

November 14, 2016

Ms. Kara Steward
Washington Department of Ecology
Hazardous Waste & Toxics Reduction Program
P.O. Box 47600
Olympia, WA 98504-7600;

Subject: Children's Safe Products Reporting Rule, Chapter 173-334 WAC - Review of the inclusion of CAS#84852-53-9 Ethane,bis(pentabromophenyl); 1,2 bis[2,3,4,5,6-pentabromophenyl]ethane or Decabromodiphenyl ethane (EBP) on the existing list of Chemicals of High Concern to Children (WAC-173-334-130)

Dear Ms. Steward,

Albemarle Corporation appreciates the opportunity to provide comment on the Children's Safe Products Reporting Rule, Chapter 173-334 WAC. Albemarle Corporation is a manufacturer and supplier of EBP and has been since the late 1980's. EBP is an important tool for imparting fire safety to a number of products. Its stability, safety and relatively high bromine content make it an efficient and important contributor to the safety of a number of industrial and household products.

I would like to bring some concerns to your attention associated with the potential inclusion of EBP in the CHCC list.

Use of Design for EPA's Design for Environment rating information for toxicity assessment

The EPA's Design for Environment (DfE) alternatives assessments are not regulatory instruments. As an EPA press release says, the hazard characterizations in the report are "*largely computer-model generated estimates.*" "*Laboratory testing and ongoing environmental monitoring are necessary to fully understand the potential for concern associated with these chemicals.*" Therefore, interpretation of these hazard profiles should be done with care.

The Design for Environment has some limitations when used in a regulatory context. Importantly:

- DfE is not intended for regulatory purposes.
- The alternatives assessment was originally drafted in 2012 (finalized in 2014) and has no accommodation for incorporating new science.

- Where empirical data was lacking at the time, as mentioned in the report, “DfE filled gaps with modeled data estimations and expert judgment.” The process, decision making and names of those experts are not available.

Some Existing Evaluations of EBP

EBP entered commerce in the United States following the enactment of the Toxic Substances Control Act (TSCA). Therefore it was subject to review by the U.S. EPA prior to production and sale.

An evaluation of EBP had been conducted by the UK Environment Agency in May of 2007. This evaluation concluded with respect to human health, “*Overall, no hazards have been identified in relation to acute toxicity, irritation, mutagenicity, carcinogenicity or reproductive toxicity.*”

Environment Canada published a draft screening assessment of EBP in October 2016 evaluating existing literature. Regarding human health, the assessment concluded, “*DBDPE is not harmful to human health.*” In this case, DBDPE stands for “Decabromodiphenyl Ethane.”

Albemarle has conducted and continues to conduct studies to assure the safety of EBP in its intended uses. I’ve attached a summary of some (not all) of the testing having been performed on EBP by Albemarle. This summary may be found at this site:

<http://albemarle.com/products---markets/bromine-specialties/fire-safety-solutions/fire-safety-facts/product-information-2134.html>.

Applications of EBP

As mentioned earlier, EBP is an important and efficient flame retardant. It improves fire safety in a number of applications. However, it is not expected to be used in important applications of relevance to the reporting rule. A review of the Washington State Department of Ecology Product Testing Data database, found at <https://fortress.wa.gov/ecy/ptdbpublicreporting/> provides some valuable insight on the intended uses of EBP in a household context. There are 30 entries in the database referring to EBP as of this writing. However, of the 30, only four of the entries indicate that EBP was positively identified. Of these four, two were paper shredders, one was a heated foot warming pad and one was plastic surrounding the battery of a tablet computer. These applications are either electronic or are associated with electrical power sources (fire hazards) and seem logical applications for EBP. The remainder of the list are characterized by “tentatively identified” or “not detected above the reporting limit.” Included in this set are a number of appliances, but also some children’s furniture items and pajamas. These particular results should be taken with a grain of salt. As versatile as EBP is, it is not a suitable flame retardant for formulation in furniture foam (it is a solid and not a liquid that may be blended with foam formulations). Neither is it suitable for garments beyond certain specialty applications in military, industrial or firefighting equipment. Findings below limits of quantification are not sufficient to provide any fire

safety benefit. EBP is known to adhere to chromatography columns giving reason to wonder if any trace found may be associated with remnants of a prior analysis or possibly the presence of EBP in laboratory electronics not related to the intended samples.

Summary

EBP is an important flame retardant that enhances fire safety to the benefit of society. It has been studied extensively by regulatory agencies and it benefits from a large body of scientific data attesting to its safety in use. EBP is a versatile flame retardant, but excluding electronics, its utility in children's products and furniture is extremely limited. Including EBP on the list of Chemicals of High Concern for Children may only add to the confusion of producers and consumer of products subject to the reporting rule without benefiting society.

Thank you in advance for consideration of Albemarle's comments. Should you have any questions you may reach me at 1-225-388-7503.

Sincerely,

A handwritten signature in blue ink that reads "Steven W. LeVan". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Steven W. LeVan
Albemarle Corporation
451 Florida St.
Baton Rouge, LA 70801

Product safety profile for:

SAYTEX® 8010 Flame Retardant

Decabromodiphenyl Ethane; S8010; DBDPEthane; EBP; CAS # 84852-53-9; Ethane, bis(pentabromophenyl); 1,2 bis[2,3,4,5,6-pentabromophenyl]ethane

Summary: Decabromodiphenyl ethane's (DBDPEthane) toxicology has been explored in a series of mammalian and environmental tests. In mammalian testing, DBDPEthane was not acutely toxic or irritating, did not cause skin allergy, was not mutagenic, did not cause toxicity on repeated doses of up to 1000 mg/kg/d, and did not affect prenatal development of two species at doses up to 1250 mg/kg/d (Hardy et al. 2002; Hardy et al. 2010). DBDPEthane's profile is likely related to its poor uptake into the body (Hardy 2012; Sims 2004; Griffin 2008).

