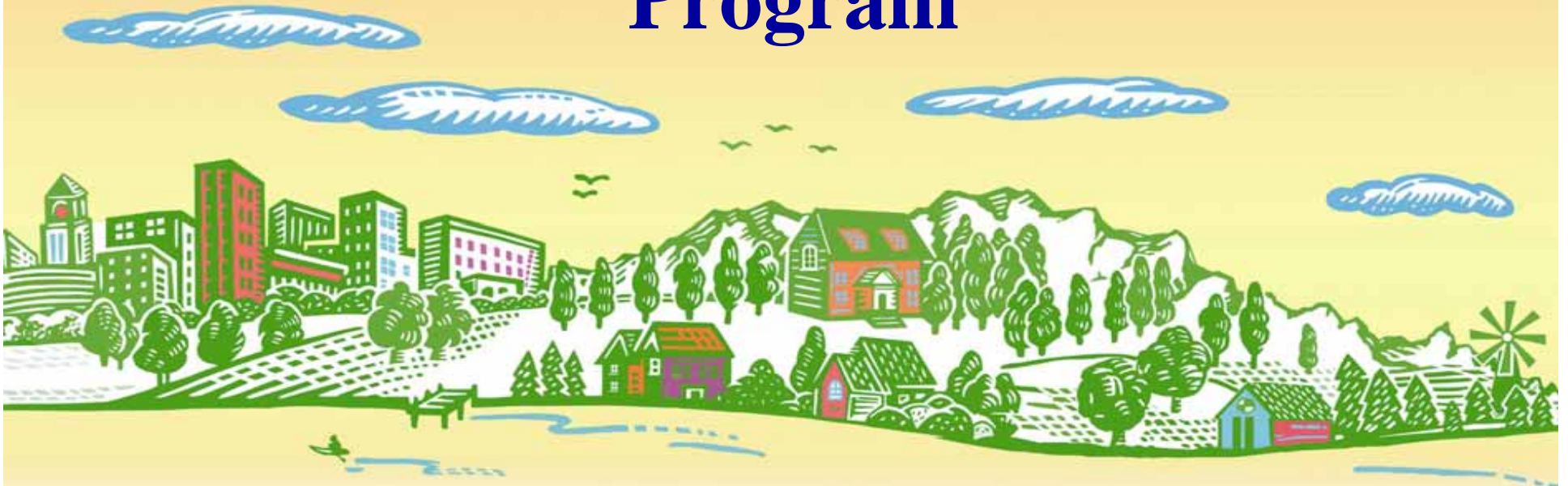


Design for the Environment Program



Great Lakes Binational Toxics Strategy Forum

December 6, 2005



DfE Themes

- **DfE provides access to OPPT technical tools and expertise that serve as an incentive for business participation in our work.**
- **DfE projects:**
 - are multi-stakeholder;
 - are driven by a business “client”;
 - recognize business realities; and
 - benefit business and the environment.
- **DfE promotes reduction of priority chemicals.**

**DfE Projects have touched more than
200,000 business facilities and
approximately 2 million workers.**





Lead-Free Solder Partnership

Life-Cycle Assessment

- **The U.S. electronics industry is moving away from lead solder (176 millions pounds per year)**
 - E.U. will ban lead in electronics by 2006
 - Industry approached DfE based on past relationship
 - Partnership will help U.S. Industry adopt lead-free alternatives and maintain international competitiveness
- **Tin-lead and alternatives:**
 - 95.5% tin, 3.9% silver, and 0.6% copper
 - 57.0% bismuth, 42.0% tin, and 1.0% silver
 - 96.0% tin, 2.5% silver, 1.0% bismuth, 0.5% copper
 - 99.2% tin and 0.8% copper
- **Key Findings**
 - Extraction of silver
 - Energy use in manufacture





Furniture Flame Retardancy Partnership

■ The Partnership

- Chemical and furniture manufacturers
- Consumer Product Safety Commission
- NGOs
- National Institute of Standards & Technology
- Fire Safety Advocates and Environmental Groups



■ The Issue

- 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.
- Decision-making for alternatives to a 18.7 million pound per year chemical.



