

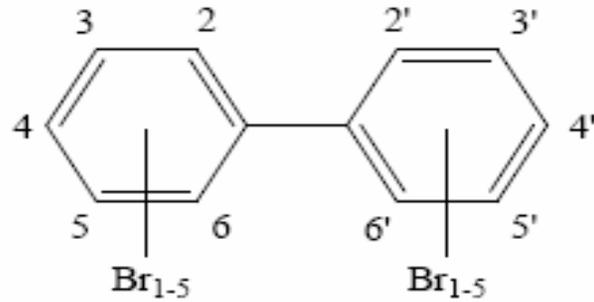


Toxic Tragedy: The Fire Retardant Dilemma



www.greensciencepolicy.org

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Polybrominated Biphenyls (PBBs)

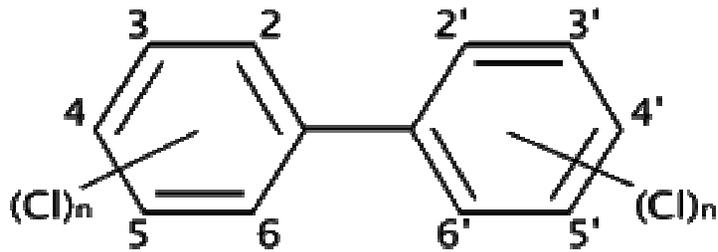
209 theoretically possible congeners

Divided into ten homolog groups, mono to decabromo

PBBs were accidentally mixed with livestock feed in 1973 in Michigan. Million of animals (chickens, cattle, pigs, and sheep) that ate the contaminated feed had to be destroyed.

PBBs can cause nervous, immune, liver, kidney, and thyroid disease and are likely human carcinogens.

PBB production ceased in 1976



Polychlorinated Biphenyls (PCBs)

209 theoretically possible congeners

Divided into ten homolog groups, mono to decabromo

PCBs cause cancer and adverse immune, nervous, reproductive, and endocrine effects.

PCBs are probable human carcinogens. US EPA

PCBs banned in 1977

Brominated Tris Flame Retardant

Tris (2,3-dibromopropyl) phosphate



- Used to treat children's sleepwear 1975 to 1977
- Up to 10% of fabric weight
- Padded on, not attached
- Absorbed in children's bodies; metabolite found in their urine



**U.S. Consumer Product
Safety Commission**

CPSC Bans TRIS-Treated Children's Garments

FOR IMMEDIATE RELEASE

April 7, 1977

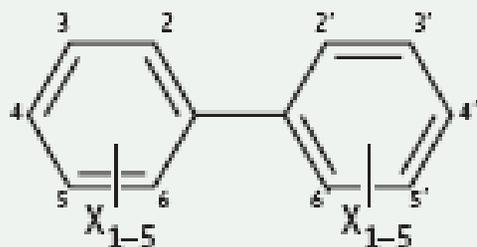
Release # 77-030



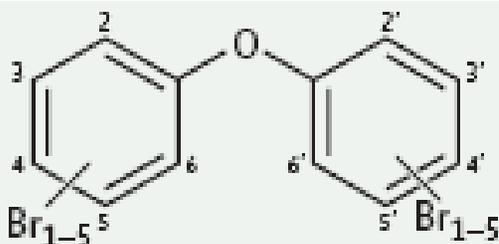
Since the 1980s:

**Technical Bulletin 117 (TB117)
California Open Flame Furniture Standard**

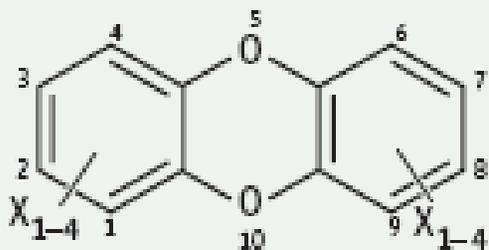
- Polyurethane foam in furniture must withstand a 12-second exposure to an open flame. No flammability requirement enforced for fabric.
- Only California has a furniture flammability standard.
- Only PentaBDE was added to furniture foam from 1980 to 2004. Used in amounts up to 10%.



