

## WHAT ARE PBDEs?

*We found this comprehensive article from the LA Times to be very informative on PBDEs.*

*[At Home Naturally](#) ORGANIC MATTRESSES AND BEDDING CONTAIN NO PBDEs.*

*It is important to know that wool is a natural fire inhibitor and naturally spreads heat out so that it does not escalate or become concentrated in one area. Our mattresses are designed to meet and exceed the California State Flammability Standards as well as Federal Flammability Standards.*

Levels of Common Fire Retardants in Humans are Rising Rapidly

MARLA CONE / **LA Times April 20, 2003**

Cause for Alarm Over Chemicals (Excerpts)

Toxic chemicals used as flame retardants are rapidly building up in the bodies of people and wildlife around the world, approaching levels in American women and their babies that could harm developing brains, new research shows.

The chemicals, PBDEs, or polybrominated diphenyl ethers, are used to reduce the spread of fire in an array of plastic and foam products in homes and offices, including upholstered furniture (and bedding), building materials, televisions, computers and other electronic equipment.

This year, the European Union banned the two PBDE compounds that have been shown to accumulate in human bodies. Some European industries had already begun to phase out the chemicals, and levels in the breast milk of European women have begun to decline. \*But in the United States, no action to regulate the flame retardants has been taken, and their use continues to rise. About half of the 135 million pounds of PBDEs used worldwide in 2001 were applied to products in North America.

A single, small dose of PBDEs fed to newborn laboratory mice and rats disrupts their brain development, altering their learning ability, memory, behavior and hearing, according to three studies, two conducted in Europe and one at the U.S. Environmental Protection Agency. Mice fed less than 1 part per million of PBDEs performed poorly in maze tests and were hyperactive and slower to become habituated to new environments. The brains of newborn mice are altered when their bodies contain concentrations that are 10 to 100 times higher than levels already seen in some people in the United States today.

"That is not a comfortable margin of exposure," said Linda Birnbaum, director of experimental toxicology at the EPA's National Health and Environmental Effects Research Laboratory. Because concentrations in Americans are doubling every few years, it won't take long to close the gap.

Researchers say the effects on children are likely to be subtle -- not mental retardation or

disability, but (rather) measurable changes in a child's intelligence, memory, hyperactivity and hearing. "We're concerned about learning and memory and some behavioral effects and hearing loss," Birnbaum said.

Exposure is probably highest in North America because it is the only place still using the form of PBDE most likely to accumulate in humans and the environment. That compound, penta-BDE, is banned in Europe but is used in the polyurethane foam of furniture (bedding) and building materials in the United States. Much less is known about any health effects of PBDE compounds that are applied to computers and electronics equipment and whether they accumulate in bodies.

What disturbs scientists the most about PBDEs are their striking similarities to PCBs, which were widely used as insulating fluids in electrical transformers until they were banned in the 1970s because they were collecting in the tissues of people and wildlife. Like PCBs and the pesticide DDT, PBDEs are slow to break down, persisting in the environment and accumulating in human and animal fat. PBDE concentrations increase as the chemicals move up through the food web, peaking in top predators such as whales, dolphins, birds of prey and humans.

PBDEs mimic thyroid hormones, which regulate the growth of a baby's neurological system. Because of that, if exposure comes during a critical phase of brain growth, it can alter how the brain develops, said Eriksson, the Swedish toxicologist. "There is a window of development when these compounds cause effects," Eriksson said. In humans, that period lasts from the third trimester of pregnancy to a child's second birthday.

Although EPA Administrator Whitman maintains that not enough is known about the effects of PBDEs to warrant regulating them now, Birnbaum, the EPA's director of toxicology, said "there is no question" that the chemicals are altering thyroid hormones. Altering thyroid hormones during fetal development "can affect how the brain functions," she said.

Research teams at Stockholm University and other scientific institutions in Sweden have led the investigation of the flame retardants. The chemicals, developed in the 1970s, were first detected in the environment in 1981 in a river downstream from a textile manufacturing plant southwest of Stockholm.

As demand for flame retardants in electronics and furniture grew in the 1980s, PBDEs began to build up in nature and people, but few scientists thought to look for them. Then, in the mid-1990s, Swedish scientists checked women's breast milk and discovered that levels of PBDEs had increased sixty-fold.

Stockholm University researcher Daiva Meironyte-Guvenius said the growth in breast milk "was very scary. The reaction here in Sweden was very powerful." Facing public and political pressure, companies in Europe began to voluntarily phase out use of the most persistent flame retardants in the late 1990s.

PBDEs also are showing up in wildlife worldwide, settling in oceans and lakes just as PCBs and DDT did. Even polar bears near the North Pole and sperm whales feeding in deep ocean waters are contaminated with them. The effects on wildlife are unknown.

Some environmental scientists say the discovery of PBDEs near the North Pole proves their global spread, and that this should be an impetus for U.S. regulators to take precautionary measures as soon as possible. Many say they are dismayed that industry and society have forgotten lessons learned from the toxic legacies of the past.

"We knew less about PCBs when they were banned than we know about PBDEs today," Bergman said. Those of us who have been around for a while say, "didn't we learn from PCBs?"

\* Please see PBDE Updates regarding state banning, since this article was written.



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