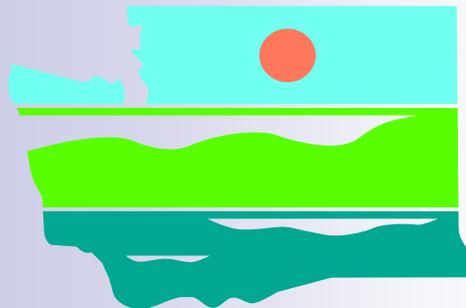


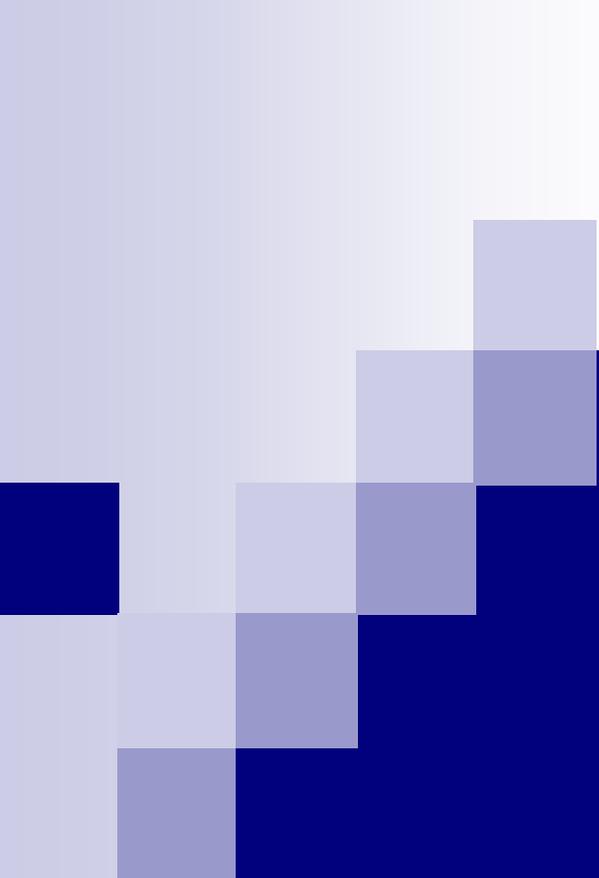
PBDE Interim Chemical Action Plan

Mike Gallagher
Moderate Risk Waste
Coordinators' Meeting
April 27/28, 2005



WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

Moderate Risk Waste Coordinator
Meeting 4/27-28/05



What are PBDEs?

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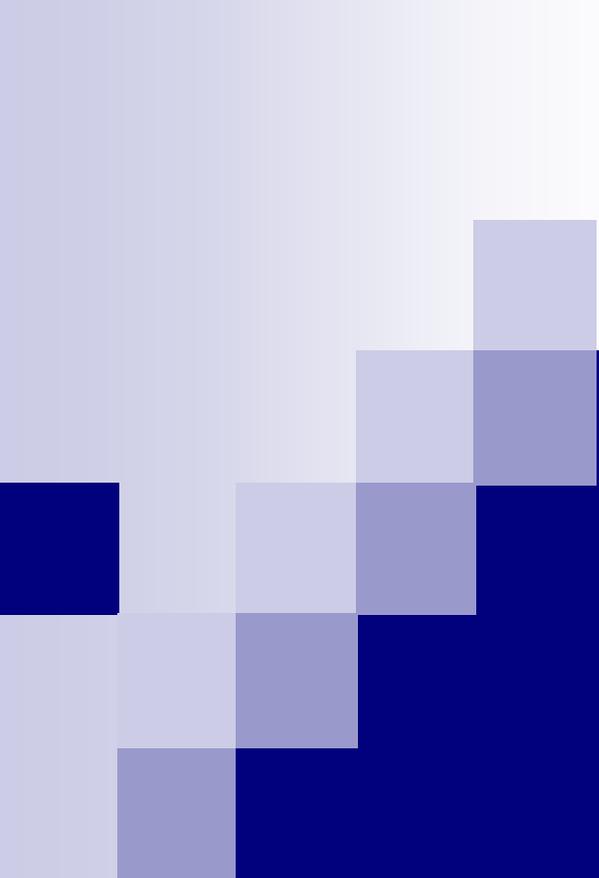
- Class of brominated flame retardants
- 3 commercial mixtures: **Penta, Octa & Deca**
- 209 theoretical forms
- Flame inhibitors – bromine effectively slows reactions needed for oxygen-dependent fires
- Additive- do not chemically bind with polymers

Where are PBDEs used?

