

Here We Go Again: PBDEs

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A new class of toxic chemicals has been discovered in breast milk, in human blood, in food, in remote rural air, in wild fish, and in the sewage sludge being applied as fertilizer on food crops across the U.S. A Canadian health official recently summed up the discovery saying, "This stuff is everywhere." [1] The newly-discovered contaminants are brominated flame retardants. Bromine is a highly-reactive chemical element, a halogen in the same class as chlorine and iodine. Worldwide, eight chemical corporations manufacture about 300 million pounds of brominated fire retardants each year, of which about 80 million pounds are members of the class known as polybromo diphenyl ethers, or PBDEs. [2] Although all brominated fire retardants seem capable of creating environment and health problems, here we will focus on PBDEs, which leach into the environment from the plastics in appliances, TVs and computers, foam in upholstery, and the fabrics of carpets and draperies. Many hard styrene plastics and many foam padding materials are 5% to 30% PBDE by weight. Like their cousin PCBs (polychlorinated biphenyls), many PBDEs persist for years in the environment, accumulate in the food chain and concentrate in fatty tissues. A recent survey of the PBDE literature revealed that some PBDEs can cause cancer, interfere with hormones, and disrupt normal growth and development in laboratory animals. [3] Recent studies have shown that these brominated compounds can interfere with the thyroid hormone, which is critical for the proper development of the brain and central nervous system in animals and humans. Baby mice exposed to PBDEs show permanent behavioral and memory problems, which worsen with age. [3,4] Because PBDEs are found at very high levels in computers, carpets and the foam padding inside furniture, the thick dust covering "ground zero" in lower Manhattan doubtless contains substantial quantities of PBDEs, so anyone breathing the air there without proper safety equipment is inhaling these toxicants. The dust at the site of the World Trade Center atrocities resulted from "thousands of plastic computers, acres of flammable carpet, [and] tons of office furniture...." pulverized when the twin towers and other nearby buildings collapsed September 11. To make matters worse, a portion of this high-tech dust is being continuously incinerated by a stubborn fire smoldering beneath the rubble. [5] In several "risk assessments" of air pollution hazards at "ground zero" U.S. Environmental Protection Agency (EPA) has concluded that the air in lower Manhattan is safe for workers and residents, [6] but EPA's risk assessment did not consider PBDEs (nor did it consider many other chemicals probably present in that air). Notably, in spite of EPA's assurances of safety, more than 4000 people have developed

chronic chest pain, a persistent cough now known as "world trade center cough" and asthma-like (or emphysema-like) breathing problems from exposure to the air in lower Manhattan.[7] EPA has also employed risk assessment to declare the use of contaminated sewage sludge "safe" as fertilizer on food crops, but here again EPA did not consider the effects of PBDEs (or many other chemicals) on the crops, on people eating the crops, or on the natural environment in which the crops are grown. An estimated 8 billion pounds of contaminated sewage sludge are routinely spread onto farmland in the U.S. each year. In July of this year researchers reported finding high concentrations of PBDEs in 11 samples of sewage sludge from Virginia, New York and California.[8] This of course is one of the unavoidable failings of a risk-assessment approach to managing toxic chemicals - you can only (partially) assess the risks of chemicals that you know a great deal about. U.S. chemical manufacturers introduce about 1000 new chemicals into commercial use each year with no safety testing required and little or none done. Typically, safety testing only begins after industrial chemicals have been discovered causing harm 10 to 20 years after introduction. Risk assessments are always "behind the curve" and therefore always give false assurances of safety. An alternative to the risk assessment approach is to take precautionary action as soon as evidence of harm begins to emerge. A recent survey by a group of Scandinavian researchers reports that PBDE levels have been increasing exponentially in the environment in Sweden for 30 years and show no sign of leveling off. [2] Recent studies indicate that the U.S. is far more contaminated than Sweden. For example, sewage sludge in the U.S. contains 10 to 100 times as much PBDE as does European sludge.[8] Other major sources of PBDEs are thought to be municipal incinerators and landfills.[2] PBDEs can also volatilize (ooze into the air) out of electrical components, especially from warm devices such as computers and TV sets. PBDEs are not very soluble in water, but they dissolve readily in fat. They are also persistent in the environment (meaning they break down only slowly). As they move through the food chain, they concentrate and biomagnify. These are the very characteristics that have caused other industrial poisons to be labeled bad actors and yanked from the market, including DDT and PCBs. Given these characteristics, it was no surprise when Scandinavian scientists reported earlier this year that PBDEs have been increasing exponentially in breast milk in Sweden since 1972, the concentration doubling every 5 years. [2] The researchers emphasized that current levels in breast milk, and in the Swedish diet, are far below the levels known to harm laboratory animals, but they concluded that "the time trend of PBDEs in human breast milk is alarming for the future." No one knows for sure what the effects of PBDEs might be on developing embryos or suckling infants. (To inform yourself about the KNOWN consequences of contaminated breast milk, read Sandra Steingraber's electrifying new book, *HAVING FAITH; AN ECOLOGIST'S JOURNEY TO MOTHERHOOD*.[9] It is worth emphasizing here that breast milk, even laced as it is with low levels of industrial poisons, is still the best food for infants because all the alternatives are worse.) PBDEs are now everywhere. European researchers have found PBDEs in freshwater and ocean fish (salmon, herring, sprat), in air at remote rural locations, in sewage sludge, in deep ocean sediments, in eels, seals, shellfish, bottlenose dolphins, porpoises, pilot whales, and crabs,