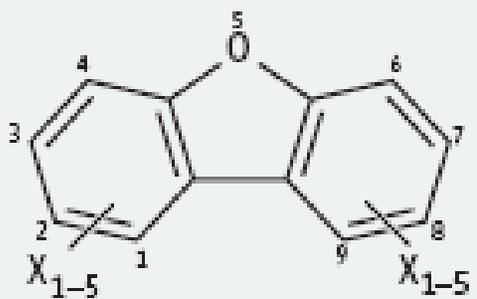
PCBs (X = Cl) and PBBs (X = Br)



PBDEs



Dioxins (X = Cl or Br)



Furans (X = Cl or Br)

PBDEs used in:

1. foam in furniture, baby products and carpet padding
2. plastic housings for TVs and other electronics
3. fabric back-coating

Levels up to 10 % by weight

Chemical Fire Retardants Slow but do not stop Fires

August 9, 2003

**California Bans Penta and Octa-BDE
(Six other states and the EU follow)**

November 3, 2003

**Great Lakes Chemical Co.
agrees to voluntarily cease
Penta-PBDE production.**

**Replacements: Firemaster 550
Chlorinated Tris**

PentaBDE replacements: Firemaster 550

EPA Design for the Environment predicted reproductive, neurological, & developmental toxicity as well as persistent degradation products in 2004

In 2005, Chemtura agreed to doing a reproductive, developmental toxicity, migration study by Jan 2009.

Chemtura has provided some data in November which is being analyzed by the EPA

Firemaster 600 is replacing 550

Firemaster 550 is found in dust and sewage sludge

1. Triphenyl Phosphate (highly eco-toxic)
2. Triaryl phosphate isopropylated (reproductive toxin)
3. Bis(2-ethylhexyl) tetrabromophthalate
4. 2-ethyl hexyl 2,3, 4, 5-tetrabromobenzoate



Most Chemicals in the U.S. are not Regulated

The U.S. Toxic Substances Control Act (1979)

- 62,000 chemicals in commerce “grandfathered”
 - Since then, EPA has restricted only five of these
- Burden of proof is on EPA to show toxicity
- 20,000 new chemicals have been introduced
 - No environmental or health data required
 - 85% have no health data; 67% no data at all
- EPA has six weeks to show cause for harm, often with no data
- Little protection for public health or environment



Change at the EPA

EPA Administrator Lisa Jackson memo, 1/23/09:

"More than 30 years after Congress enacted the Toxic Substances Control Act, it is clear that we are not doing an adequate job of assessing and managing the risks of chemicals in consumer products, the workplace and the environment.

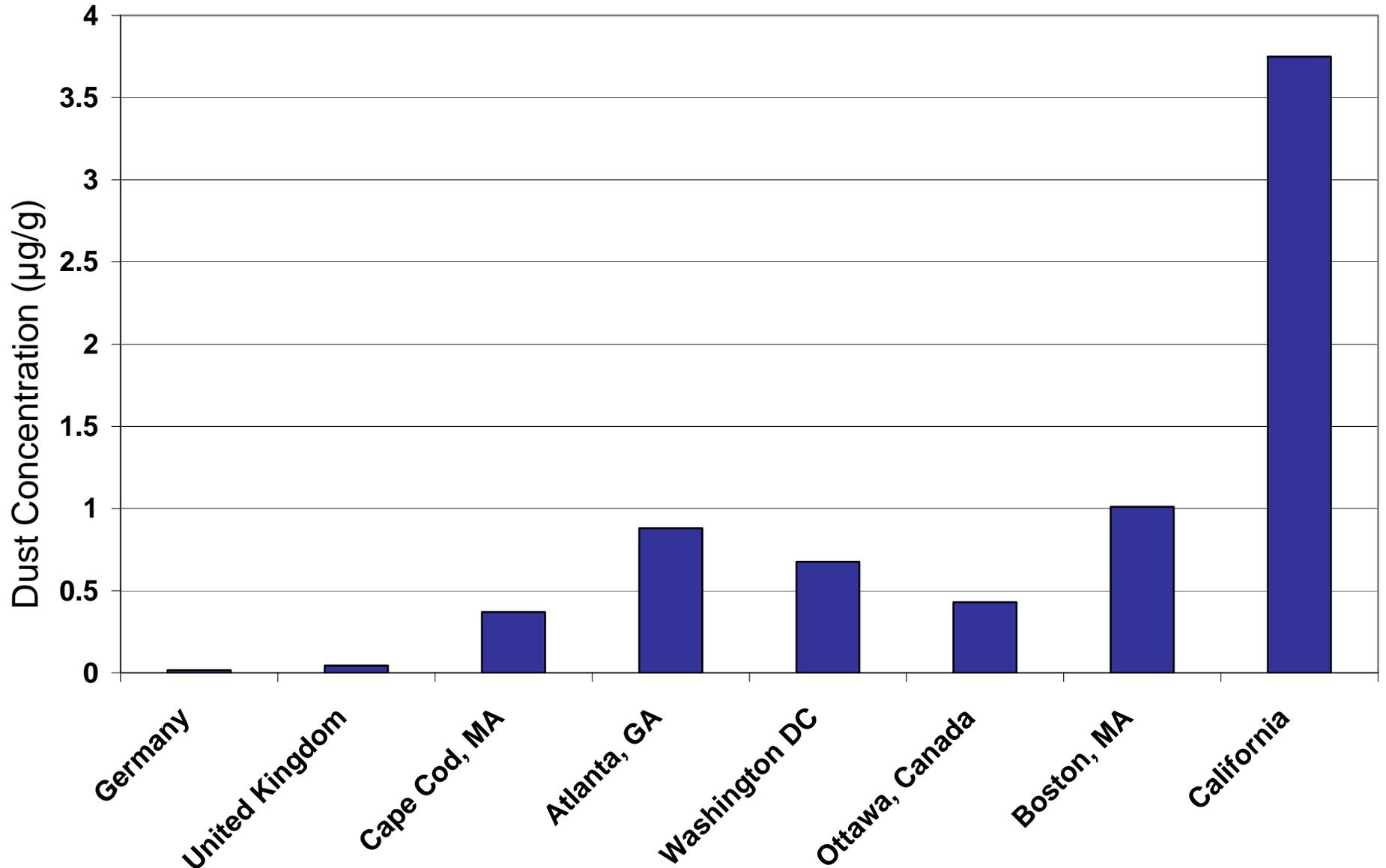
It is now time to revise and strengthen EPA's chemicals management and risk assessment programs...."