- **Penta:** polyurethane foams (*mattresses, seat cushions, other upholstered furniture, rigid foam insulation*)
- **Octa:** ABS plastic (*housings for fax machines & computers, automobile trim, telephone handsets, kitchen appliance casings, others*)
- **Deca:** High-impact polystyrene plastic (*housings for TV's, stereos, other electronics*); polypropylene fiber (*upholstery textiles*); coated wire and cable

Current Status

- Penta and Octa voluntarily phased out by sole manufacturer in December 2004
- Deca accounted for 80% of PBDE market in 2001
- Deca use expected to continue and increase
- Deca does not appear to be toxic in original state, but appears to break down into Penta and Octa-like forms



Why are we concerned?

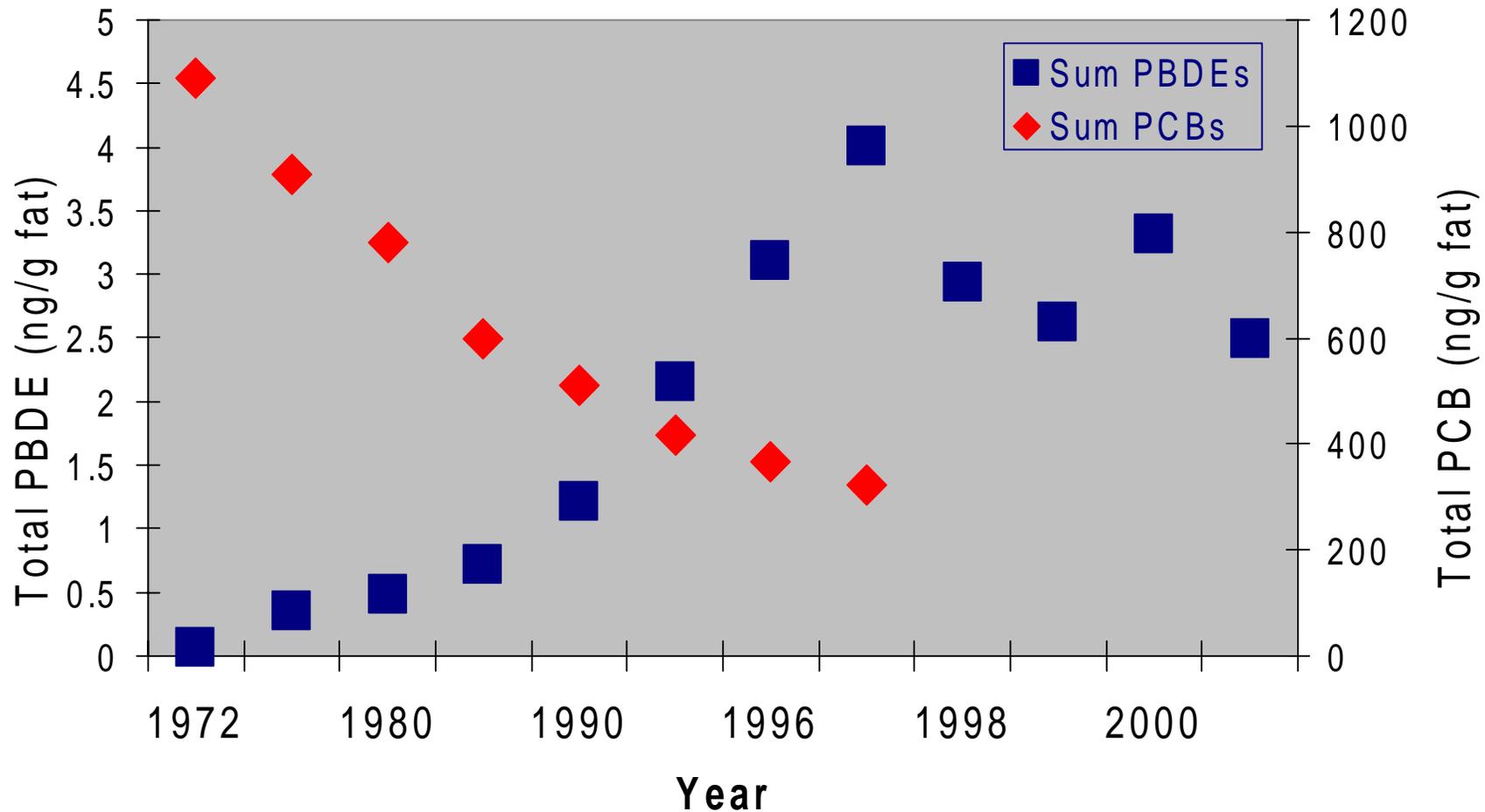
PBDEs are ubiquitous

- Foods
- Dust (household and workplace)
- Sewage sludge
- Soil
- Sediment
- Biota (fish, marine mammals, birds)
- Indoor and outdoor air