Furniture Flame Retardancy Partnership (cont'd)

■ Partnership Goals:

- Facilitate industry decision-making
- Level the playing field
 - New and existing chemicals
 - Chemical manufacturers
- Drive innovation toward environmentally safer flame retardancy methods
- Develop a model for alternatives assessment

■ **Final Report online: www.epa.gov/dfe**





Flame Retardant Alternatives Report

Hazard Concerns

- **Table summarizing EPA assessment for environmental and human health endpoints**
 - High, Moderate, Low (hazard concern levels)
- **Summary assessments of chemicals in flame retardant formulations**
 - Detailed hazard reviews – publicly available information
 - Measured confidential data from EPA and chemical companies
 - Estimations from EPA New Chemicals Program
 - Professional judgment of EPA staff
- **Detailed hazard reviews**
 - Data summary table
 - Full data review by endpoint
 - References if non-proprietary



Flame Retardancy Partnership Alternatives Report - Hazard Concerns

Toxicity Summary Table

Company	Chemical	% in formulation	Human Health Effects							Ecotoxicity	
			Cancer Hazard Potential	Skin Sensitizer	Reproductive Effects	Developmental Effects	Neurological	Systemic Effects	Mutagenicity	Acute	Chronic
Company A	Flame Retardant 1										
	CAS # 123	90	L	M	L	L	L	M	L	M	H
	CAS # 456	7	M*	L*	M	M	L	M	M	M	M
	Proprietary A	3	L	L	M	L	M	L	M*	L	M
Company B	Flame Retardant 2										
	Proprietary B		M	L	L	L	M*	L	M	L	M
	CAS # 123		L	M	L	L*	L	M	L	M	H

* Ongoing studies may result in a change in this endpoint



Flame Retardancy Partnership

Alternatives Report - Exposure Routes

Fate/Exposure Summary Table

Company	Chemical	Environmental Fate		Potential Routes of Exposure						Other
		Persistence	Bioaccumulation	Worker		General Population			Aquatic	Additive/ Reactive?
				Inhalation	Dermal	Inhalation	Dermal	Ingestion		
Company A	FR1									
	CAS # 123	L [^]	L	Yes	Yes	No	No	No	No	Additive
	CAS # 456	L*	L	Yes	Yes	Yes	No	No	No	Reactive
	Proprietary A	L	M	Yes	Yes	No	No	No	Yes	Reactive
Company B	FR2									
	Proprietary B	H	M	No	Yes	No	No	No	Yes	Reactive
	CAS # 123	L	L*	Yes	Yes	No	No	No	No	Additive