<http://www.epa.gov/administrator/memotoemployees.html>



My Cat Midnight has thyroid disease & a high PBDE body burden

BDE-99 fire retardant concentration in household dust



From: Zota et al., 2007 ISEA annual meeting.
Silent Spring Institute

Los Angeles Times

Did the state kill my cat?

Fire-retardant chemicals required by California in furniture may be poisoning us.

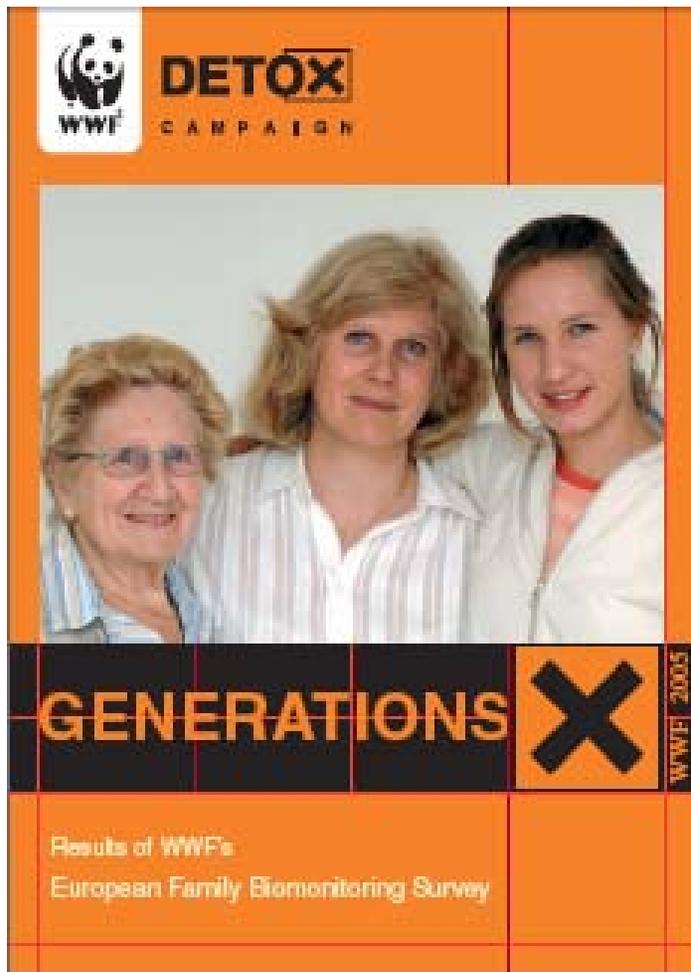
By Arlene Blum PhD, October 17, 2008



http://www.latimes.com/news/opinion/sunday/commentary/la-oe-blum17-2008oct17_0,6525043.story

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WWF Body Burden Study of Three Generations



- Professor Jacqueline McGlade, Executive Director of the European Environmental Agency (EEA), and her daughters had highest PBDE levels.
- Lived in the U.S. and Canada for eleven years

Human effects of PCBs

- In utero exposure to PCBs in concentrations slightly higher than those in the general population can have a long-term impact on intellectual function

Jacobsen and Jacobsen
1985 -1996

Are California's Children at Risk?