PBDEs in People

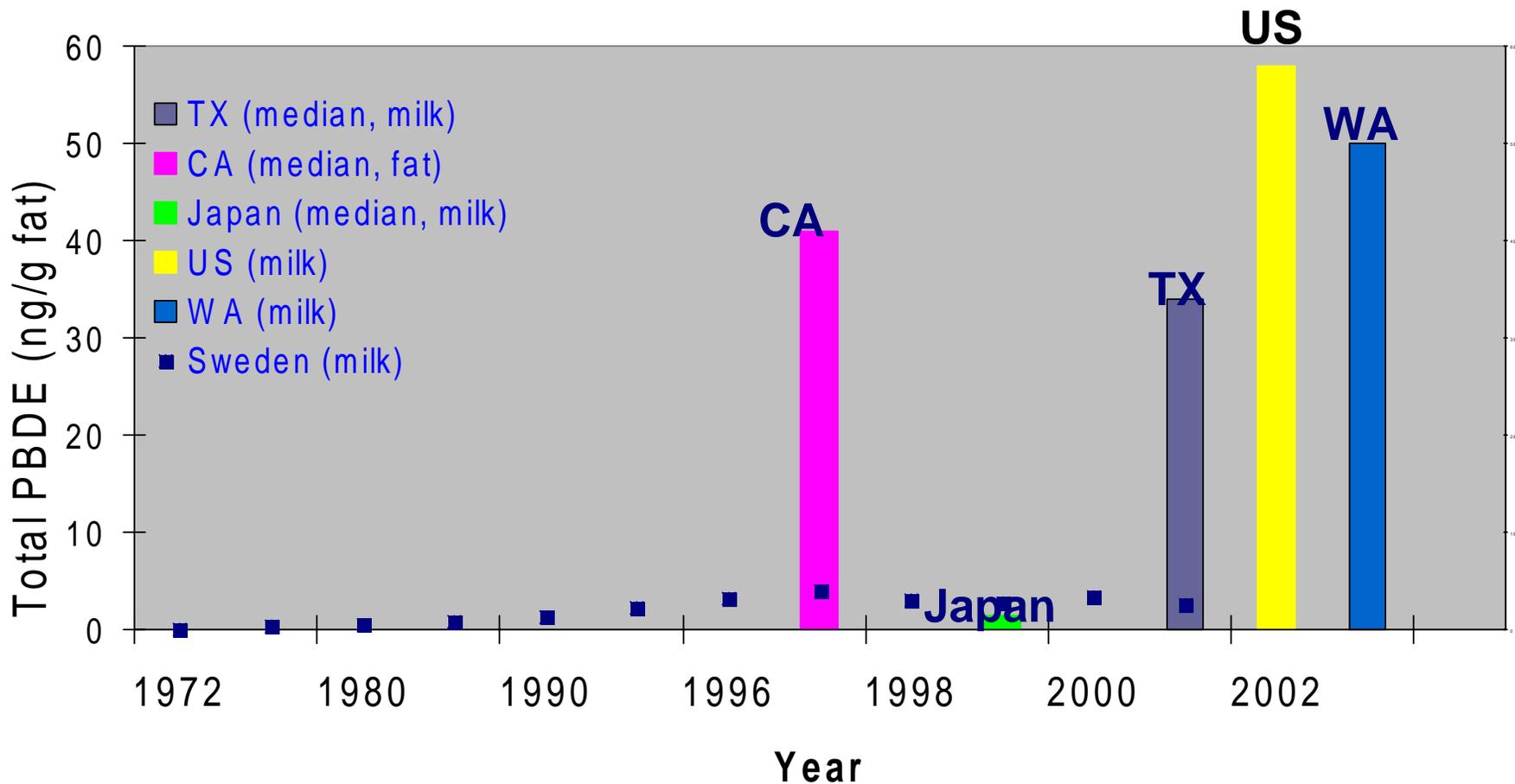
- PBDEs have been found in blood, fat and breastmilk
- U.S. levels of PBDEs in breast milk are 10-100 higher than in Europe or Japan
- U.S. levels of PBDE in blood are increasing
- Data from Sweden indicate exposures associated with some occupations
- Levels in cord blood (fetal) are similar to maternal levels

