Ministre de l'Environnement,
du Changement climatique
et de la Nature

Minister of the Environment,
Climate Change
and Nature

Ottawa (Ontario), Canada K1A 0A6

DEC 2 9 2025

Chris DeArmitt, Ph.D.
President
Phantom Plastics
chris@phantomplastics.com

Dear Dr. DeArmitt:

This letter is in response to your Notice of Objection and request to establish a board of review to the publication of the proposed Prohibition of Certain Toxic Substances Regulations, 2022 (proposed Regulations), which was received by Environment and Climate Change Canada on July 12, 2022. The proposed Regulations were published in the *Canada Gazette*, Part I, on May 14, 2022.

I have carefully considered all the issues in your Notice of Objection, including those dealing with the nature and extent of the danger posed by decabromodiphenyl ethane (DBDPE) and the other questions and considerations that you brought to my attention. In my opinion, your Notice of Objection does not raise sufficient uncertainty or doubt in the science underlying the proposed Regulations that would warrant the establishment of a board of review under subsection 333(1) of the *Canadian Environmental Protection Act, 1999* . Therefore, I am denying your request, and I will not establish a board of review. The reasons for my decision are explained below and in the Annex to this letter.

Responses to comments in your Notice of Objection related to the outcomes of the screening assessment for DBDPE, which concluded that there is a risk of harm to the environment due to the persistence and widespread occurrence of DBDPE in the environment along with the potential for bioaccumulation and toxicity of its transformation products, are provided in the Annex.

The comments in your Notice of Objection regarding the development of the proposed Regulations have been considered alongside other comments received on these regulations. The specific points you have raised on the proposed Regulations and how they will be addressed are also summarized in the Annex to this letter. Your Notice of Objection raised specific concerns on the proposed exemptions for DBDPE, and to address these concerns, the proposed timeline of

…/2

the DBDPE exemptions will be extended by an additional 10 years (i.e. extended from 5 years to 15 years for new products and from 20 years to 30 years for replacement parts) and the scope of these exemptions will be broadened to include all manufactured items and additional intermediate materials. This extended timeline will allow all stakeholders additional time for the research and development of alternatives, testing and certification, and transitioning their manufacturing and supply chains. Broadening the scope of the DBDPE exemptions will help to reduce the risk of prohibiting critical components, reduce the need to apply for permits under the proposed Regulations for non-exempted parts, and reduce compliance burden of stakeholders throughout the supply chain.

Please note that the comments on the proposed Regulations will be summarized in the Regulatory Impact Analysis Statement that will be published with the final Prohibition of Certain Toxic Substances Regulations, 2025 (2025 Regulations) in the *Canada Gazette*, Part II, which describe how these matters have been addressed.

I appreciate your bringing your concerns to my attention. Please accept my best regards.

Yours truly,

The Honourable Julie Dabrusin, P.C., M.P.

Att.

Annex

Minister of Environment and Climate Change Canada
Detailed Responses to Notice of Objection Comments

1) The following provides a summary of comments as set out in the "*Executive Summary*" section in your Notice of Objection and the analysis of the information you have provided:

1A) In your Notice of Objection, you commented that proposed risk management is based on assumption about the possible degradation products of DBDPE and the assumption was not valid and the use of decaBDE is both inappropriate and unscientific because DBDPE does not degrade under environmental conditions and is therefore safe.

The use of analogues and read-across in risk assessment, much like how decaBDE is used in the DBDPE screening assessment, is well established and internationally recognized. Canada's approach to the use of analogues and read-across in risk assessment[1] is consistent with OECD Guidance[2] and the approaches used in other jurisdictions, including by the European Chemicals Agency (ECHA)[3].

DecaBDE is considered to be a suitably close analogue for DBDPE given the high degree of structural and functional similarities between the two substances, and the availability of relevant empirical information. In addition to Canada, the United Kingdom (UK) in 2007 and Sweden in 2024 utilized decaBDE as an analogue substance in their respective assessments of the target substance DBDPE[4].

