

March 27, 2009

An Overview of PBDEs and their Regulatory Status in Canada

What are PBDEs?

PBDEs are a group of synthetic chemicals used as flame retardants. A PBDE molecule can have one to ten bromine atoms. PBDEs with four or more bromine atoms have been assessed for toxicity under the *Canadian Environmental Protection Act*:

- Tetrabromodiphenyl ether (tetraBDE)
- Pentabromodiphenyl ether (pentaBDE)
- Hexabromodiphenyl ether (hexaBDE)
- Heptabromodiphenyl ether (heptaBDE)
- Octabromodiphenyl ether (octaBDE)
- Nonabromodiphenyl ether (nonaBDE)
- Decabromodiphenyl ether (decaBDE)

PBDEs are sold in the following three commercial mixtures:

- PentaBDE – primarily composed of tetraBDE, pentaBDE, and hexaBDE congeners
- OctaBDE – primarily composed of hexaBDE, heptaBDE, and octaBDE congeners
- DecaBDE – primarily composed of decaBDE with trace amounts of nonaBDE congeners.

Widely used until recently, PentaBDE and OctaBDE were voluntarily phased out of use internationally and in Canada in 2006. DecaBDE is now the only PBDE mixture used in manufacturing worldwide; although PentaBDE and OctaBDE are still an environmental concern as older products and components containing these mixtures are still commonly found in homes, offices, vehicles, and disposal sites.

Regulatory Status of PBDEs in Canada

In December 2006, PBDEs were added to the “List of Toxic Substances,” paving the way for federal regulatory action under the *Canadian Environmental Protection Act (CEPA), 1999*. Furthermore, Environment Canada identified tetra- through hexaBDEs as meeting the legal criteria for “virtual elimination.”

A proposed regulation under the Canadian Environmental Protection Act was introduced in December 2006. Ecojustice Canada on behalf of David Suzuki Foundation, Canadian Environmental Law Association and Environmental Defence formally objected to the proposed regulation because it failed to ban the most prevalent commercial PBDE mixture – DecaBDE. Groups cited growing scientific evidence that DecaBDE meets the criteria for virtual elimination under *CEPA* in support of their call for the proposed regulation to be revised to include a ban on heptaBDE through to decaBDE which would have the effect of banning the DecaBDE commercial mixture.

The final regulation was released on July 9th, 2008 and, like the proposed regulation, bans the manufacture of all PBDEs and the import and use of tetra- through hexaBDE (ingredients in the discontinued Penta and Octa commercial mixtures) but fails to ban heptaBDE through to decaBDE and thus the DecaBDE commercial mixture.

The Minister of the Environment has not responded to a Notice of Objection (‘NOO’) from environmental groups contending that all PBDEs meet the criteria for virtual elimination and should be banned in manufacturing and imports.

On March 27th 2009, Environment Canada released a draft state of the science report, which examines the central issues raised in the NOO on the basis of scientific research published since the original PBDE screening assessment was completed. The draft report concludes that:

- DecaBDE may contribute to the formation of bioaccumulative, and/or potentially bioaccumulative transformation products such as lower brominated PBDEs in organisms and in the environment; and
- DecaBDE is available for uptake in organisms and may accumulate to high and potentially problematic levels in certain species, although it does not meet current regulatory threshold for bioaccumulation.

Based on the conclusions of the draft state-of-the-science report, Environment Canada is also proposing to ban the DecaBDE mixture in electronics and electrical equipment, similar to the RoHS Directive ban in place in the European Union. A draft Revised PBDEs Risk Management Strategy, issued on the same day as the draft state-of-the-science report, calls for a regulation to be in force by 2011.

Both the state-of-the-science report and the revised risk management strategy were posted for a 60-day comment period that expires on May 27, 2009.

History of PBDEs under CEPA

June 2006 – Environment Canada publishes Ecological Screening Assessments for PBDEs; Health Canada Screening Health Assessment released concurrently (though dated December 2004).

July 1, 2006 – Ministers of Health and Environment give notice of intention to add PBDEs (tetra- through decaBDE) to the List of Toxic Substances and to implement the “virtual elimination” of tetra- through hexaBDE.

December 2006 – Environment Canada publishes Risk Management Strategy for PBDEs, indicating that “Phase I” regulations would be finalized in Fall 2007.

December 7, 2006 – Government of Canada adds PBDEs (tetra- through decaBDE) to the List of Toxic Substances.

December 16, 2006 – Environment Canada proposes “Phase I” regulations to prohibit the use, sale, offer for sale, and import of tetra-, penta-, and hexaBDE, and mixtures, polymers and resins

containing these substances. The regulations would also prohibit the manufacture of all PBDEs in Canada (PBDEs have never been manufactured in Canada).

February 14, 2007 –Sierra Legal (now Ecojustice), the David Suzuki Foundation, the Canadian Environmental Law Association, and Environmental Defence submit a Notice of Objection to the Minister of the Environment, concerning the proposed PBDE regulations. The objection argues that the scope of the regulations is too narrow; *all* PBDEs meet the legal requirements for virtual elimination and should be banned, including the commonly used DecaBDE commercial mixture.

December 7, 2007 – Ecojustice, the David Suzuki Foundation, the Canadian Environmental Law Association, and Environmental Defence submit a supplement to the Notice of Objection, reviewing recent scientific findings on decaBDE.

