



Toxic Sofas

By Andy Isaacson, Earthscope Reporter

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Some firefighters are heroic, and others so it seems, are toxic. New studies issued in the past month raise further concerns that brominated flame-retardant compounds known as polybrominated diphenyl ethers, or PBDEs -- commonly manufactured into household products such as couches, carpets and computers -- are pervasive in Bay Area wildlife and humans at alarming levels.

Scientists at the Hazardous Materials Laboratory in Berkeley studying seabird eggs in the Bay Area have found the world's highest levels of PBDEs to date. Seabirds, they said, are useful for monitoring and assessing ecosystem health at various times and places "because they occupy a high trophic level in the marine food web, are long-lived, and are generally localized near their breeding and nonbreeding sites." Similar results were found in Bay Area angler-caught fish and harbor seals.

Another study published in Environmental Science and Technology in September detected low levels of PBDEs in meat, fish and dairy products from U.S. supermarket shelves. The findings add to mounting evidence that PBDEs, which have been discovered in breast milk, blood and household dust, are higher in the United States than elsewhere in the world — in the case of breast milk, 75 times the average found in recent European studies.

"We have limited understandings of how this stuff gets into the environment and the transport mechanisms — it's hard to get the big picture," says Arthur Holden, a scientist at the California Department of Toxic Substances and Control, and a co-author of the seabird study.

What is known is that fire-retardant chemicals are persistent in the environment — migrating as far as the Arctic — and bioaccumulative, building up in people's bodies over a lifetime. PBDEs seem to behave in lab rats like PCBs, their chemical relatives banned in 1976 after being linked to birth defects, neurological damage and thyroid imbalances in humans. The prevalence of fire retardants in breast milk is a worrisome indicator that a mother can pass the chemicals on not just to a nursing infant, but more critically, to the unborn fetus at a period in human brain development most vulnerable to impacts from neurotoxins.

PBDEs are blended into plastics and foams during the manufacturing of household products like computer casings, sofa cushions and carpets. If objects containing PBDEs reach extremely hot temperatures, they release atoms called bromines that rob the air of the oxygen needed to start or feed a fire. California's fire codes require products to meet strict safety standards.

The main areas of bromine production in the world are southeastern Arkansas, where the only two U.S. manufacturers of PBDEs — Great Lakes Chemical and Albemarle — extract it from underground pools of brine, and Israel, where Dead Sea Bromine mines it from the inland sea.

Last year, California was the first state to enact legislation, effective 2008, banning two common types of fire retardants — octa- and penta-BDEs — and a handful of other states, including New York and Maine, are following suit. (The European Union's ban on these types took effect last August.) In the wake of this legislation — and prodded by the EPA — Great Lakes Chemical announced that by 2005 it would voluntarily phase out production of penta and octa (a prefix referring to the number of bromine atoms attached to the molecule). Many companies, including IKEA, Sony and IBM, have begun to phase out PBDEs even without a regulatory mandate.

However, researchers expect PBDE levels will increase. Even with the impending phase-out of two types of PBDEs, the most common type, deca, is still being manufactured, and it will take decades for the chemicals already in the environment to complete their life cycle. California's ban did not include deca because of incomplete science and arguments from the chemical industry that deca molecules were too big to be absorbed by people's bodies. Yet recent research has shown that in fact the body can, that UV light breaks down deca into smaller, more toxic compounds, and that thyroid system enzymes — as observed in fish — may also do the same.

“Under our old pollution mentality, we used to think of smokestacks as responsible for our exposure to hazardous chemicals,” said Sonya Lunder, an analyst with the Environmental Working Group in Oakland and a co-author of studies on household dust and breast milk. “But we're finding chemicals in everyday household products — furniture, Teflon pans, cosmetics — to be very dangerous.”