- Double the amount of penta-BDEs was found in the blood of California residents compared to the nationwide average.
- An Environmental Working Group study shows toddlers' bodies have an average of three times the levels of pentaBDE fire retardant found in their mothers and bear some of the heaviest burdens of flame-retardant pollution in the world

What is my daughter's PBDE level?

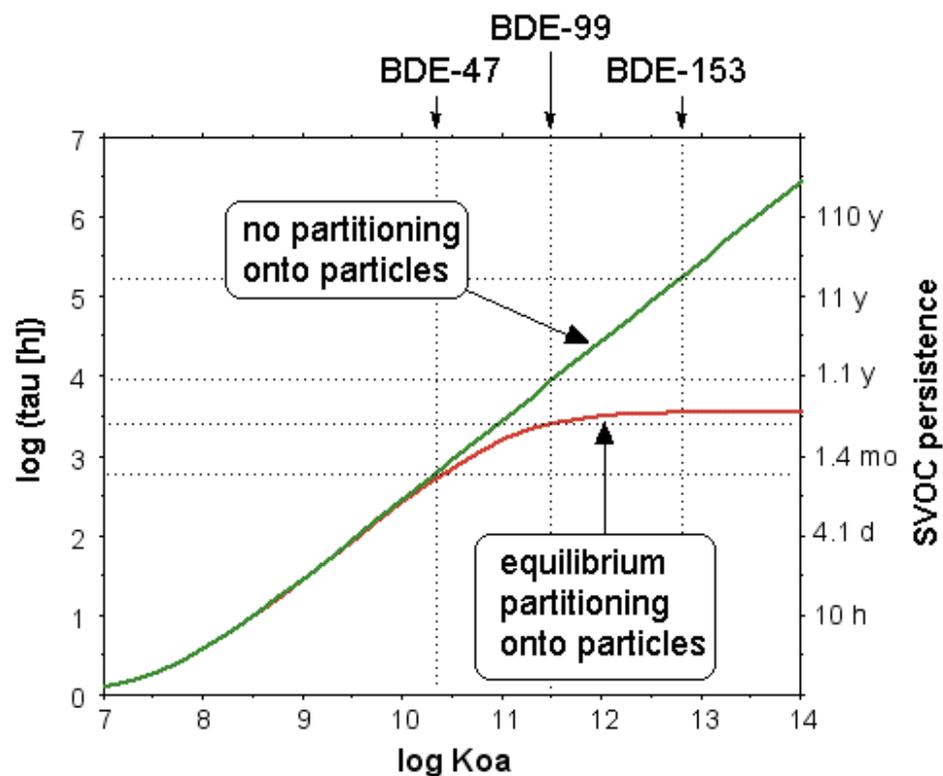


Can it be reduced through diet?

Olestra? Other ideas?

PBDEs persist in homes

- PBDEs are semivolatile organic compounds. They migrate from furniture into indoor air and sorb to indoor surfaces
- PBDE estimated persistence after sources are removed:
 - BDE 47: ~ 1 mo
 - BDE 99: ~ 3 mo - 1 y
 - BDE-153: ~ 4 mo - 20 y



Source: CJ Weschler and WW Nazaroff,
Atmospheric Environment **42**, 9018, 2008.

A PBDE exposure ‘time bomb’

- PentaBDE in furniture is slowly “bleeding” into the outdoor environment.
- Our main exposure route may shift from indoor air and dust to diet.
- Owing to its persistence, PBDEs will become amplified in food chains.
- Critical needs: (a) reduce the existing indoor reservoir and (b) properly manage the end-of-life for PBDE-containing products.

