Alternatives Assessment 117 Webinar:
Challenges in Selecting Alternatives and Implementing Substitution – Cross Agency Perspectives

DECEMBER 19, 2013

FACilitated BY: JOEL TICKNER, SCD

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LOWELL CENTER FOR SUSTAINABLE PRODUCTION, UMASS LOWELL

* If you would like to ask a question or comment during this webinar please type your question in the Q&A box located in the control panel.
Goals

- Continuing education and dialog

- To advance the practice of alternatives assessment for informed substitution across federal, state, and local agencies through networking, sharing of experiences, development of common approaches, tools, datasets and frameworks, and creation of a community of practice.
Purpose of this call

• Addressing chemical flame retardants represents an important cross-agency chemicals management problem.

• Flame retardants serve important fire protection roles, but concerns have been raised about the environmental persistence and toxicity of many current flame retardants and their replacements.

• Restrictions on flame retardant chemicals of concern may have had the unintended consequence of their replacement by other problematic substances. In some cases, substitution has not been accompanied by careful alternatives assessments.
Purpose of this call

• Discussion has been increasing about the nature of and need for flame retardant requirements in some applications.

• This three part series addresses flame retardant needs and problems, potential alternatives, how different agencies see the issue and potential solutions and possibilities for greater cross agency collaboration.
Speakers

- Alissa Cordner, Whitman College
- Paul Yaroshak, US Department of Defense
- Treye Thomas, CPSC
- Chris Weis, NIEHS
Discussion Questions

• What are key research gaps on flame retardants and future research plans and recommendations?

• How do we effectively consider health and safety considerations and trade-offs in evaluating alternatives to flame retardants?

• How do we ensure that there is a sufficient supply of functionally equivalent, cost-effective alternatives, particularly for critical applications when restrictions take place?

• What are the challenges and opportunities in better local, state, and federal agency coordination on flame retardants and alternatives? What can we learn from this case?
Webinar Discussion Instructions

- Due to the number of participants on the Webinar, all lines will be muted.

- If you wish to ask a question, please type your question in the Q&A box located in the drop down control panel at the top of the screen.

- All questions will be answered at the end of the presentations.
Challenges in Selecting Alternatives and Implementing Substitution: The Case of Flame Retardant Chemicals

Alissa Cordner, PhD
Assistant Professor of Sociology
Whitman College

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www.alissacordner.com
Flame Retardant Chemicals

Number of PubMed Articles, 1995-2012

Source: Cordner 2013
PubMed searches for keywords and Date-Completion.

- Brominated Flame Retardants
- Flame Retardants
- PBDE
Flame Retardant Chemicals

8 Sickening Facts about Flame Retardants

A new documentary chronicles a decades-long "campaign of deception" that resulted in widespread use of the biggest rip-off ever.

BY EMILY MAIN

“It’s Love Canal, and it’s on fire.” That’s how one California firefighter described the average residential house fire to the filmmakers behind the new HBO documentary Toxic Hot Seat. “These fires that we’re going to now are an absolute toxic soup.”

Deadly flame-retardant chemicals lurk in most household

And he isn’t wrong. Flame retardant chemicals have now
Challenges

- There are *many* flame retardants on the market
- Lots of data gaps and uncertainties about hazards and exposure potential
- Competing interests and scientific stories
- Very complex supply chain
- Changing regulatory landscape
GOVERNOR BROWN DIRECTS STATE AGENCIES TO REVISE FLAMMABILITY STANDARDS

6-18-2012

SACRAMENTO – In an effort to protect public safety by reducing the use of toxic flame retardants, Governor Edmund G. Brown Jr. today directed state agencies to revise flammability standards for upholstered furniture sold in the state.

