "Young et. al., 2021" in the discussion of TCPP exposure; however, this study relates to pipe insulation, not insulation installed as part of the building exterior. Similar failings exist in other cited studies.

In terms of installation practices, polyiso insulation products are designed to be installed with minimal overall cutting. When select polyiso boards must be cut during an installation project, the cutting or trimming is performed onsite (outdoors) with hand tools. Polyiso products are typically disposed of in landfills as part of larger construction waste streams. While products may break during the removal and disposal process, polyiso insulation products are typically not ground or crushed at the end of life. As evidenced by the Government of Canada's review of TCPP, its common uses are not expected to be a significant source of environmental harm.

D. *The potential for priority chemicals to be found in the outdoor environment, with priority given to surface water, groundwater, marine waters, sediments, and other ecologically sensitive areas, when the consumer product is used, disposed of, or has decomposed*.

While TCPP is somewhat persistent, Ecology must determine whether its presence in the environment is likely to cause harm. Presence alone should not be sufficient to prioritize specific OFRs. The Report does not cite research that demonstrates that TCPP is likely to cause harm to the outdoor environment and relies on simple assumptions to connect TCPP use in insulation to the reported concentrations in the outdoors. Without a more detailed analysis linking TCPP use in polyiso insulation and current disposal practices to the reported environmental concentrations, relying on assumptions alone is an inaccurate method. Moreover, when the Government of Canada conducted its assessment of TCPP, it concluded that based on current uses of TCPP, the chemical is not likely to cause harm to the outdoor environment.

E. If another state or nation has identified or taken regulatory action to restrict or otherwise regulated the priority chemical in the consumer product.

No jurisdictions in the U.S. or Canada currently restrict the use of TCPP in polyiso insulation products.

F. The availability and feasibility of safer alternatives.

Certain manufacturers offer for sale polyiso products manufactured with non-halogenated reactive flame retardants (typically an all-phosphorous reactive flame retardant is used as the replacement for TCPP). However, an extensive range of factors must be considered before determining whether a substitute chemical is a commercially viable alternative including, but not limited to, the supply of the alternative chemistry. PIMA understands that the supply of alternative flame retardants is currently insufficient to replace TCPP based on current manufacturing volumes. Additionally, when reformulating a product and replacing a critical chemistry such as the flame retardant, manufacturers will be required to retest and requalify the product for use in various building assemblies. These processes are time intensive and often iterative. A product must be qualified by third party testing laboratories to be considered commercially viable. Therefore, should Ecology consider the availability and feasibility of alternatives as a relevant criterion for polyiso, we encourage Ecology to consider the full range of factors and extensive timeline behind implementing an alternative chemistry.

Additionally, we strongly disagree with the suggestion in the Report that other insulation product categories may be "safer" alternatives to insulation manufactured with OFRs. All insulation materials offer performance advantages that may be uniquely suited for specific projects, applications and building types. Moreover, the construction industry relies on a wide variety of products to meet project-specific needs in a cost-effective manner. Ecology would need to complete a comprehensive alternatives assessment review of other product categories to ensure other materials are not regrettable substitutes. Ecology should not assume an alternative material is "safer" based only on the fact that it does not contain OFRs. Alternatively, we encourage Ecology to confine its review of "safer alternatives" to the priority chemical rather than entirely different insulation categories.

G. Whether the department has already identified the consumer priority or priority chemical in a different chemical action plan.

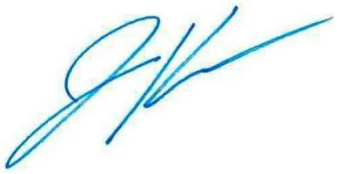
In the Report, Ecology does not cite existing chemical action plans that identify OFRs as a priority chemical or insulation containing OFRs as a priority product. Therefore, we assume that Ecology is not relying on this criterion to support its proposed designation of insulation and OFRs as a priority product.

As outlined above, the Report simply establishes the fact that polyiso insulation products are manufactured with TCPP and used in Washington State. However, the authorizing statute suggests that more than the mere presence of a priority chemical in a product is required for prioritization. When all criteria are considered, the facts do not support prioritizing polyiso insulation products containing TCPP as a priority product.

VI. Conclusion

PIMA appreciates the opportunity to comment on the Report and looks forward to working with Ecology at is finalizes the selection process for priority products for the next phase of the Program. Should additional information be necessary regarding polyiso insulation products containing TCPP, please contact me (jkoscher@pima.org; (703) 224-2289).

Sincerely,



Justin Koscher
President