Structural and functional similarities between substances have typically translated to similarities in environmental fate, behavior, and other properties. It is noted that some differences in molecular makeup, dimensions, and configurations exist between DBDPE and decaBDE that may affect the manner in which these molecules interact with their environment; however, these differences are well within what is typical for analogue-target differences found in regulatory risk assessments.

The abundance of empirical data on decaBDE also factored in its selection as the most appropriate analogue for DBDPE. Expert judgement is applied in this process, where chemical properties and the various empirically known properties, fate or behaviour of decaBDE is read-across to DBDPE on a case-by-case (e.g., per endpoint or property)

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[1] https://www.canada.ca/en/health-canada/services/chemical-substances/fact-sheets/analogues-read-across-risk-assessment.html.
[2] OECD, *Guidance on Grouping of* Chemicals, 2d ed., 13 April 2017: https://www.oecd.org/en/publications/guidance-on-grouping-of-chemicals-second-edition_9789264274679-en.html.
[3] ECHA, Read-Across Assessment Framework (RAAF), 2017: https://echa.europa.eu/documents/10162/17221/raaf_en.pdf/614e5d61-891d-4154-8a47-87efebd1851a.
[4] Environmental risk evaluation report: 1,1'-(Ethane-1,2-diyl)bis[penta-bromobenzene] by United Kingdom Environment Agency (2007) and Substance Evaluation Conclusion and Evaluation Report for 1,1'-(ethane-1.2-diyl)bis[pentabromobenzene] (DBDPE) by Sweden (2024).

basis rather than in an absolute manner, taking into consideration the suitability and comparability of these attributes.

The assessment of DBDPE draws on the available empirical, modelling, and scientific information for DBDPE. In the absence of certain data on DBDPE, information on its close analogue, decaBDE, was used to evaluate certain properties of DBDPE and its potential to cause adverse effects in the environment including breaking down to lower brominated products. A weight of evidence approach is applied with consideration of multiple lines of evidence, and some uncertainty associated with data gaps in the assessment warranted application of precaution. Given this supporting scientific information, further details on the rationale for the risk management of DBDPE is provided in the response 1B and further detail on the degradation of DBPDE is provided in the response 4A and 4B.

1B) In your Notice of Objection, you commented that the proposed risk management measures for DBDPE were rash in the extreme, illogical, unjust and unwise without evidence and that evidence does not exist. In addition, you commented that just as it would be unjust to incarcerate an innocent person because they look similar to a guilty person, that it would be unjust to ban DBDPE because it looks somewhat similar to decaBDE, and that scientific testing and peer-reviewed data such as testing should be used as the basis for decision making.

Your views are noted. However, the proposed risk management for DBDPE is based on the following reasons:

The DBDPE screening assessment concludes that DBDPE is toxic, persistent and results predominantly from human activities and that DBDPE is expected to contribute to the formation of persistent, bioaccumulative and inherently toxic transformation products, such as lower brominated diphenyl ethanes, in the environment. As such, at the time the risk management approach for DBDPE was published, DBDPE met the criteria outlined in the Government of Canada's Toxic Substances Management Policy for virtual elimination from the environment (Canada, 1995).

Upon the coming into force of the *Strengthening Environmental Protection for a Healthier Canada Act* (S.C. 2023, c. 12) in June 2023, the virtual elimination provisions of CEPA were replaced with a new regime that remains risk based. In developing a proposed regulation or instrument respecting preventive or control actions in relation to substances added to Part 1 of Schedule 1 of the Act, priority will be given to the total, partial or conditional prohibition of activities in relation to the substance or of releases of the substance into the environment. For substances added to Part 2 of Schedule 1,

priority will be given to pollution prevention actions, which may include prohibition, when managing risks posed by those substances.

An Order adding DBDPE to Part 2 of Schedule 1 to the *Canadian Environmental Protection Act, 1999* was published in the *Canada Gazette*, Part II on February 26, 2025.

As indicated in the risk management approach for DBDPE, the environmental objective for DBDPE is to reduce its concentrations in the Canadian environment to the greatest extent practicable, and the risk management objective for DBDPE is to achieve the lowest level of release of the substance into the Canadian environment, taking into account social, economic and technical matters.