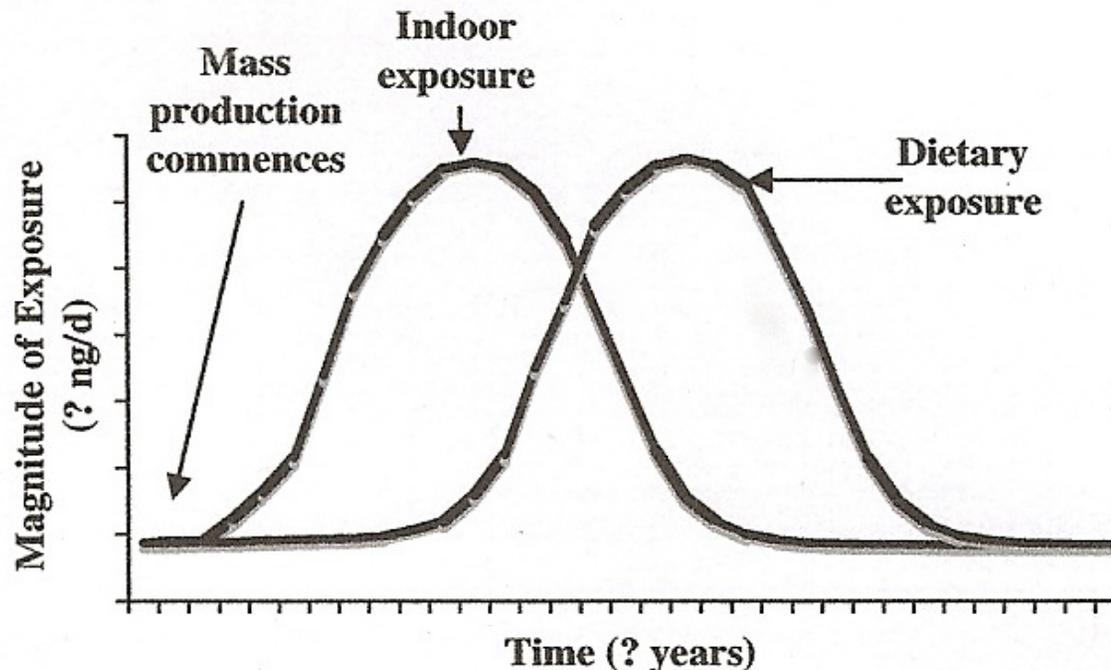


Figure source: Harrad and Diamond, 2006 *Atmospheric Environment*



Where should all the PBDE furniture go?

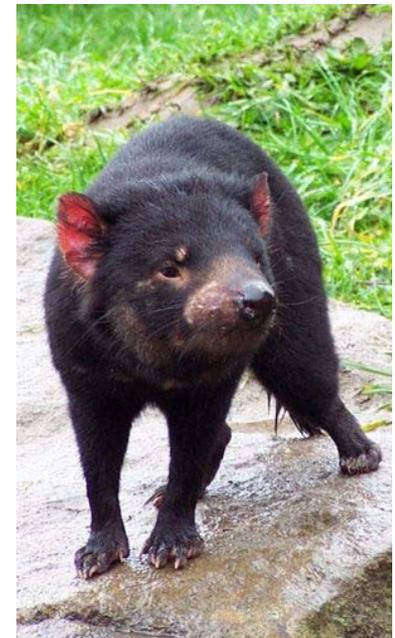
A billion lbs of recycled foam carpet cushion is produced annually



- Foam trim from the manufacture of furniture is mixed with previously used foam and recycled into bonded carpet cushion, “a recycling success story.”
- The Carpet Cushion Council has obtained exemptions from pentaBDE bans for recycled materials in carpet cushion.
- They assume current FRs are safe

Is PentaBDE safer in carpet cushion
than in landfills?

Halogenated Flame Retardants Are Ubiquitous and Believed to Impact Health of Wild Animals





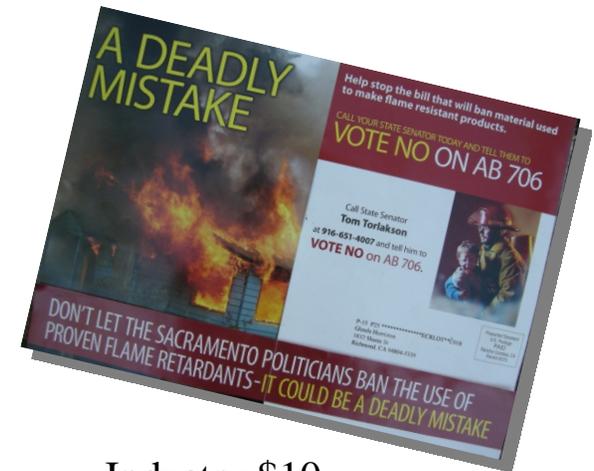
AB 706: Improving Fire Safety and Stopping Toxics



Based on
Blum's Op-ed



Introducing bill with Mary Brune
(MOMS), Russell Long (FOE),
Mark Leno, and Andrew McGuire