* Ongoing studies may result in a change in this endpoint

[^] Likely degradation product expected to be persistent



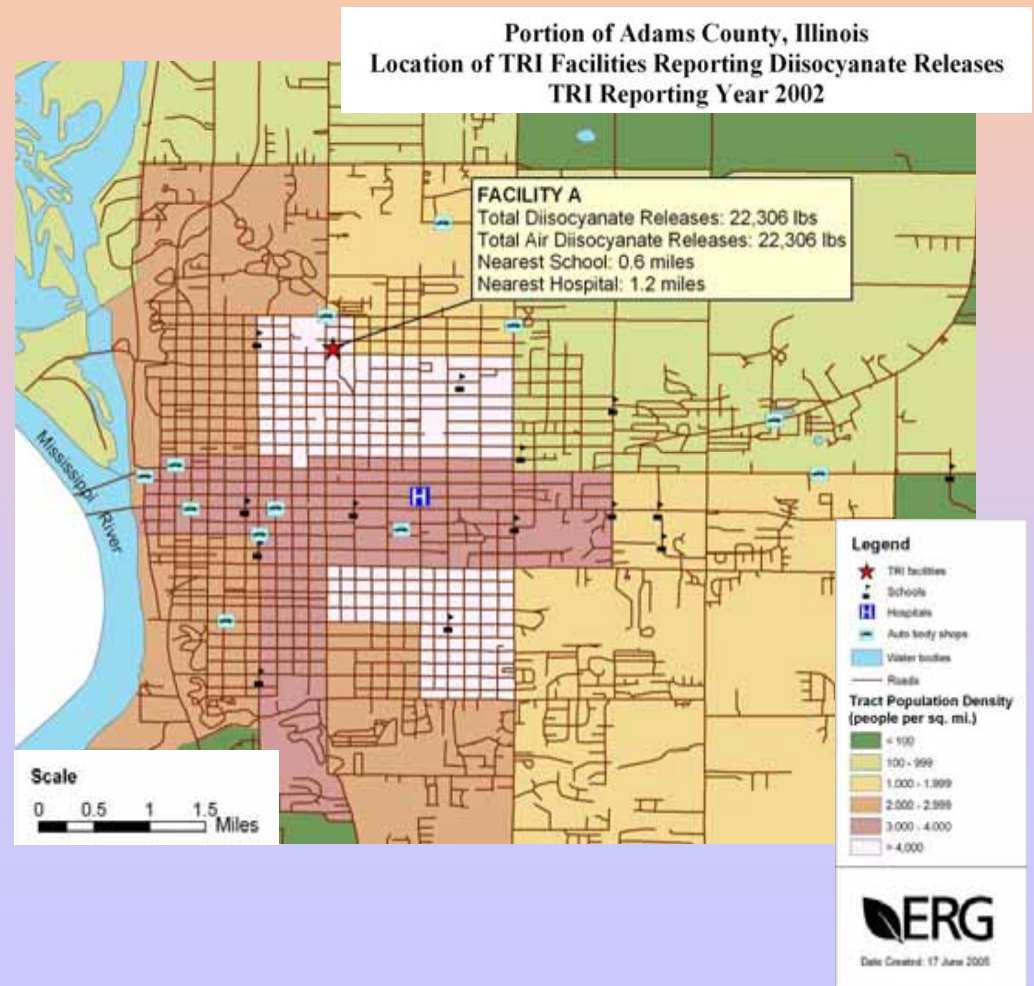
Cross-Agency Collaboration on Area Sources

- **Partnership among Regions, OPPT, and OAQPS**
- **Voluntary programs backstopped by regulations**
 - Evaluate P2 proposals from trade associations and similar organizations
 - Develop voluntary approaches and integrate P2 practices into rulemaking



Area Sources Being Considered

- Auto body
- Industrial boilers
- Plating and polishing
- Paint and allied sources
- Steel foundries
- Iron foundries