among other species. Based on limited studies, the Great Lakes appear to be among the most PBDE-contaminated bodies of water in the world, with Lake Michigan the worst.[2] Studies in Germany, Holland, Sweden, Japan and the U.S. have reported the presence of PBDEs in fish, meat, cow's milk, fats/- oils, and bakery products. Studies of human blood in the U.S. have revealed PBDEs in all samples. In 1999 the Swedish Chemicals Inspectorate concluded that, "The lower-brominated technical PBDE compounds, containing mostly pentaBDE, are persistent, bioaccumulative and toxic in the aquatic environment. They show effects above all on the liver but also on thyroid hormone and affect the behaviour of mice. They occur widely in the environment, in human blood and in mother's milk." [10] In Sweden, this combination of characteristics triggers precautionary action to remove such chemicals from the market. Denmark and the Netherlands have also taken steps to ban PBDEs.[2,11] In September the European Union decided to take precautionary action without waiting for conclusive scientific evidence of harm. The European Parliament voted September 6 to ban the use, manufacture, and import of some forms of PBDEs during the next few years, but the European Council of Ministers must approve the ban before it becomes law. Naturally, all such bans will be subject to challenge in the secret tribunals of the World Trade Organization (WTO) if any of the world's eight manufacturers of PBDEs decides to fight for its self-declared "right" to turn a profit by discharging industrial poisons into the environment. The manufacturers have reportedly expressed "furious opposition" to the European ban.[11] One of the main purposes in setting up the WTO was to allow corporations (acting through pliant governments) to use "risk assessment" to challenge and repeal the health and safety regulations of any and all nations. Prior to the WTO, corporations had no way to challenge the health and safety policies of all nations simultaneously, so the WTO offers remarkable new efficiencies in this regard. Risk assessment is ideally suited for such a purpose, especially when little is known about the chemicals being assessed. The less is known, the safer the chemicals can be made to appear - just as with the air at ground zero. The U.S. government has no regulations governing the manufacture, use, or disposal of PBDEs, and has announced no plans to initiate regulations. U.S. chemical policy is still in a primitive state, guided by the philosophy, "Don't ask, don't tell." PBDEs are similar in chemical form, and in many of their actions, to PCBs (polychlorinated biphenyls), which are among the most dangerous and persistent chemicals ever let loose by corporate imprudence. The U.S. banned PCBs in 1976, when much less was known about PCBs than is known about PBDEs today. But our political situation is far different today than it was in 1976. Corporations today are much more powerful and governments are substantially weaker. Corporations have succeeded in embedding risk assessment into all U.S. government decision-making processes, so precautionary action is nearly inconceivable within most agencies of government. The public is much better informed, but its democratic institutions (public schools, the press, the judiciary, Congress and the executive branch) have been hijacked by corporate money and now mainly serve powerful elites, regardless of the general welfare. Within 10 to 15 years PBDEs will have surpassed PCBs as environmental hazards. Breast milk studies indicate that the danger to infants and children is rapidly rising. Who will lead this fight to allow us to take

precautionary action against the corporate poisoners? - - - [1] Charlotte Shubert, "Burned by Flame Retardants?" *SCIENCE NEWS* Vol. 160 (October 13, 2001), pgs. 238-239. [2] Per Ola Darnerud and others, "Polybrominated Diphenyl Ethers: Occurrence, Dietary Exposure, and Toxicology," *ENVIRONMENTAL HEALTH PERSPECTIVES* Vol. 109 Supplement 1 (March 2001), pgs. 49-68. [3] Kim Hooper and Thomas A. McDonald, "The PBDEs: An Emerging Environmental Challenge and Another Reason for Breast-Milk Monitoring Programs," *ENVIRONMENTAL HEALTH PERSPECTIVES* Vol. 108, No. 5 (May 2000), pgs. 387-392.

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