U.S. EPA Design for the Environment Program

Safer Product Labeling and Alternatives Analysis

PPDC Workgroup

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  – Alternatives Analysis for Flame Retardants
    • Furniture Foam
    • Printed Circuit Boards
  – Life Cycle Assessment – Nano-Enabled Batteries for Electric Vehicles

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  – Criteria
  – Safer Ingredients
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What DfE is About

• Goals
  • Safer Alternative Chemicals
  • Safer Products
• Central Elements
  • OPPTS technical tools and expertise
  • Multi-stakeholder participation
• Results
  • Industry partners reduced more than 330 million pounds of chemicals of concern last year
Furniture Flame Retardancy Partnership
Alternatives Assessment (Completed)

• Predominant flame retardant (pentaBDE) was being found increasingly in human tissue, breast milk and the environment.
  – This flame retardant was phased-out at the end of 2004.
  – Need for fire safety will likely increase based on planned national standards.
  – Report provides data to inform industry.
  – Decision-making for alternatives to this 19 million pound per year chemical.

• The Report
  – Summary assessments of chemicals in flame retardant formulations.
  – Tables summarizing EPA assessment for environmental and human health endpoints.
  – Detailed hazard reviews.
Furniture Flame Retardancy Partnership

Results: Data Presentation

<table>
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<tr>
<th>Company</th>
<th>Chemical</th>
<th>% in Formulation</th>
<th>Human Health Effects</th>
<th>Ecotoxicity</th>
<th>Environmental</th>
<th>Potential Routes of Exposure</th>
<th>Reactive or Additive?</th>
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<td></td>
<td>Cancer Hazard</td>
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<td>Reproductive</td>
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<td>M*</td>
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DfE Safer Product Labeling

- Cleaning products
  - Household
  - Industrial and Institutional
  - Direct release, car-wash, boat wash, graffiti removers, etc...
- Biological-based products
  - Holding tank treatments
  - Bioremediation products
- Deicers
- Aircraft conversion coatings
- Industrial coatings
- Inks
- Odor removal
- Field paint
- Tire balancing liquid

![Safer Product Labeling Program](chart.png)

- 46 recognized products
A Stringent Approach for Differentiating Products

Assess human health and environmental endpoints for every product ingredient:
- Does not allow dilution of toxicity
- Acute mammalian toxicity
- IARC's chemicals of known concern are carcinogenic
- EU's chemicals are carcinogenic, mutagenic, and reprotoxic

One approach:
1. Blacklist chemicals based on authoritative lists:
   - IARC
   - NTP
   - EU
   - These "blacklist chemicals" are only a tiny fraction of chemicals in commerce

2. Conduct whole product toxicity testing, focus on certain endpoints:
   - Acute mammalian toxicity
   - Carcinogenicity
   - Genetic toxicity
   - Neurotoxicity
   - Reproductive and developmental toxicity
   - Respiratory and skin sensitization
   - Environmental toxicity and fate

Tens of thousands of chemicals in commerce

Promotes the greenest possible chemistry:
- Does not allow dilution of toxicity
- Ensures chemicals of known concern are not replaced with problematic but poorly understood chemicals
- Examines every chemical in the context of its functional class and includes:
  - Fragrances & colorants
  - Stabilizers & impurities
  - Preservatives

U.S. Environmental Protection Agency
Review – 3 Basic Components

1) Review every ingredient by functional use class
   • To promote green chemistry
   • To understand toxicity
     - Literature
     - Analogous chemicals – SAR

2) Review formulation as a whole
   • Synergistic effects
   • pH
   • Performance testing

3) Partnership Agreement
Continuous Improvement: As innovation occurs, continuum may shift

- Continuum of Improvement
- Formula Ingredient by Functional Class

Of Concern

Improved

Sustainable

Characteristics of Ingredient of Concern

Characteristics of Improved Ingredient

Characteristics of Sustainable Ingredient
DfE Evaluation of Products in the Pilot

- The Whole Product Will Be Evaluated Against:
  - DfE Criteria for Safer Cleaning Products
- Each Inert Ingredient Will Be Evaluated Against:
  - DfE Criteria for Safer Cleaning Products
  - DfE Screens for Safer Chemicals
- Active Ingredients Will Be Evaluated Against:
  - DfE General Screen
Steps to Obtaining DfE Logo for a Currently Registered Product

**Applicant**
- Submits ingredient worksheet to qualified third-party reviewer.

**Third-Party Reviewer**
- Reviews all product ingredients (active and inert) against DfE criteria, develops chemical profiles, and collects performance information.
- Communicates findings to applicant. Within 60 days

**DfE**
- Performs QA on third-party assessment and confirms that ingredients meet DfE criteria for human health and the environment. Within 60 days
- Discusses its assessment with applicant and third-party reviewer.

**Improvements needed for DfE?**
- Yes
- Applicant makes necessary improvements & re-submits application
- No

**Applicant makes necessary improvements & re-submits application**
- Yes
- No

**Third-Party Reviewer**
- Perform QA on third-party assessment and confirms that ingredients meet DfE criteria for human health and the environment.

**Reviews new end-use product registration or amendment**
- 120 days
- OPP
More Information

- DfE Criteria for Safer Cleaning Products
- DfE Screens for Safer Chemicals
- Logistics for Partnering

www.epa.gov/dfe
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