Total PBDEs and Total PCBs in Human Milk in Sweden



Sources: Sjodin et al., 2003; Lind et al., 2003; Noren & Meironyte, 2000

Total PBDE Levels



Data as summarized in Sjodin et al., 2003; Schechter et al., 2003 (TX); Akutsu et al., 2003 (Japan); EWG, 2003 (US); NWWatch, 2004 (WA)

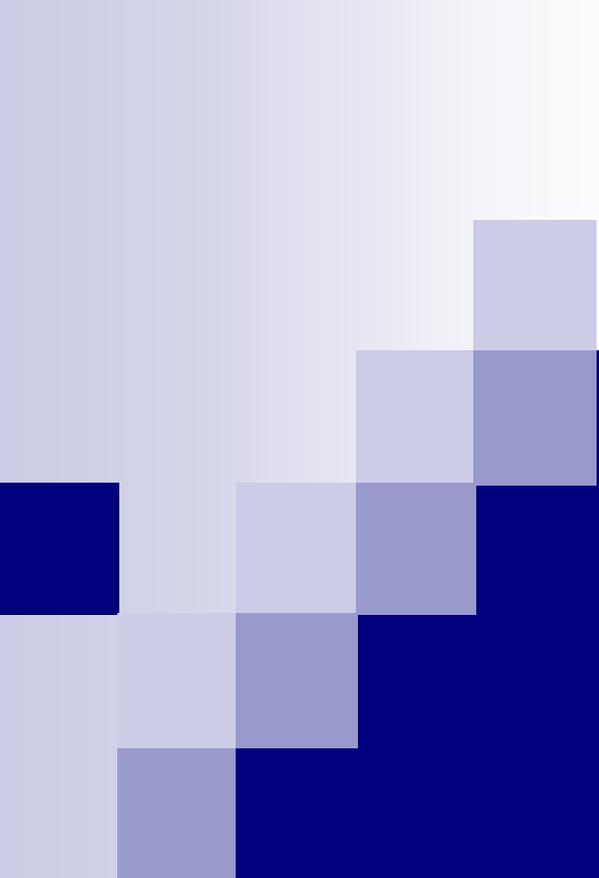
Margin of exposure appears low

- There is wide variability in reported PBDE levels in the U.S. It is estimated that 5% of women have ≥ 300 ng/g lipid
- Comparing this level to effects levels in rodent studies indicates that the margin of safety may be low for many individuals.

Reference: McDonald, 2004

Environmental Presence: Washington State Data

- **Freshwater fish (Johnson and Olson, 2001)**
- **High concentrations, some > 1 ppm in eagle and cormorant eggs along Columbia River and in Hood Canal area (Peterman - 2001).**
- **Increased concentrations in Columbia River fish monitored from 1992 – 2000 (Rayne, et al 2003).**
- **3 Orca communities in NE Pacific, including Puget Sound Orcas, at 2-10x higher levels than N. Atlantic sperm whales (Rayne, Ikonomou, & Ross, 2004)**
- **Fish from Puget Sound (O'Neill, et. al., 2004)**