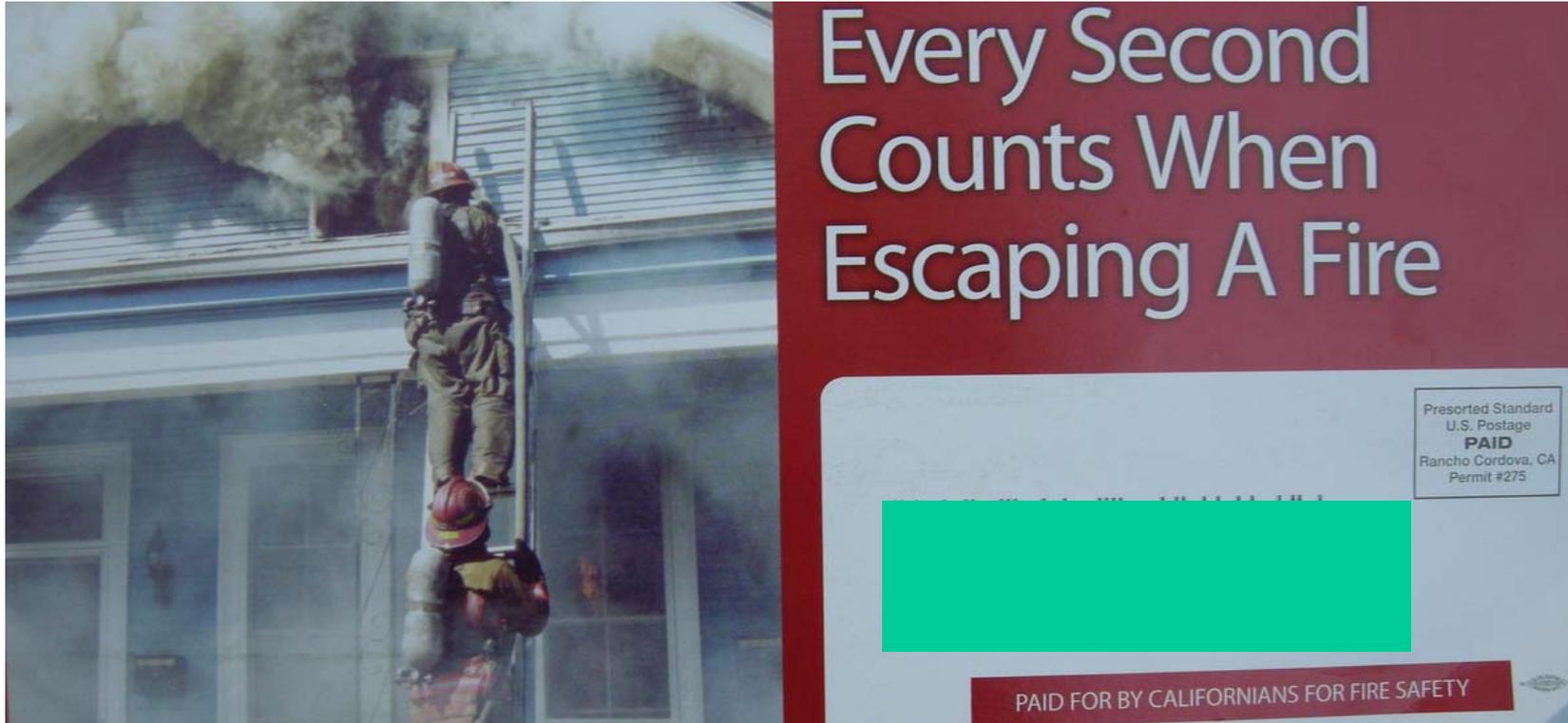
Industry \$10
million media blitz

- Replaces old foam standard which led to high levels of chemicals with a new fabric standard similar to the proposed federal standard.
- Defeated after PR and lobbying campaign by chemical industry.

Don't Let Sacramento Weaken Fire Safety.



California has some of the toughest, most progressive fire safety standards in the country — including the only regulation in the country that requires flame