The high importation volumes of DBDPE into Canada, along with information on its uses, indicate potential for widespread release into the Canadian environment. Aquatic exposure to DBDPE is expected through activities such as formulation, either directly to receiving surface water or to a wastewater treatment system that discharges its effluent to a receiving surface water body. In addition, products containing DBDPE have the potential to release DBDPE at various stages of lifecycle, including use (see house dust studies referred to in Section 10.1.1.2 and Appendix D of the DBDPE screening assessment) and disposal. Once released into the environment, DBDPE will be found mainly in sediment and soil, where it may persist for long periods of time, resulting in DBDPE build-up, as seen by rapid doubling times in sediment in the Great Lakes.

In addition, the suitability of decaBDE analogue comparison with DBDPE is outlined in the DBDPE screening assessment and in the first three paragraphs of the response to 1A.

Given the above, regulatory prohibition is the best approach to meet the risk management objective for DBDPE, which is to achieve the lowest level of release of the substance into the Canadian environment, taking into account social, economic and technical matters.

2) The following provides a summary of comments as set out in the section, "The Safety of Brominated Flame Retardants" in your Notice of Objection and the analysis of the information you have provided.

In your Notice of Objection, you commented "In the case of DBDPE, the molecule has extremely low solubility which dramatically reduces exposure".

DBDPE accumulation in environmental media such as sediment despite its low solubility may present a significant source for the generation of potentially more bioavailable, bioaccumulative and hazardous transformation products, via degradation under various environmental conditions. Thus, DBDPE's low solubility does not reduce the exposure to

certain organisms or more broadly to its more harmful degradation products in the environment.

3) **The following provides a summary of comments as set out in the "What Evidence is there that DBDPE is a Threat to Human Health?" section in your Notice of Objection and the analysis of the information you have provided.**

In your Notice of Objection, you commented "After a review of the scientific literature, I found extensive testing had been performed but could find no evidence that DBDPE is a threat to human health. This view is the same as that of the many regulatory agencies around the world".

While you make this point regarding human health in your Notice of Objection, the May 2019 DBDPE screening assessment concluded that DBDPE does not meet the criteria under paragraph 64(c) of CEPA and thus, was not considered harmful to human health at exposure levels described in the screening assessment.

4) **The following provides a summary of comments related to the "Degradation of DBDPE" section in your Notice of Objection and the analysis of the information you have provided.**

4A) **In your Notice of Objection, you commented " The proposed ban is based purely on unfounded speculation about the possible degradation of DBDPE. It was incorrectly assumed that the degradation pathway and products would be similar to those for the banned substance DecaBDE.", "It is the use of "modeling" by the ECCC which is incorrect and misleading. Modeling is just a fancy scientific name for guessing and we should not make decisions affecting the lives of our fellow human beings based on guesswork" and "The proposed ban was based on the statement that no experimental evidence existed on this matter and so, they thought it appropriate to take a guess at what might happen. Apparently, they did properly consider this peer-reviewed evidence".**

The scientific evidence cited in your Notice of Objection pertaining to the photodegradation of DBDPE was considered in the assessment of DBDPE, except for the 2,000-hour photodegradation study (R. S. Mathur et al., Photolysis of ethane-bis(pentabromophenyl) (EBP) flame retardant in resins, manuscript in preparation) subsequently published in the Journal Chemosphere in 2023 after the assessment. The available evidence presented in the screening assessment illustrates that lower brominated congeners (e.g. nona, octa, hepta-, hexa, and pentaBDPEs) are likely formed from transformation of DBDPE under various environmental conditions and processes which can include photodegradation. Scientific studies cited in the screening assessment demonstrated that lower bromo-diphenylethanes were identified in water with humic