Alternatives to PBDEs

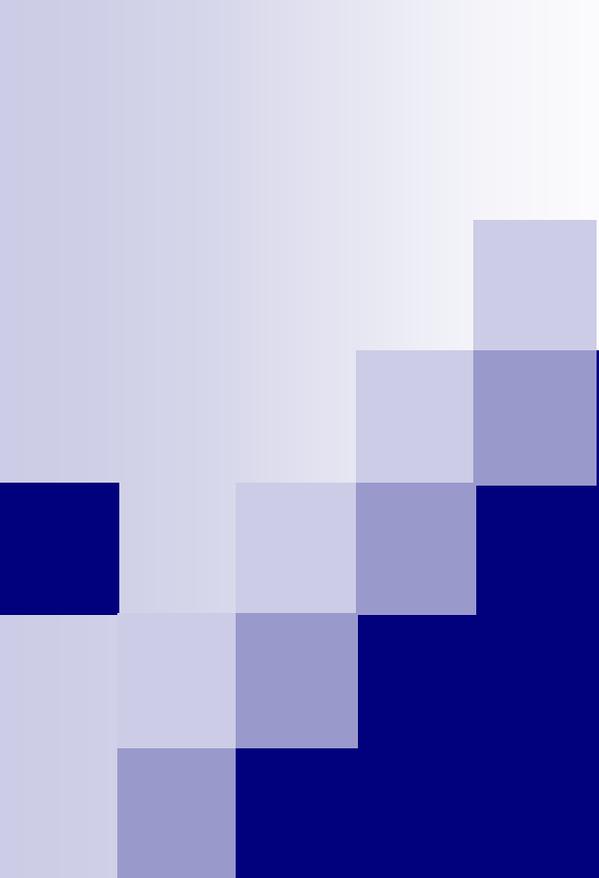
Alternatives to PBDE's

- 3 approaches:
 - Use different flame retardant
 - Use different plastic material
 - Redesign of product
- Little known about most alternative flame retardants

Manufacturers Phasing Out all PBDE's in Some or all of their Products

- Apple
- Brother
- Canon
- Compaq
- Daikin
- Dell
- Eizo Nanaoa
- Ericsson
- IKEA
- Matsushita
- Minolta
- NEC
- Sharp
- Sony
- ViewSonic
- Xerox

Based on review of manufacturer websites



PBDE Chemical Action Plan

External Direction

- **Executive Order 04-01 – Ecology, in consultation with DOH, develop CAP to reduce threats posed by PBDEs. Recommend action by 12/1/04. Implement by 7/1/05.**
- **2004 Legislature- funding provided to develop PBDE CAP**

Elements of the Ecology/Health PBDE Chemical Action Plan

- ***Identify PBDEs, toxicological effects, & environmental distribution***
- ***Identify current uses & applications in WA***
- ***Analyze current laws, regulations related to PBDE use and management***
- ***Identify available alternatives to PBDE use and proper management, reduction and elimination options for PBDEs***
- ***Develop recommendations for further action.***

PBDE Chemical Action Plan

Process to date

- **Created external PBDE Advisory Committee (6/04)**
- **Released Draft PBDE Chemical Action Plan for public review and comment (10/04)**
- **Released *Interim* PDBE Chemical Action Plan (12/04)**
- **Currently requesting legislative funding to implement PBDE CAP during 05-07 biennium**



Next Steps if Funding is Obtained

- Ecology developing external stakeholder processes on two areas:
 - Deca-ban proposal (by Dec. 2005)
 - End-of-Life management of PBDE containing products (by June 2006)
- Cost-Benefit Analysis on PBDE CAP
- Final PBDE CAP by December 2005

Interim CAP Recommendations: Source Control: Penta & Octa

Legislature should prohibit the manufacture, distribution (but not transshipment) or sale of new products containing Penta-BDE and Octa-BDE in Washington state by July 2006.

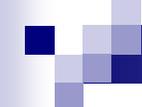
May include an exemption for new products that contain recycled material from products that contained Penta-BDE and Octa-BDE, pending further review.

Interim CAP Recommendations

Source Control

Deca: Ecology and DOH, in consultation with stakeholders, should develop a proposal for a ban on appropriate products containing Deca-BDE, with recommendations by December 2005.

U.S. Chemical Policy: Ecology and Health to work with other states and interested parties in a dialogue toward improving U.S. chemical policy. Current U.S. chemical policy has resulted in only minimal testing of many chemicals currently in use.



Interim CAP Recommendations End-of-Life

Ecology should establish, by July 2006, appropriate disposal and recycling practices for products containing PBDE flame retardants.

Interim CAP Recommendations

Minimizing Human Exposure

- The state's purchase of PBDE products should be restricted in appropriate contracts, consistent with Executive Order 04-01.
- DOH to develop methods and materials for education on how the public can minimize exposure to PBDEs.
- L&I to develop and communicate ways for employers and employees to minimize exposure to PBDE-containing dust using standard industrial hygiene controls.

Interim CAP Recommendations Research & Monitoring

- DOH and L&I should continue to investigate the feasibility of implementing a workplace exposure study in collaboration with the federal Centers for Disease Control and Prevention.

Additional Information

<http://www.flameretardants.org>

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