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Ms. Kim Young-hee 김영희, Senior Researcher  
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Joe DiGangi, IPEN

Date: April 17, 2019

Re: Withdrawing the Stockholm Convention recycling exemptions for TetraBDE, PentaBDE, HexaBDE and HeptaBDE

Dear Ms. Lee and Ms. Kim,

We are writing to you with concerns about the Republic of Korea's recycling exemptions under the Stockholm Convention for materials such as plastics and foam containing the flame retardant chemicals, TetraBDE,

PentaBDE, HexaBDE and HeptaBDE.<sup>1</sup> These concerns are based on a review of the practice by the Stockholm Convention expert committee and monitoring of consumer products.

As you know, the recycling exemption for materials containing these four flame retardant substances was part of the [listing decisions](#) at the 4<sup>th</sup> Conference of the Parties and allows the practice to continue until 2030. However, Parties at the Conference also tasked the treaty's expert committee to evaluate the recycling practice and provide recommendations.

The expert committee's findings are described in Decision POPRC-6/2 contained in the [meeting report](#). Key recommendations included taking action to "...eliminate brominated diphenyl ethers [BDEs] from the recycling streams as swiftly as possible." The Committee noted that, "Failure to do so will inevitably result in wider human and environmental contamination and the dispersal of brominated diphenyl ethers into matrices from which recovery is not technically or economically feasible and in the loss of the long-term credibility of recycling." Subsequent testing of consumer products has demonstrated that these concerns are valid.

We have not yet tested consumer products on the Korean market. However, we tested consumer products made of recycled plastic on the Japanese market in 2019 and found that these toxic chemicals along with another toxic flame retardant chemical are making their way into products, exactly as the Stockholm Convention expert committee predicted in 2010.

Product	Commercial OctaBDE (HexaBDE + HeptaBDE) (ppm)	DecaBDE <sup>1</sup> (ppm)
Toy telescope	15	61
Toy guitar	142	267
Toy gun	20	127
Toy knife	22	114
Hair rack	30	91
Hair diadem	21	116
Smart phone holder	38	654

<sup>1</sup>DecaBDE was [listed in the Stockholm Convention](#) for global elimination in 2017.

Children's toys are not a fire hazard and should certainly not contain the world's worst substances which are listed for global elimination under the Stockholm Convention.

A recent [study](#) of plastic children's products on the European market tested 430 plastic children's toys, hair accessories, and kitchen utensils purchased in 19 European countries. The study found that 109 products (25%) had elevated levels of bromine, indicating potential presence of a brominated flame retardant. The 109 samples were then analyzed further for concentrations of specific brominated flame retardant chemicals which showed 50 (46%) would fail to meet the EU POPs Regulation if the product was composed of new plastic rather than recycled plastic. Other researchers have found chemicals used in plastics for electronics recycled into [polymeric food-contact materials](#) and [kitchen utensils](#). In our view, toxic chemicals present in electronic waste should not be present in children's products, including as a result of recycling.

An [earlier study](#) of recycled foam products also found high levels of flame retardant chemicals. In a study with samples from Asia (Nepal, Thailand) and other regions (Canada, USA, Hungary, Kyrgyzstan), found significant levels of commercial PentaBDE (listed in the treaty as TetraBDE and PentaBDE) and commercial OctaBDE (listed in the treaty as HexaBDE and HeptaBDE).

The principal consequence of the recycling exemption is contamination of products made of recycled plastic or foam with toxic chemicals. The flame retardant substances at issue resemble PCBs and are known to disrupt human hormone systems, adversely impacting the [development of the nervous system](#) and [children's intelligence](#). They are also known to be released into [household dust](#), causing exposure. Foam recyclers and carpet layers in the USA have [high body burdens of flame retardants](#) and researchers note that they, "may be at higher risk from adverse health effects associated with brominated flame retardant exposure."

Ironically, a practice such as recycling which is supposed to be environmentally friendly can lead to toxic substances in products as they are carried along in the recycling process. In this case, PBDEs have been widely

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<sup>1</sup> Known collectively as polybrominated diphenylethers or PBDEs.

used in plastic enclosures for electronics. In essence, toxic chemicals in electronic waste are being recycled into consumer products, including children's products. This undermines a truly circular economy and diminishes the overall credibility of recycling.

For these reasons, we respectfully request the Republic of Korea to withdraw its recycling exemptions for [TetraBDE](#), [PentaBDE](#), [HexaBDE](#) and [HeptaBDE](#) under the Stockholm Convention.

We note that Japan withdrew their exemptions for a variety of uses including recycling automobile shredder residues to refuse paper and plastic fuel and recycling automobile shredder residues to sound-proofing products. We are also aware that Czechia, Iran, and Vietnam no longer have recycling exemptions for [TetraBDE and PentaBDE](#) as of 2014 – 2015 and Czechia and Iran also no longer have recycling exemptions for [HexaBDE and HeptaBDE](#) as of 2014 – 2015.

We note that [technical solutions exist for separation](#) of PBDE-contaminated waste including [Creasolv](#), x-ray fluorescence devices, x-ray transmission devices, and even low-cost sink-float methods. Techniques for destruction of PBDEs as required under the Stockholm Convention include [non-combustion techniques](#) such as super critical water oxidation (SCWO), gas phase chemical reduction, and mechanochemical processes such as high-energy ball milling.

Korean consumers should be able to purchase products made of recycled materials without having to worry that they contain substances that are globally banned. We hope that the Republic of Korea can announce its withdrawal of the recycling exemptions for TetraBDE, PentaBDE, HexaBDE and HeptaBDE at the upcoming [9<sup>th</sup> Conference of the Parties](#) 29 April – 10 May in Geneva. We would welcome further dialog with you about this important matter for Stockholm Convention implementation and protection of Korean consumers.

Thank you for consideration of our views.

Cordially,

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