



Protecting Public Health from Toxic Flame Retardants

Flame retardants are widely used in a variety of products to prevent and slow the spread of fire. While fire retardancy is important, some flame retardants, known as polybrominated diphenyl ethers or PBDEs, used in electronics and other products are leaving a lasting toxic legacy in the environment and in human beings. The good news is safer alternatives are available at a comparable cost. Minnesota should phase out the unnecessary use of these toxic chemicals.

- The highest volume commercial flame retardant mixture, deca-BDE, is used in television enclosures, some computers, wire and cable and some textiles.
- Deca is widely found in the environment, and builds up in fish and the human body, including cord blood and breast milk. It is also present in household dust.
- Deca is a developmental toxin and children are most highly exposed.
- The European Union has already restricted the use of deca in electronic devices.
- Many electronics companies have found safer substitutes and have phased out the use of deca, including in 95 percent of computer products and 57 percent of televisions.

The American Public Health Association, the Minnesota Public Health Association and the Minnesota Medical Association have recommended the phase out of toxic PBDE flame retardants.

MINNESOTA'S TOXIC FLAME RETARDANT BILL

- Phases out the manufacture and sale of products containing penta-BDE and octa-BDE by January 1, 2008.
- Phases out the manufacture and sale of computers, televisions, furniture, textiles and mattresses containing deca-BDE by 2010. Allows continued use of deca-BDE in wire and cable and other applications.
- Exempts transportation vehicles; equipment for military use; used products; medical devices; and carpet cushion made from recycled foam.

- Allows individual manufacturers of products not specifically exempted to request a temporary exemption if feasible and safer alternatives are not available.
- Provides for the Pollution Control Agency to recommend other actions needed to address deca-BDE contamination.
- Requires Minnesota state agencies to lead by example by purchasing products that are free of toxic flame retardants.

WHAT ARE TOXIC FLAME RETARDANTS?

Polybrominated diphenyl ethers are flame retardants used in foam products, textiles, electrical equipment, building materials and transportation. **Penta** (pentabromodiphenyl-ether), **octa** (octabromodiphenylether) and **deca** (decabromodiphenylether) are three of the most common commercial classes. Chemically, they are very similar to PCBs, which were banned in 1979 due to their high toxicity, persistence, and evidence that they can cause developmental problems in children. Like PCBs, PBDEs accumulate in the environment, in fish and meat, in breast milk and in humans. They are also commonly found in household dust.

Increasing levels

While PCB levels in fish and breast milk have slowly declined since being banned, PBDE levels are increasing at an exponential pace, as they are still largely unregulated in the U.S.

- PBDE levels in Great Lakes lake trout, including from Lake Superior, doubled every 3-4 years between 1980 and 2000.¹
- Levels of PBDEs in U.S. women's breast milk are 10-100 times higher than levels in European women.^{2,3}
- Total PBDE levels in breast milk, blood and tissues have increased by a factor of 100 during the past 30 years, doubling about every five years.⁴
- PBDE levels in Minnesota in fish, sediments, sewage sludge and wastewater are increasing.⁵

DECA OF GREATEST CONCERN

Chemtura, the only U.S. manufacturer of penta and octa has already phased out these formulations, so the main concern now is deca. The widest use of deca (50-80 percent) is in plastic polymers commonly used to make computer and audio/video equipment, cell phones, fax machines and televisions. Deca also has textile and wire and cable applications.

Although penta and octa have the highest potential for bioaccumulation and are typically the most common classes found in humans, fish, and other wildlife, scientists are increasingly finding deca in animals and plant life. Deca can degrade to more toxic forms in the environment in soil, sediment, house dust and fish tissue.^{6,7,8,9,10} Studies are also finding deca in humans.

- One study found deca in the breast milk of 24 of 40 women studied.¹¹
- Deca has been identified in the cord blood of newborn babies.^{12,13}

HEALTH IMPACTS

Laboratory studies in animals indicate that PBDEs, like PCBs, are toxic to the brain, reproductive system and liver and disrupt thyroid function.

Deca has the ability to cause the same effects on developing brains of mice as penta,¹⁴ which has already been banned in eight states and Europe.

An estimated 5 percent of American women have levels of PBDEs in their body greater than levels that have been shown to cause reproductive problems in laboratory animals.¹⁵

The U.S. Environmental Protection Agency considers deca a possible human carcinogen.¹⁶

Children are receiving up to 300 times greater exposure than adults, primarily from breast milk and dust ingestion.^{17,18}

SAFER ALTERNATIVES ARE AVAILABLE

Alternatives to the use of PBDE flame retardants are available and cost effective. Some alternatives are: product redesign to eliminate the need for added chemicals; use of natural flame retardant materials like wool and leather or plastics containing sulfur; and use of less toxic chemicals, like red phosphorus, ammonium polyphosphate and aluminum trihydroxide. Self-extinguishing plastics that don't need added flame retardants are now available e.g. polysulfone, polyaryletherketone, and polyethersulfone.

One commonly used phosphorus-based alternative to deca, resorcinol bis(diphenyl-phosphate) or RDP meets Underwriters Laboratories recommended fire safety standards for television components.

Many companies are taking the lead in using safer alternatives, including Apple, Dell, Xerox, Ericsson, IBM, Intel, Motorola, Sony, Panasonic, Phillips and many others. Motorola now uses a halogen-free laminate that is cost effective, while meeting fire safety standards. A representative from Sony states: "All virgin plastic presently used by Sony are 'deca-free' (Decabromodiphenyl ether). These products meet all relevant fire safety standards."

Organizations supporting PBDE phase-out: Arc Greater Twin Cities, Clean Water Action Alliance, Duluth Audubon Society, Environmental Association for Great Lakes Education, Environmental Justice Advocates of Minnesota, Eureka Recycling, Indigenous Environmental Network, Institute for Agriculture and Trade Policy, Learning Disability Association of Minnesota, Minnesota Center for Environmental Advocacy, Minnesota Medical Association, Minnesota Nurses Association, Minnesota Public Health Association, Mississippi Corridor Neighborhood Coalition, Sierra Club-Northstar Chapter, Women's Environmental Institute

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