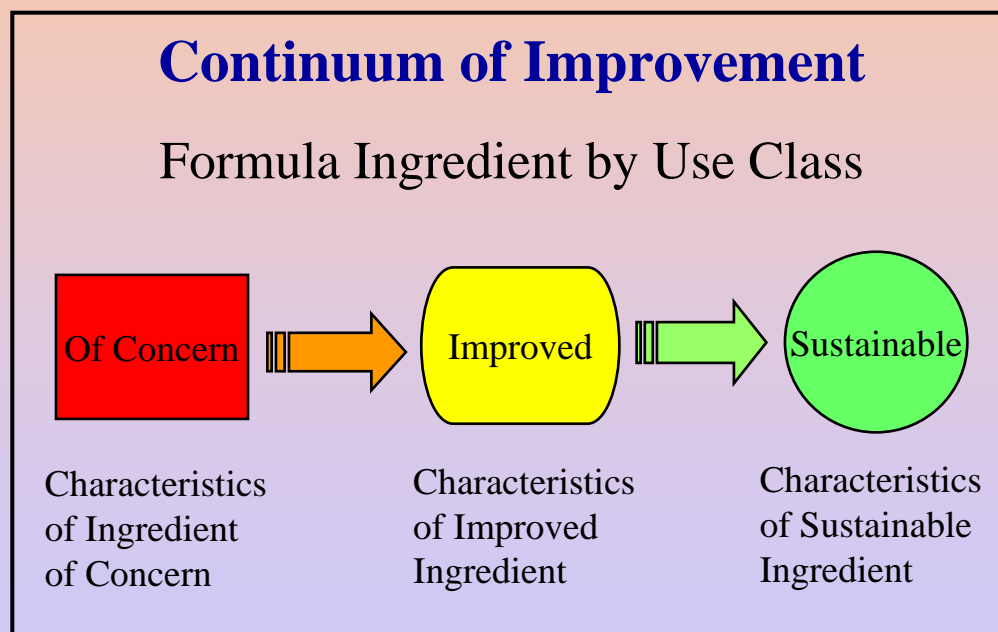


DfE Formulator

Partners with Chemical Product Manufacturers to Improve Health and Environmental Profile of Products

DfE Review

- Considers Every Formulation Ingredient
- Prepares Health and Environmental Profile
(Existing Data, Estimation Models, Chemical Expertise)
- Situates Chemical on Continuum of Improvement
- Recommends Safer Substitutes





DfE Formulator Partnerships

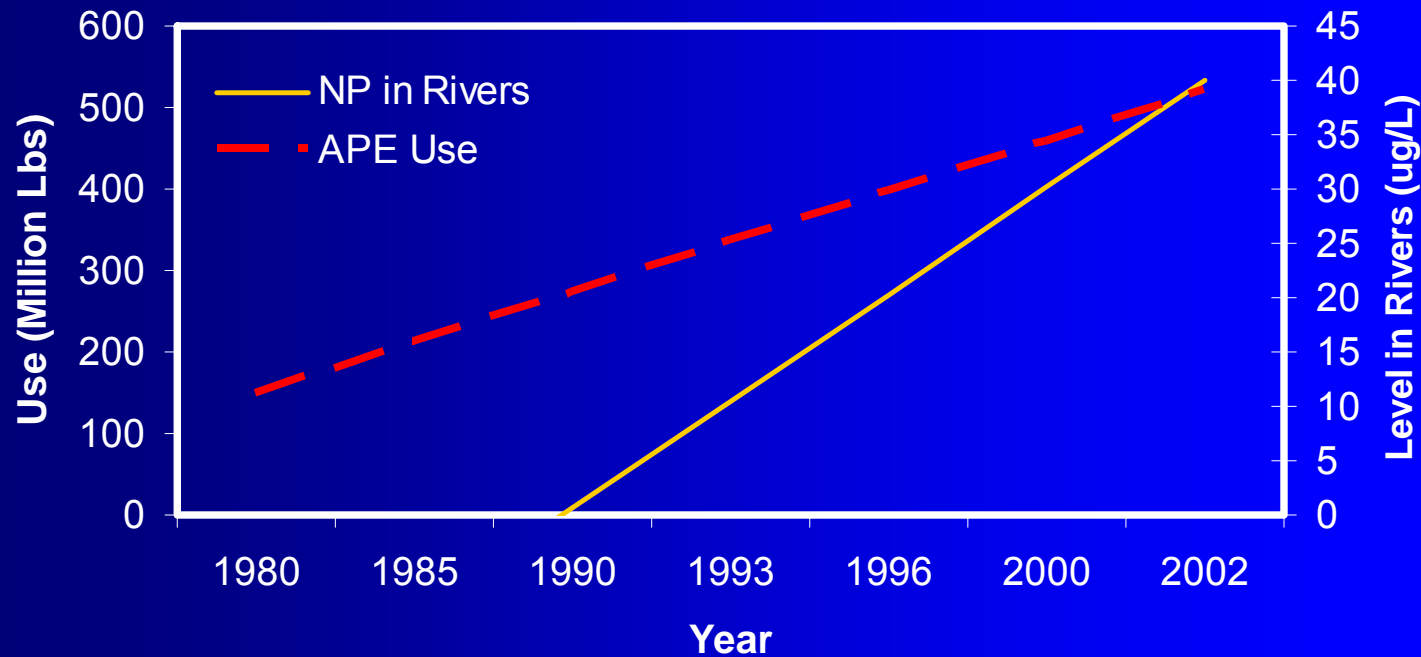
- **Offer Companies Access to EPA Expertise, Advice and Recognition**
- **Yield Measures of Environmental Benefit**
 - Partnerships have reduced the use of 40 million of pounds of chemicals of concern
 - More than 70 recognized products in the following sectors:
Industrial/Institutional Cleaners and Laundry Detergents, Holding Tank Treatments/Deodorizers, and Industrial Coatings