Governor Brown has asked the Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation to review the state's four-decade-old flammability standards and recommend changes to reduce toxic flame retardants while continuing to ensure fire safety.
Example: TB117-2013

chicagotribune.com

Toxic flame retardants may be on way out

New California fire standard can be met without chemicals in furniture foam

Contact: Stephanie Hendricks, Coming Clean, Alliance for Toxic free Fire Safety
stepdh@earthlink.net

November 21, 2013

Toxic Flame Retardant Chemicals No Longer?
New California Regulation Announced
Enables Fire Safety Without Toxic Flame Retardants
Principles of Alternatives Assessment

The Commons Principles (BizNGO)

- Reduce hazard
- Minimize exposure
- Use best available information
- Require disclosure and transparency
- Resolve trade-offs
- Take action

(http://www.bizngo.org/alternatives-assessment/?/alternativesAssessment.php)
Challenges of Alternatives Assessment

- **Time- and resource-intensive**

- **Stakeholder process**
  - “They’re going to present their stake. So you have to consider why this stakeholder is saying what they’re saying.”

- **Competing definitions**
  - E.g., chemical persistence – “We make molecules which are very, very stable. We call them stable. NGOs call them persistent.”
Challenges of AA

- Data gaps and scientific uncertainty

**VL** = Very Low hazard  **L** = Low hazard  **M** = Moderate hazard  **H** = High hazard  **VH** = Very High hazard — Endpoints in colored text (VL, L, M, H, and VH) were assigned based on empirical data. Endpoints in black italics (VL, L, M, H, and VH) were assigned using values from estimation software and professional judgment.

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CASRN</th>
<th>Acute Toxicity</th>
<th>Carcinogenicity</th>
<th>Genotoxicity</th>
<th>Reproductive</th>
<th>Developmental</th>
<th>Neurological</th>
<th>Repeated Dose</th>
<th>Skin Sensitization</th>
<th>Respiratory Sensitization</th>
<th>Eye Irritation</th>
<th>Dermal Irritation</th>
<th>Acute</th>
<th>Chronic</th>
<th>Persistence</th>
<th>Bioaccumulation</th>
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<td>19186-97-1</td>
<td>L</td>
<td>M</td>
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</tr>
</tbody>
</table>
Challenges of AA

- **Data gaps and scientific uncertainty**
  - “If we fill a data gap with a call that’s anything but low, and the manufacturer disagrees with that, they will provide... a supported opinion to try and change our minds... If we’ve made a more conservative call on a data gap, it’s an effective way of getting some supporting data to determine if that’s an accurate call...
  - “The more difficult area, I think, is that... if we don’t see a concern for a moderate or high call so we give it a low call... I think that is of greater concern, because is there any incentive for a company to come forward and say, ‘oh, by the way, that’s not low, that’s moderate, and here are my data’?... I think the moderate and high calls will get checked. I’m not sure the low calls will be checked.”
Using Alternatives Assessment

- Companies need long-term replacement decisions
- Avoiding regrettable substitution
- Moving beyond drop-in substitutes
Alissa Cordner  
Whitman College  
cordneaa@whitman.edu

Acknowledgements: NSF-SES 0924241 and EPA STAR FP-917119

Recent publications:

Managing Chemical & Material Risks

Flame Retardants Webinar

December 2013

Paul Yaroschak, P.E.
Deputy for Chemical & Material Risk Management
Office of the Deputy Under Secretary of Defense
(Installations & Environment)
Our Dual Role

- **Ensures availability of mission critical chemicals & materials**
  - Identify, assess & manage chemical/material risks
  - DoD Emerging Contaminants Program helps do this

- **Integrate sustainable chemicals/materials into DoD**
  - Environmental RDT&E\(^1\) programs
  - Sustainable Chemicals & Materials for Defense Forum
    - Collaboration of defense & chemical industries

\(^1\) Research, Development, Testing & Evaluation
What is an Emerging Contaminant?

• Chemicals & materials that have pathways to enter the environment and present real or potential unacceptable human health or environmental risks...

and either

• do not have peer-reviewed human health standards

or

• Standards/regulations are evolving due to new science, detection capabilities, or pathways.
EC “Scan-Watch-Action” Process

Over-the-horizon

Review literature, periodicals, regulatory communications, etc.