acid under UV light[5]. With regards to the 2,000-hour photodegradation study, while the applied weathering conditions appear reasonable for simulation of environmental conditions when DBDPE is bound within high impact polystyrene and polypropylene, this study represents only one specific scenario with limited relevance to overall DBDPE environmental release and fate. Similarly, photodegradation results from the study cited, Kajiwara et al. (2008), was considered in the final screening assessment and this study only considers a relatively short exposure period (224 days) that only reflects photo-transformation versus other important transformation mechanisms (e.g., biodegradation). The study reflects only one aspect of product lifecycle (DBDPE in HIPs polymer) and is considered to have limited relevance to the assessment. Evidence from studies with DBDPE adsorbed to solid matrices such as soil or sediment are most relevant to the fate of the substance in the natural environment. As an additive brominated flame retardant that is blended with the polymer product (rather than a reactive flame retardant chemical bonded to the polymer product), there is the possibility of release of DBDPE from these products to the environment. In addition, DBDPE may be released to air or dust by volatilization or abrasion of product containing the substance and then deposited to soil or water. Thus, the information presented in the photodegradation studies you reference with DBDPE present within a polymer matrix has no impact on the regulatory conclusion reached in the DBDPE screening assessment.

The transformation of both decaBDE and DBDPE is expected to proceed slowly (half-lives may be as long as decades) in the environment and some evidence suggests that DBDPE may proceed more slowly than decaBDE.

It is well established that decaBDE may be a significant source of release of more hazardous debromination products in the environment even if the transformation is slow; meaning that when there is sufficient parent compound (decaBDE) in the environment, the more hazardous transformation products will accumulate. As DBDPE is a high-volume substance which has been detected in the Canadian environment at increasing concentrations in some instances, such as in the sediment of the Great Lakes, an element of precaution is applied for the consideration of its debromination and comparison to that of the rate of debromination seen for decaBDE in the environment.

Regarding the statement on the “use of “modeling” by the ECCC which is incorrect and misleading” please refer to the response in 5A.

[5] Wang J, Chen S, Nie X, Tian , Luo X, An T, Mai, B. 2012. Photolytic degradation of decabromodiphenyl ethane (DBDPE). Chemosphere 89(7):844-9.

In summary, your comment incorrectly assumes that decaBDE debromination would proceed rapidly, while empirical evidence suggests otherwise. DecaBDE debromination proceeds slowly but it still leads to the problem of transformation products in the environment. DBDPE may debrominate more slowly than decaBDE in the environment; however, this would likely still lead to significant release of more hazardous transformation products in the environment.

4B) In your Notice of Objection, you commented that the science you reviewed proved "that using decaBDE as an analogue for the behaviour of DBDPE is not valid."

The suitability of decaBDE analogue comparison with DBDPE is outlined in the DBDPE screening assessment and in the response to 1A.

5) The following provides a summary of comments related to "The Use of Modeling" section in your Notice of Objection and the analysis of the information you have provided.

5A) In your Notice of Objection, you commented "That the use of modeling is incorrect and not proper science." and that "experimental evidence does exist. We know that DBDPE does not act like the banned decaBDE, so the model was working from a false assumption" You also stated that "We know from experimental evidence that DBDPE does not degrade in UV light" and "[DBDPE]….does not degrade into the toxic substances that the model predicted."

Relevant and well-established models, readily used by other jurisdictions, industry, and academia have been applied. The generated model results were evaluated to ensure reliability in order to inform the assessment and were applied in a weight-of-evidence approach, together with empirical data, an analogue approach, and information submitted by industry, to reduce uncertainties associated with any one line of evidence. Thus, model results are considered a robust and realistic line of evidence and were used in the assessment with consideration of any underlying uncertainties.

Regarding the statements on the degradation of DBDPE refer to the response provided in 4A.

5B) In your Notice of Objection, you commented that many companies have sent Notices of Objection to the Canadian Government "showing them conclusively that the actual scientific data simply does not support the Government's propose action" and you further stated that in each case the Minister responded to deny the request on the grounds of "not raising sufficient uncertainty or doubt in the scientific considerations of the underlying the proposed regulations…." You commented that this response is not appropriate.