June 18, 2008 – Ecojustice writes to Environment Minister John Baird, on behalf of the David Suzuki Foundation, the Canadian Environmental Law Association, and Environmental Defence, requesting an update on consideration of the Notice of Objection and finalization of PBDE regulations.

July 9th, 2008 - Canada bans the manufacturing of all PBDEs (although PBDEs have never been manufactured in Canada nor is there any intention by industry to do so) and bans the "use, sell or offer for sale of three PBDE congeners (tetraBDE, pentaBDE and hexaBDE) which has the effect of banning the PentaBDE and OctaBDE commercial mixtures but not the DecaBDE commercial mixture. Canada's ban does not extent to PBDEs that may be in imported goods.

March 27th, 2009 – In response to the issues raised in the NOO, Canada releases a “State of the Science Report on Bioaccumulation and Transformation DecaBDE”.

March 27, 2009 – Canada publishes a draft Revised Risk Management Strategy in response to the findings of the draft State of the Science Report on Decabromodiphenyl ether. The strategy proposes regulations in force by 2011 to ban the use of PentaBDE and OctaBDE mixtures in manufactured and imported products and DecaBDE mixtures in electronics and electrical equipment, similar to the RoHS Directive ban in place in the European Union.

PBDE Use in Canada

PBDEs are added as fire retardants to polymer resins and plastics, including many consumer products such as televisions, stereos, computers, furniture, carpets, and curtains. PBDEs are also used, to a lesser extent, in textiles, adhesives, sealants, and coatings. PBDEs are not produced in Canada, but are imported by manufacturers and in consumer products. The only commercial PBDE mixture available in Canada is DecaBDE and it is manufactured in the United States.

Environmental and Health Impacts of PBDEs

PBDEs are dangerous chemicals that have increased significantly over time in the tissue of humans and wildlife. PBDEs are toxic to development, including the developing brain, immune, reproductive and hormonal systems.

PBDEs are released into the environment during manufacturing operations, and as products containing these chemicals degrade. This breakdown begins indoors during normal use of products making housedust the largest exposure source and of particular concern to small children.

Like PCBs, their long-banned chemical relatives, PBDEs are persistent in the environment and bioaccumulative, building up in people's bodies and concentrations are rising.

Biomonitoring studies have detected PBDEs in Canadians' blood samples and even in mothers' breast milk. One study found that the breast milk of Canadian women contains the second-highest PBDE concentrations in the world (behind Americans) and PBDE levels measured in breast milk samples from Vancouver women increased 15-fold from 1992 to 2002.

PBDEs are so ubiquitous in the environment that they are one of a handful of chemicals found in organisms including octopods and squids that live at depths between 1000 and 2000 meters below the surface of the sea. Researchers have measured concerning levels of PBDEs contaminating Canadian landscapes, from the Great Lakes to the Arctic, and building up in the tissues of Canadian wildlife, including polar bears, grizzly bears, and killer whales. A recent study of herring gull eggs from the Great Lakes region found that the concentrations of decaBDE in the eggs, the most prevalent PBDE still in use today, is doubling every 2 to 3 years.

Furthermore, studies have found that higher brominated PBDEs like decaBDE break down naturally into the lower brominated PBDEs. Thus only a ban that includes all PBDEs in all products will be completely effective at lowering the levels in the environment.

Measures to Ban PBDEs in other Jurisdictions

February 2003 - the European Union bans the commercial mixtures OctaBDE and PentaBDE. The ban prohibits goods containing OctaBDE and PentaBDE from being placed on the market in the EU.

January 2005 - the US passes a law which effectively bans the import and manufacturing of OctaBDE and PentaBDE.

February 2006 - China passes a law banning the use of OctaBDE and PentaBDE in new electrical and electronic equipment (i.e. Restriction on Hazardous Substances – China RoHS).

August 2006 - Sweden approves a ban on the use of DecaBDE in textiles, furniture and some electronic. In May 2008, the Swedish ban is supplanted by European Union Restrictions on Hazardous Substances (RoHS) for DecaBDE - see below – as Sweden is a member-country of the EU.

April 17th, 2007 - Washington State bans the use of DecaBDE in mattresses by 2008 and televisions, computers, and residential upholstered furniture by 2011, as long as safer alternatives can be found.

June 14th, 2007 - Maine bans the use of DecaBDE in mattresses and upholstered furniture by 2008 and computers and televisions by 2010. Maine had already banned the use of PentaBDE and OctaBDE commercial mixtures along with eleven other US states.

January 18th, 2008 - Norway announces a ban on the use of DecaBDE in new consumer products.

July 1st, 2008 - European Union bans the use of DecaBDE in electrical and electronic goods, following a ruling from the European Court of Justice on April 1st, 2008. DecaBDE in electrical and electronic goods was banned in 2002 under the EU's Restriction on Hazardous Substances (RoHS) law, but in 2005 the Commission lifted the ban, citing "practicalities". Denmark, backed by members of the European Parliament, challenged this decision and won and the ban was reinstated.

For more information please contact:

Elaine MacDonald, Ecojustice: 416-368-7533 x 27

Lisa Gue, David Suzuki Foundation: 613-594-5428

Kathleen Cooper, Canadian Environmental Law Association: (705) 341-2488