Possible DoD impacts

Monitor events; Conduct Phase I qualitative impact assessment

Probable high DoD impacts

Conduct Phase II quantitative impact assessment; develop & rank RMOs

Risk Management Options (RMOs) to Governance Council

Risk Management Options (RMOs) to Governance Council

Approved RMOs become Risk Management Actions (RMAs)
DecaBDE\textsuperscript{1} – An Emerging Contaminant

- A flame retardant used in electronics, wire and cable insulation, textiles, automobiles & aircraft
- Previously considered safe and necessary for fire safety
- Evolving science indicates decaBDE to persist in the environment and present human health risks
- EPA & companies agree to phase out production & sales for most uses 31 Dec 2012 & end all uses by end of 2013
- RISK to DoD: unavailability of a chemical used to meet performance requirements
  - Combat systems & equipment must meet flammability requirements

\textsuperscript{1} decabromodiphenyl ether
Flame Retardants in Aerospace Products Have Increased Survivability

- Assures safety in flight, if fire occurs
- Assures ability to escape, if aircraft crash occurs
- Meets FAA requirements
  - 14 CFR Part 25 regulations:
    - Section 25.853, Compartment Interiors
    - Section 25.855, Cargo/Baggage Compartment
    - Section 25.856, Thermal/Acoustic Insulation
    - Section 25.869, Wire Flammability
  - Appendix F, Detailed Test Requirements
    - Materials and parts must successfully pass test/s in order to show compliance
    - Nine (9) different tests specified; some materials/parts must pass multiple tests
    - Variations of configurations require individual testing

DecaBDE has become integral to meeting stringent aviation safety requirements
DecaBDE is Used in Many Applications in Most Boeing Products

- Adhesives and Tapes
- Composites
- Ducting & Molded Parts
- Electrical/Electronics
- Emergency Equipment
- Fabrics & Films
- Insulation
- Interiors
- Sealants
Boeing has a Global, Multi-Tiered Supply Chain

DeCaBDE alternative manufacturers & compounders drive the replacement timetable

The Boeing Company – Distribution to OIRA – 16 February 2011

Use by DoD Approved by The Boeing Company
Substitution Challenges

• Where is the chemical in the supply chain? Who knows? How much effort to determine?
  – Complex global supply chain
  – Articles don’t always list chemical content

• What is the viability of substitutes?
  – Varied applications & performance requirements
  – What is the human health and environmental profile?

• Substantial time & funding needed to test & verify substitutes
The National Institute of Environmental Health Sciences

• One of the U.S. National Institutes of Health, but located in Research Triangle Park, North Carolina

• Wide variety of programs supporting our mission of environmental health:
  -- Intramural laboratories
  -- Extramural funding programs
  -- Disease Prevention
  -- Clinical research program
  -- National Toxicology Program
  -- Public Health Focus

Christopher Weis, Ph.D., D.A.B.T.
Toxicology Liaison- Office of the Director
New ways of thinking about environmental health sciences…

OLD… chemicals act by overwhelming the body’s defenses by brute force at very high doses;

NEW… chemicals can act like hormones and drugs to disrupt the control of development and function at very low doses to which the average person is exposed;

NEW… susceptibility to disease persists long after exposure (epigenetics). We need to be less ‘reactive’ and adopt a more ‘predictive’ approach.
High throughput screening can be used to identify chemicals that activate pathways associated with disease.
New ways of addressing environmental health problems…

**Toxicology for the 21st Century Goals…**

- Identify patterns of compound-induced biological response in order to:
  - characterize toxicity/disease pathways
  - facilitate cross-species extrapolation
  - model low-dose extrapolation
- Prioritize compounds for more extensive toxicological evaluation
- Develop predictive models for biological response in humans
**Notable 2013 Events in FR Research**

- **Sixth International Symposium on BFR:** [http://www.bfr2013.com/](http://www.bfr2013.com/)


Discussion Questions

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- What are the challenges and opportunities in better local, state, and federal agency coordination on flame retardants and alternatives? What can we learn from this case?
Next Webinar

Alternatives Assessment 118: IC2 Alternatives Assessment Guide

Wednesday, January 29, 2014
12pm EST/9am PST

Alex Stone, Washington Department of Ecology
The audio recording and slides shown during this presentation will be available at:

http://www.chemicalspolicy.org/alternativesassessment.webinarseries.php