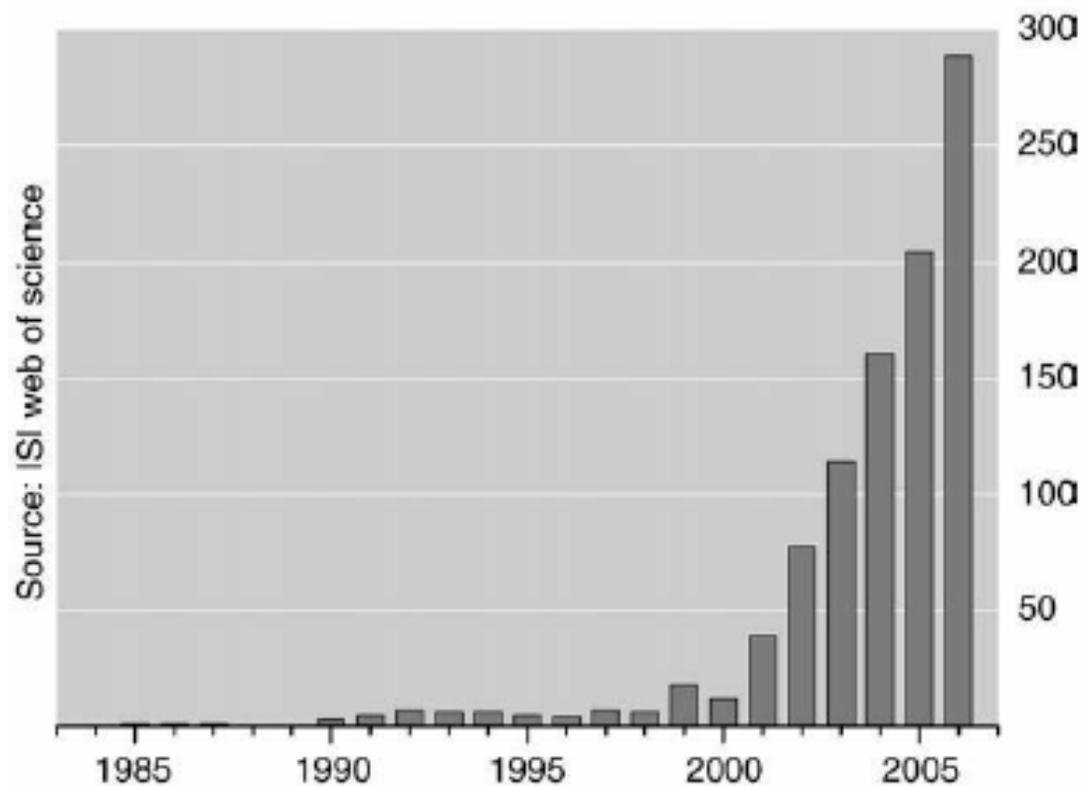
Californians for Fire Safety

- Albemarle
- Chemtura,
- IC-Ltd Industrial Products (Dead Sea Bromine)
Fire retardant chemical producers

No Evidence for Reduction in Fire Deaths from FR chemicals

- No flammability standard for fabric
- When the fabric burns, foam will burn and give off dioxins and furans
- National Fire Protection Association fire analysts concur that U.S. fire data is not detailed or complete enough to show whether adding fire retardant chemicals to furniture foam in California since 1980 has made a measurable difference in fire deaths in that state.

Increase in number of scientific articles about PBDEs



Vonderheide et al, 2008

Unbiased Research Results Needed for Policy Decisions

- The Governor of Minnesota vetoed a ban on decaBDE, stating: “the EU has conducted more than 500 studies over 10 years and concluded that decaBDE does not pose any significant environmental or human health risk.”
- That statement came from the chemical industry lobbying materials. No one had challenged it.
- Our 2008 summary of the peer-reviewed literature found 257 papers. Six studies showed no adverse health impacts, and all were published before 2004, when analytic techniques were less well developed.

Decabromodiphenyl Ethane

(DBDPE or DeBDethane.)

- One of the replacements for DecaBDE for use in TVs
- the concentrations of DBDPE are greater than those of DecaBDE after a short period of usage suggests that DBDPE may be more persistent and/or bioaccumulative than DecaBDE



**Commission Electrotechnique Internationale
International Electrotechnical Commission**

International IEC Electronics Standards

A series of worldwide electronics industry standards would require plastic enclosures for consumer electronics to resist external candle ignition

- proposed in 2002 and in final voting state
- up to an estimated additional 1.7 billion pounds of fire retardant chemicals would be required annually

There are no fire deaths from candle fires in consumer electronics in the U.S.

Motivation from the fire retardant chemical industry

What Can Be Done To Influence these Flammability Standards?

The process is far enough along and sufficiently isolated to preclude the NGO community from influencing the standard.

Pure Strategies in November 2007

The standards are being voted on right now. You can see them after they pass.

Underwriters Laboratory in December 2007



Case against Candle Resistant Electronics

Firefighters oppose BFRs and CFRs in electronic housings



- Fire fighters have significantly elevated rates of multiple myeloma, non-Hodgkin's lymphoma, prostate, and testicular cancer.
- These four types of cancer can all be related to exposure to dioxins and/or furans
- Dioxins and furans are produced at high levels when BFRs and CFRs burn

TV's are a source of decaBDE

- Bromine levels in TVs can be related to decaBDE levels in dust in homes.
 - Allen JG, McClean MD, Stapleton HM, Webster TF. Linking PBDEs in House Dust to Consumer Products using X-ray Fluorescence (XRF). *Environ Sci Technol* 2008. [Online April 30, 2008].
- “Harmful chemical wafts off your TV.”
 - Scott Streater, Fort Wort Star-Telegram,



When Product Safety and the Environment Appear to Collide:
**The Defeat of the Candle
Flame Ignition Requirement**

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by Michael Kirschner, Design Chain Associates, and
Arlene Blum, Ph.D., Green Science Policy Institute

Conformity, January 2009



U.S. Consumer Product Safety Commission

Proposed federal regulation would have led to more chemicals in furniture than the California regulation. Until GSP became involved, this was expected to pass.