Safer Detergents Stewardship Initiative

Increasing APE Use and NP Occurrence





Safer Detergents Stewardship Initiative

Surfactants



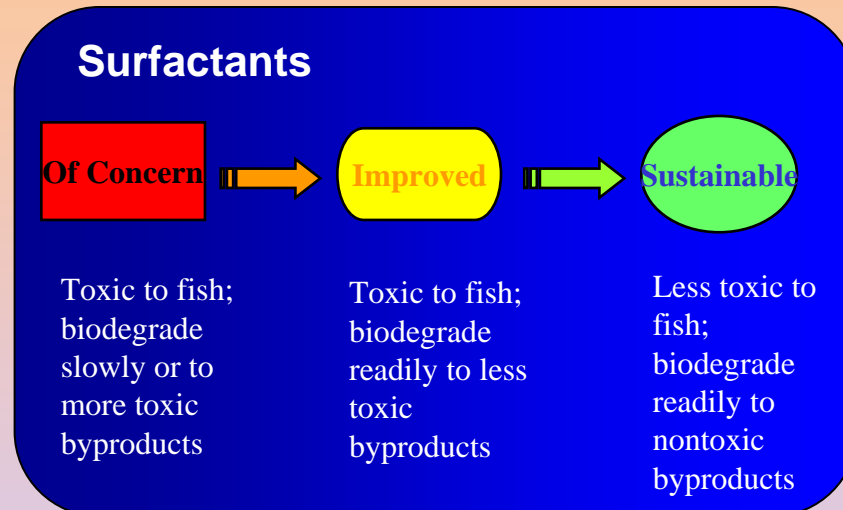
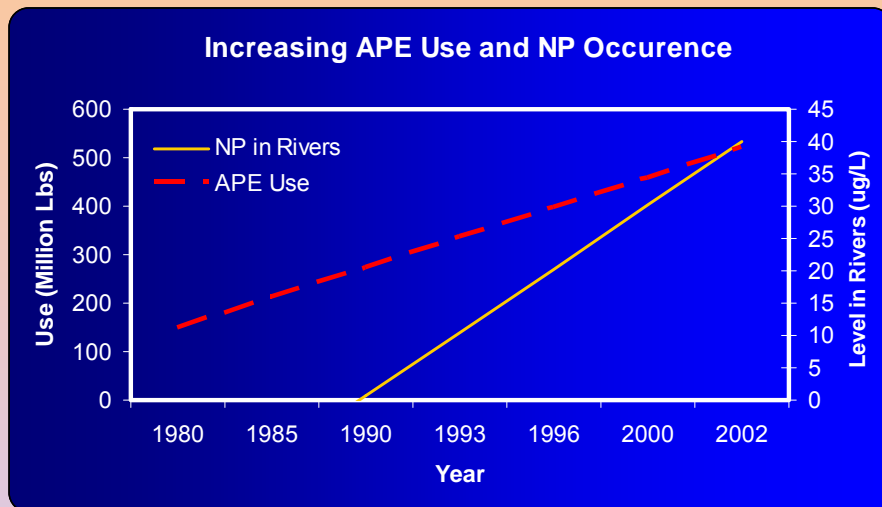
Toxic to fish;
biodegrade
slowly or to
more toxic
byproducts

Toxic to fish;
biodegrade
readily to less
toxic
byproducts

Less toxic
to fish;
biodegrade
readily to
nontoxic
byproducts



Safer Detergents Stewardship Initiative



SDSI – Opportunity for Recognition

Recognition for companies who have eliminated NPEs or state that they will phase them out by a date certain

- High-level EPA recognition
- Formulators, suppliers, retailers/distributors, users, and encouragers will be recognized