DBDPEthane has also been evaluated for its potential to effect sewage and soil bacteria, earthworms, plants, aquatic and sediment organisms, and to undergo biodegradation or bioconcentration (Hardy et al. 2011; Hardy et al. 2012; Hardy 2004; Hamaya 1991; Schaeffer and Carpenter 2010; Schaeffer and Matthews 2011). The NOECs were equivalent to the highest dose tested for sewage bacteria (>10 mg/kg), soil bacteria (>2500 mg/kg dry soil), earthworm survival (>3720 mg/kg dry soil) and emergence and growth for 3 plant species (>6250 mg/kg dry soil). Earthworm reproduction was not affected at 2210 mg/kg dry soil. The lowest NOEC in 3 other plant species was 1563 mg/kg dry soil. Biodegradation studies indicate DBDPEthane is unlikely to be degraded in the environment. Neither bioconcentration (water) nor bioaccumulation (diet) in aquatic organisms is expected.

The lowest NOEC were used to calculate predicted no effect concentrations (PNEC) for sewage treatment, soil, and sediment of 2500 mg/kg, 156 mg/kg, and 100 mg/kg, respectively (Hardy et al. 2011, 2012). The calculated PNECs indicate DBDPEthane presents little risk to organisms in these compartments.

Human Health

- Not acutely toxic (see Hardy et al. 2002)
 - Oral LD50 > 5000 mg/kg
 - Dermal LD50 > 2000 mg/kg
- Not a skin or eye irritant (Hardy et al. 2002)
- Not mutagenic (see Hardy et al. 2002)
 - Ames, Chromosome Aberration
- Skin sensitization (Newton 2003)
 - Not a sensitizer
- 28 Day rat (gavage) (see Hardy et al. 2002)
 - No effects
 - 1250 mg/kg/d
- 90 Day rat (gavage) (Hardy et al. 2002)
 - No adverse effects
 - 1000 mg/kg/d

- Prenatal development, rat (gavage) (Hardy et al. 2010)
 - No effects
 - 1250 mg/kg/d throughout gestation
- Prenatal development, rabbit (gavage) (Hardy et al. 2010)
 - No effects
 - 1250 mg/kg/d throughout gestation

Human Exposure

- Median U.S. house dust levels were reported to be 201 ng/g with a range of <10 – 11070 ng/g (Stapleton et al. 2008). A child's estimated daily intake of DBDPEthane from the dust would be ~40 ng/d with a range of <2 – 2214 ng/d. In comparison, an oral reference dose calculated from the 90-d NOAEL and EPA's maximum uncertainty factor (3000) is 5,000,000 ng/d (Hardy et al. 2008). A child's dust exposure is 0.0008% of this value.
- Some studies have reported detection of DBDPEthane in various environmental media. The analysis of DBDPEthane is extremely difficult due to its poor solubility, very low vapor pressure, high melting point and tendency to adsorb to surfaces. Many of the reports used highly sensitive, but not specific, methods of analysis (Hardy and Ranken 2008; Banasik et al. 2010). Thus, it is not clear that DBDPEthane was actually detected. For information on analytical methods see Konstantinov et al. 2006 and Kolic et al. 2009.

Ecotoxicology

- Not acutely toxic to aquatic organisms (Hardy et al. 2012)
 - LC50 fish, algae, daphnia > 110 mg/L (water accommodated fraction)
- Not chronically toxic to sediment organisms (Hardy et al. 2012)
 - NOEC for survival, reproduction and growth of *L. varigatus* > 5000 mg/kg dry sediment
 - NOEC for survival, reproduction and growth of *C. riparius* > 5000 mg/kg dry sediment
- Not toxic to sewage sludge bacteria (Hardy et al. 2011)
 - NOEC ≥ 10 mg/L
- Not toxic to soil bacteria (Hardy et al. 2011)
 - NOEC ≥ 2500 mg/kg dry soil
- Not toxic to earthworms (Hardy et al. 2012)
 - NOEC for survival and growth = 3720 mg/kg dry soil
 - NOEC for reproduction = 1910 mg/kg dry soil
- Not toxic to plant emergence and growth (Hardy et al. 2011)
 - NOEC for emergence, survival and growth in six plants ≥ 1563 mg/kg dry soil
- Did not bioconcentrate in fish from water
 - Fish BCF < 25 (see Hardy 2004)
 - Publications claiming "accumulation" use the term to indicate detection; detection does not equate to the regulatory definition of "bioaccumulation"
- Expected to be persistent

- U.S. EPA's estimation software predicts will mainly distribute to soil and sediment and be persistent
 - EPA's definition of persistent in soil and sediment is half- lives > 6 months
- Not readily biodegradable by aerobic sewage treatment bacteria within 28 d (Hamaya 1991)
- Not inherently biodegradable by aerobic soil and sewage bacteria within 90 d (Schaeffer and Carpenter 2010)
- Not biodegradable by anaerobic sewage bacteria within 60 d (Schaeffer and Matthews 2011)
 - Typical holding time in anaerobic sewage digester is ~ 1 month

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