GSP cost benefit analysis, including health impacts for the first time, found up to three billion dollar cost for open flame standard for furniture

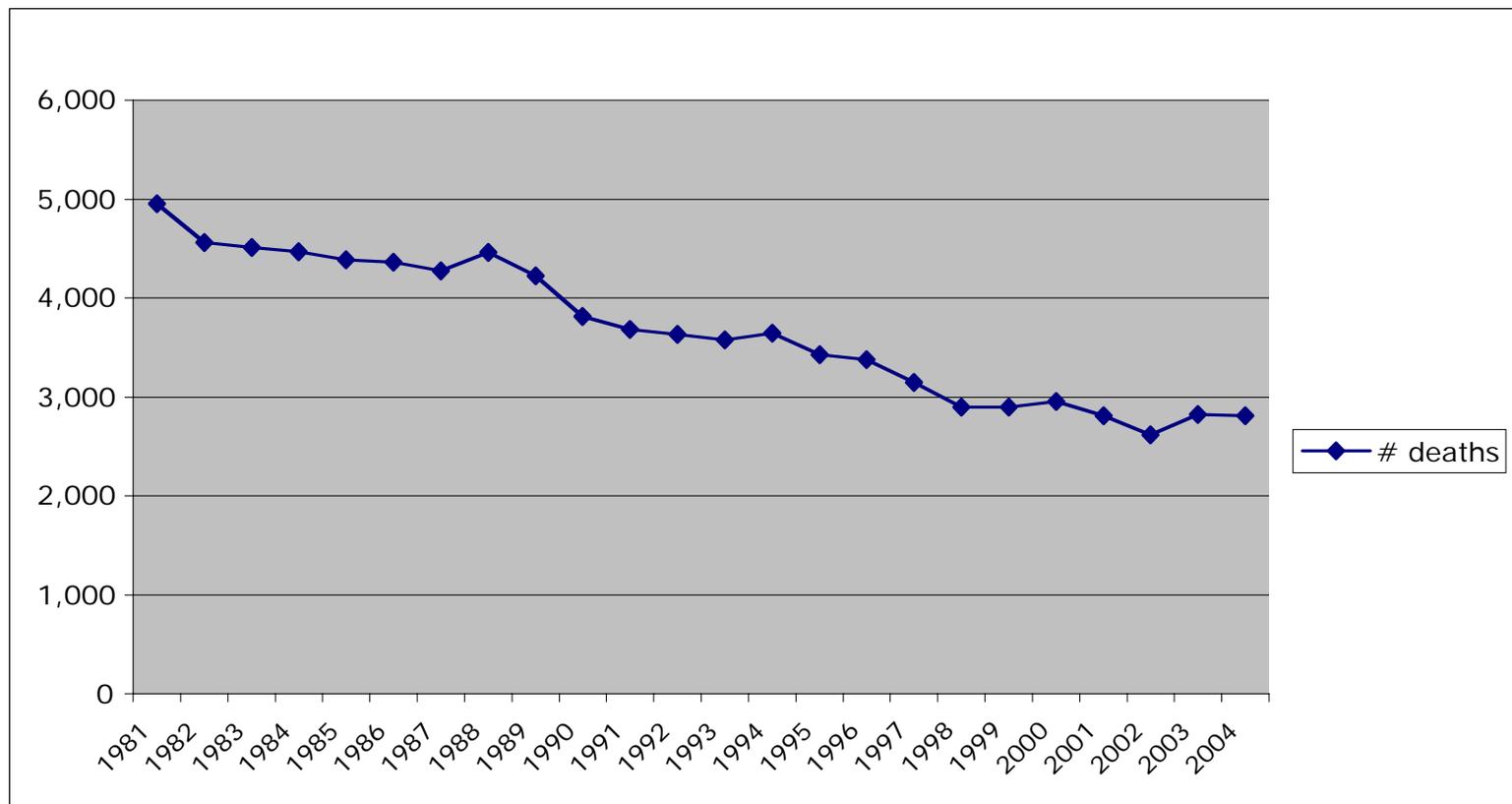
New proposed national furniture flammability standard can be met without fire retardants.

“Blum briefed the CPSC staff last fall, and some furniture industry lobbyists credit her with helping shape the agency's latest version of the upholstered furniture standard. Approved by the commission in December, the proposal relies on the use of fire-resistant fabrics as flame barriers, rather than chemicals.”

Washington Post January 26, 2008

Good News About Fire Safety

USA Home Fire Deaths down 42% 1981-2004



4,956 deaths

2,810 deaths

Source: National Center for Health Statistics