



Averting a California toxics disaster

By *Arlene Blum and Elana Fishman*
[*Green Science Policy Institute*](#)

Californians have twice the level of the toxic fire retardant chemical pentaBDE in their blood, compared to residents of other states. This chemicals can cause neurological, reproductive and thyroid impairments in laboratory animals. This is the legacy of state regulations adopted in the 1980s. These regulations were designed to reduce fires in our homes, but there is scant evidence that they have achieved their intended results. In spite of this, and without considering human health and environmental impacts, California is now considering new regulations that would add more potentially toxic fire retardant chemicals and materials to our homes.



In laboratory animals, fire retardants can cause neurological and reproductive impairments; cancer; attention-deficit/hyperactivity disorder; infertility; reduced sperm count and endocrine disruption; cryptorchidism (undescended testicles); and hypospadias (a penile deformity), among other health disorders. And studies are underway to determine if fire-retardant chemicals are contributing to current increases in autism, hyperactivity, birth defects, infertility, diabetes and obesity in children.

The benefit of adding these chemicals to consumer products has not been proven to the satisfaction of those concerned about these health implications. Fire retardants can slow, but usually do not stop, fires. As materials treated with these chemicals smolder for seconds or minutes, they can create toxic smoke, which contributes to fire deaths. A decrease in smoking, more smoke detectors, sprinkler systems and better enforcement of fire safety standards are among the many – and more effective – ways to reduce fires and fire-related deaths. These do not pose the same potential danger to human health.



Consequently, many scientists, environmentalists, and even the International Association of Fire Fighters oppose the use of chemical flame-retardant additives, unless there is a proven need for their use, or if alternative methods of fire prevention are not adequate.

Halogenated fire retardants, which contain chlorine or bromine bonded to carbon, are often persistent and bioaccumulative. “Persistent” means that they do not break down into safer chemicals over time. For example, fire retardants, such as polychlorinated biphenyls (PCB) and polybrominated biphenyls (PBB) – banned more than three decades ago – are still present and problematic in sediments and wildlife. “Bioaccumulative” means that they accumulate in plants and animals, becoming more concentrated as they move up the food chain. Such chemicals are being detected at higher and higher levels in animals across the planet, from killer whales and polar bears to Tasmanian devils and housecats.

The dangers associated with these chemicals began to surface with the 1973 “Poisoning of Michigan”, a disaster that perhaps foreshadowed the recent tragedy of melamine (another fire retardant, which was added to milk and livestock feed). In 1973, one ton of PBB fire retardant was inadvertently mixed with animal feed. The toxic flame retardants moved from farm animals to milk, eggs and meat, finally ending up in humans. Ultimately,

millions of farm animals that had consumed the toxic mixture had to be culled, and humans with high levels of exposure had a 20 to 30-fold increased risk of some cancers.

In 1980, California began to implement Technical Bulletin 117 (TB117), which requires the foam in upholstered furniture and baby products to withstand exposure to an open flame for twelve seconds without burning. It does not include any flammability standard for the cover fabric. In order to meet this requirement, large amounts of fire-retardant chemicals are added to foam.

From 1980 until 2003, the primary chemical used to meet TB117 was pentaBDE. 98% of the worldwide use of pentaBDE during those years was in the United States and Canada in TB117-compliant furniture and baby products. After pentaBDE was found to be highly toxic and persistent, it was banned in California and the US manufacturer voluntarily ceased production of the chemical in 2004. However, high levels of the chemical are now found in creatures from all habitats, such as the polar peregrine falcons in the air, to sea otters on the ocean's surface, to squid and octopuses one mile down.

Nursing babies are at the very top of the food chain. Breast milk from Californian women contains fire retardants at levels approaching those that cause reproductive and neurological deficits in lab studies of animals. Dust in Californian homes contains four to 10 times the pentaBDE found in dust from other states and 200 times the amount in houses in Europe, according to a new study from the Silent Spring Institute. Worse, Californians have twice the level of this fire retardant in their blood as do people in other states. No other known toxins are found in homes at levels as high as these chemical fire retardants.

Are Californian families safer from fires because of the toxic chemicals in our couches? Probably not, since furniture fabric in California is not required to be fire resistant. In a fire, the upholstery fabric burns long enough to even ignite foam treated with fire-retardant chemicals. According to the National Fire Protection Association, fire data is not good enough to show whether the 28 years of putting toxic fire retardants into furniture and baby products in California has made any difference to fire safety.

The good news is that the death rate from fires has gone down considerably in California since 1980. But it has dropped either a similar amount or more in states that do not require retardants in their furniture. Although we cannot measure the increase in fire safety from fire retardants in furniture, we can identify the very fire retardants used to treat furniture in newly-born babies in the United States. After birth, they get an additional dose from their mothers' breast milk. The levels of flame retardants in toddlers' blood is three times that of their mothers'. Similarly, the same health disorders found in lab animals exposed to fire retardants are increasing in American children.

Another major problem is how to dispose of furniture, electronics and other consumer products containing halogenated fire retardants. If put in landfills, the chemicals can leach out and be recycled back into our food or water. If burned, they convert to highly toxic dioxins, which can remain in the human body for decades and in the atmosphere forever.

A better way to reduce fire deaths is by requiring fire-safe or self-extinguishing cigarettes. In these cigarettes, the paper has "speed bumps" of thicker paper. If left unattended or if the smoker falls asleep, the cigarette will extinguish itself when it burns to one of the thicker places with less oxygen, rather than smoldering for half an hour and starting a fire. Many US states, including California, require fire-safe cigarettes and the European Union has passed legislation requiring them as well.

The use of halogenated chemicals is primarily promoted by the three major producers: Albermarle, Chemtura and Israeli Chemicals Ltd. In order to create markets for their products, they lobby for legislation and standards requiring the use of fire-retardant chemicals in consumer products.

California's Bureau of Home Furnishings and Thermal Insulation (BHFTI), the state agency that oversees fire-resistant requirements for consumer products, is currently drafting Technical Bulletin 604 (TB604), which

would require filled bed clothing such as comforters, mattress pads and pillows to withstand open flame ignition. The requirement does not give any consideration to the health and environmental impacts associated with the chemicals that would likely be used, nor does it require labeling for consumers. TB604 has not yet implemented but is expected to be implemented in 2009, after a public comment period.

Before we add large amounts of toxic or potentially toxic fire-retardant chemicals to consumer products, the important questions are: do we need them? Is there a better way to reduce fire hazards without creating other health risks? As consumers we need information about the chemicals used in our couches, pillows and high chairs and our government should be aware of the human-health and environmental problems that can be caused by fire-retardant chemicals. These costs, coupled with the lack of proven benefit in some instances, indicate that the government should draft legislation and regulations to encourage manufacturers to develop safer alternative materials and technologies to reduce fire hazards. When chemicals are necessary, green chemistry research can provide safer alternatives.

CPSC Commissioner Thomas Moore says "No one wants to trade fire risks for chemical toxicity risks."

The chemicals we add to our products should not pose a greater hazard to our health and safety than the risk of the fires they are meant to reduce.

Arlene Blum, PhD, Executive Director of the Green Science Policy Institute, is a visiting scholar in chemistry at the University of California at Berkeley and has taught chemistry at Stanford, Wellesley, and U.C. Berkeley. She has written about toxics in Science, The New York Times, and the Los Angeles Times.

Elana Fishman is the Program and Finance Director of the Green Science Policy Institute.

[Green Science Policy Institute](#) provides unbiased scientific data to government, industry, and non-governmental organizations to facilitate more informed decision-making about chemicals used in consumer products.

Posted on March 11, 2009