



Design for the Environment Approaches to Safer Chemicals

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DfE's Mission

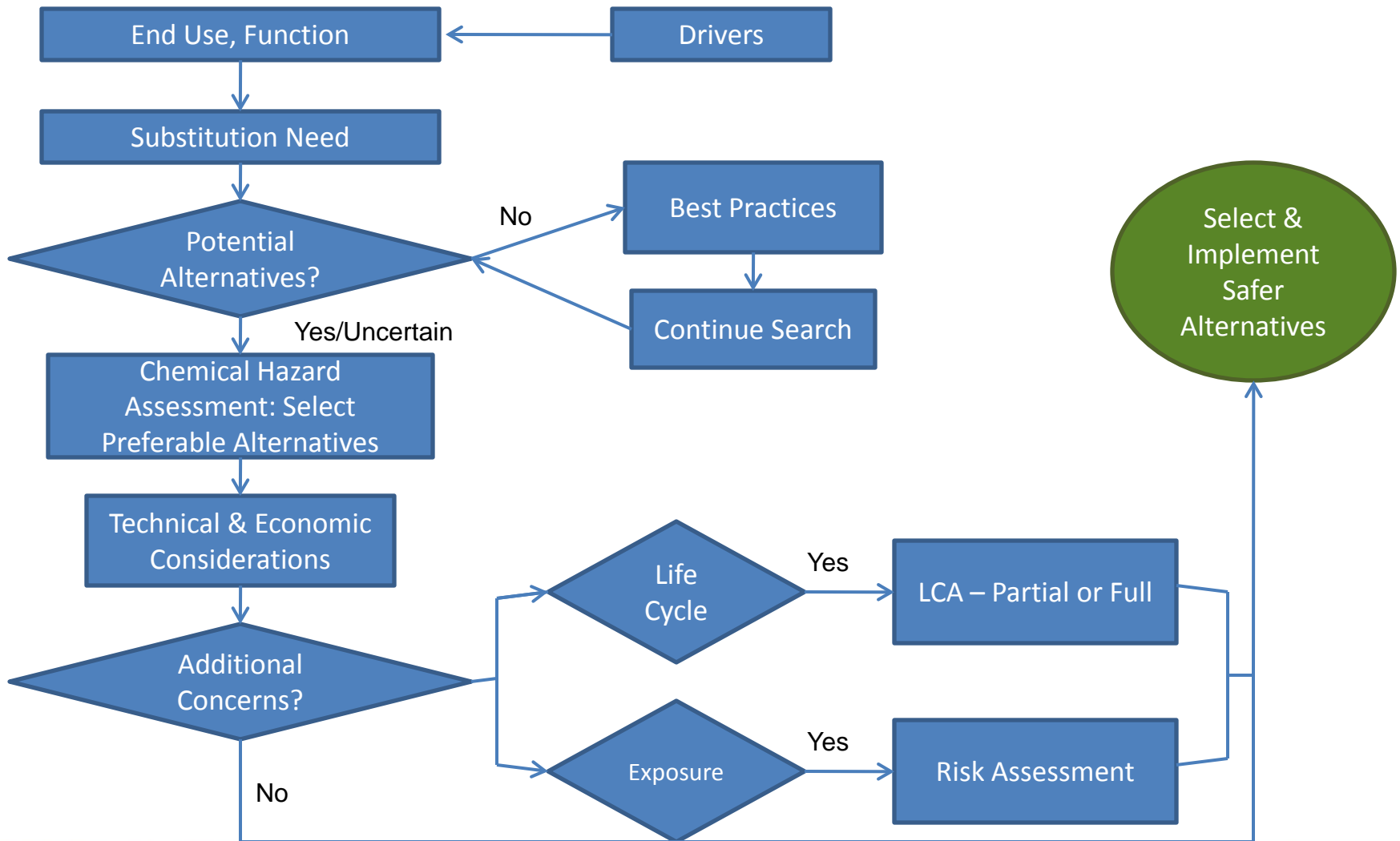
- Promote Design of Safer Products
 - Safer chemical ingredients
 - Life cycle impacts
- Develop Tools to Identify Safer Chemicals
 - OPPT technical tools and expertise
 - Multi-stakeholder participation
- Results
 - Industry partners reduced more than 750 million pounds of chemicals of concern last year by substituting safer chemicals



Design for the Environment (DfE) Programs

- **Safer Product Labeling:** High exposure, release products; Label innovative formulations made with low hazard ingredients with the DfE logo as incentive
- **Lifecycle Assessment:** Concerns exist throughout lifecycle; use LCA to identify better alternatives and otherwise improve risk management
- **Chemical Alternatives Assessment:** Environmental and human health impacts of chemicals of concern & alternatives; Promote informed substitution.
- **Best Practices:** Safer alternatives are not available, reduce worker and community exposure

DfE Decision Logic



What is Safer?



- Hazard can be ranked on a continuum
 - OPPT
 - New Chemicals Program
 - Sustainable Futures Program
 - Existing Chemicals Program
 - OPP
 - GHS
 - EU REACH Annex IV

Chemical Functionality

- The function of a chemical in a formula is related to p-chem properties and toxicity
- Criteria can be tailored to functional class to distinguish safer chemicals
- Functional use classes
 - Surfactants
 - Solvents
 - Chelating and sequestering agents
 - Fragrances
 - Colorants
 - Preservatives

DfE Criteria

- Carcinogenicity
- Mutagenicity/Genotoxicity
- Acute mammalian toxicity
- Respiratory & Skin Sensitization
- Eye & Skin Irritation/Corrosivity
- Reproductive and Developmental Toxicity
- Repeated Dose Toxicity
- Neurotoxicity
- Aquatic toxicity
- Persistence
- Bioaccumulation
- Endocrine activity

Safer Product Labeling Program

- Promote use of safer chemicals in products
- Review every ingredient by functional use class
 - Pass/Fail based on criteria
- Review formulation as a whole
 - Synergistic effects
 - pH
 - Performance testing
- Partnership Agreement
 - Use DfE Logo
 - Annual audits
 - Over 2000 products from several hundred manufacturers



SPLP Chemical Evaluation

Carcinogenicity	Pass
	No known, presumed, or suspected human carcinogens (based on GHS criteria and authoritative lists)
Developmental Toxicity	Pass
Oral (mg/kg/day)	> 250
Dermal (mg/kg/day)	> 500
Inhalation (vapor, gas, mg/L/day)	> 2.5
Inhalation (dust/mist/fume, mg/L/day)	> 0.5
Repeated Dose Toxicity (90-day study)	Pass
Oral (mg/kg-bw/day)	> 100
Dermal (mg/kg-bw/day)	> 200
Inhalation (vapor/gas) (mg/L/6h/day)	> 1.0
Inhalation (dust/mist/fume) (mg/L/6h/day)	> 0.2

Alternatives Assessment Program

- Chemical alternatives assessments:
 - Identify and evaluate potentially safer alternatives
 - Involve stakeholders from across the spectrum of interested parties
- The outcome of an alternatives assessment:
 - Provides the best information on hazard from literature and models (Based on New Chemicals Program approaches)
 - Helps stakeholders choose safer alternatives
 - Provides information that manufacturers can use to create more sustainable products
 - Helps [minimize the potential for unintended consequences](#) by reducing the likelihood of moving to alternatives that could pose a concern

Concluding Thoughts

- Chemical hazard exists on a continuum
- DfE considers chemical hazard within the context of chemical function
- DfE criteria, which is used to define “safer”, closely mirrors GHS criteria
- DfE approaches facilitate the identification of safer alternatives and informed substitution to minimize unintended consequences

For more information:

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