I am of the view that this statement is incorrect on all fronts. While multiple Notices of Objections were received, none demonstrated that the scientific data does not support the proposed regulatory measures. In addition, at the time of your correspondence (July 2022), I had not responded to any of the Notices of Objections on DBDPE; your comment on my response appears to be quoted from an unconnected, separate initiative.

With respect to the reasons to deny your request for a board of review, these have been provided in detail in this response letter and the corresponding Annex.

6) The following provides a summary of comments related to "Conclusions" section in your Notice of Objection and the analysis of the information you have provided.

6A) In your Notice of Objection, you commented that brominated flame retardants including DBDPE are used as flame retardants to meet critical flammability standards and safety requirements in products and that alternative flame retardants do not perform as well.

Flame retardant substances are generally used to meet performance-based flammability requirements. These requirements do not specify what chemical flame retardants need to be used; rather they may require a product or component to pass a laboratory test such as a cigarette smolder or open flame ignition test (ASTM 2014). Using chemical flame retardants such as DBDPE in products is one of the ways by which companies can meet flammability requirements for their products. Alternate substances as well as non-chemical-based alternatives may also be used to replace the use of DBDPE as a flame retardant in various applications.

In addition to the concerns you have raised in your Notice of Objection, a number of similar comments were received during the public comment period for the proposed Regulations. To address these concerns, the proposed timeline of the DBDPE exemptions will be extended by an additional 10 years (i.e. extended from 5 years to 15 years for new products and from 20 years to 30 years for replacement parts) and the scope of the DBDPE exemptions will be broadened to include all manufactured items and additional intermediate materials. This extended timeline will allow all stakeholders additional time for the research and development of alternatives, testing and certification, and transitioning their manufacturing and supply chains. Broadening the scope of the DBDPE exemptions will help to reduce the risk of prohibiting critical components, reduce the need to apply for permits under the Regulations for non-exempted parts, and reduce compliance burden of stakeholders throughout the supply chain.

6B) In your Notice of Objection, you commented that there is no scientific evidence that DBDPE is toxic and its physical properties prevent migration and exposure.

The DBDPE screening assessment which considers empirical, modelled and analogue evidence concludes that DBDPE is toxic (meets the criteria under paragraph 64(a) of CEPA), persistent and results predominantly from human activities and that DBDPE is expected to contribute to the formation of persistent, bioaccumulative and inherently toxic transformation products, such as lower brominated diphenyl ethanes, in the environment. In relation to your comment "its physical properties prevent migration and exposure" please refer to the response in point 2.

6C) In your Notice of Objection, you commented that the proposed risk management is based on pure guesswork, that there is no scientific evidence to support the speculation, existing data shows that DBDPE does not degrade under environmental conditions, that there is no evidence of harm and the risk management was based on invalid assumptions.

Please refer to the responses in points 1, 4 and 5.

6D) In your Notice of Objection, you state:

"1. That DBDPE degrades rapidly like DecaBDE – disproven by experiment
2. That DBDPE forms toxic substances like DecaBDE – disproven by experiment
3. That a model /guess should be used because experimental data was not available – disproven – models cannot substitute for real data and experimental data does exist"

Please refer to the responses in points 1, 4 and 5.

6E) In your Notice of Objection, you commented that brominated flame retardants save lives and the proposed risk management measures restricting DBDPE was the opposite of the applying the "precautionary principle".

Please refer to the response in point 1B.

6F) In your Notice of Objection, you commented that "flame retardant regulations enacted by responsible governments have halved the number of fatalities".

Please refer to point 6A detailing that performance-based flammability testing requirements do not specify the use of a specific substance such as DBDPE.

In addition, it is noted that information such as peer-reviewed studies (e.g. Babrauskas, Vytenis & Blum, Arlene & Fuoco, Rebecca & Birnbaum, Linda. (2011). Flame Retardants in Furniture Foam: Benefits and Risks. Fire Safety Science. 10. 10.3801/IAFFS.FSS.10-265) have indicated flame retardant regulations, such as the California Furniture

Flammability Standard Technical Bulletin 117 (TB117), and use of chemical flame retardants in products, have not been shown to have a measurable fire safety benefit.