Applying TRI type Data for Chemical Prioritization and Alternatives Assessment

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Overview

- From Data to Prevention – Understanding

- Applying chemical information in prioritization
- Applying chemical information in alternatives assessment
- Data needs for the future
- Discussion

From Toxics Release Inventory to Pollution Prevention

- Information on releases a wake up call on

- TRI limited in terms of telling us much about how chemical is used in the facility and how it is transformed into product
- TRI limited to facilities, when increasing concern about small, dispersive releases from products. Little data on product constituents.

Expanded chemical information through state Pollution Prevention programs

- Process level chemical use/materials

  prevention/redesign
- Data that can track materials flows, identify inefficiencies.
- Lower thresholds allow for tracking greater number of smaller establishments

Efforts to expand TRI to include use information

- HR 4234 (1996) Public Right-To-Know and
  - Proposed expansion of TRI to include materials accounting, reduce thresholds for PBTs, and require reporting on toxics reductions
- EPA ANPR 61FR5132 to expand TRI
  - Proposed expansion to include materials throughput data
  - Consideration of overlaps with TSCA authorities

Limits of materials throughput data

- Doesn't tell us anything about "imported" products – where manufacture does not occur in a particular jurisdiction
- Programs such as Prop 65; Interstate Mercury Education and Reduction Clearinghouse; California Safe Cosmetics; Washington and ME Children's Safe Products Acts – start to get at data on chemicals of concern in specific products
- Still very limited information on chemicals in products. Difficult to obtain

About the Database

Browse by Company

Browse by Product Category

Using the Database

Please note: This is not the access page for the IMERC e-filing system for Mercury-added Product Notification. You may access the system here.

To access the database, select from the following options to learn about mercury in products by product category or company.

- Access a list of notifications sorted by **product category**.
- Access a list of notifications sorted by **company**.

Database Caveats

There are a number of important caveats to consider when viewing the information in the database:

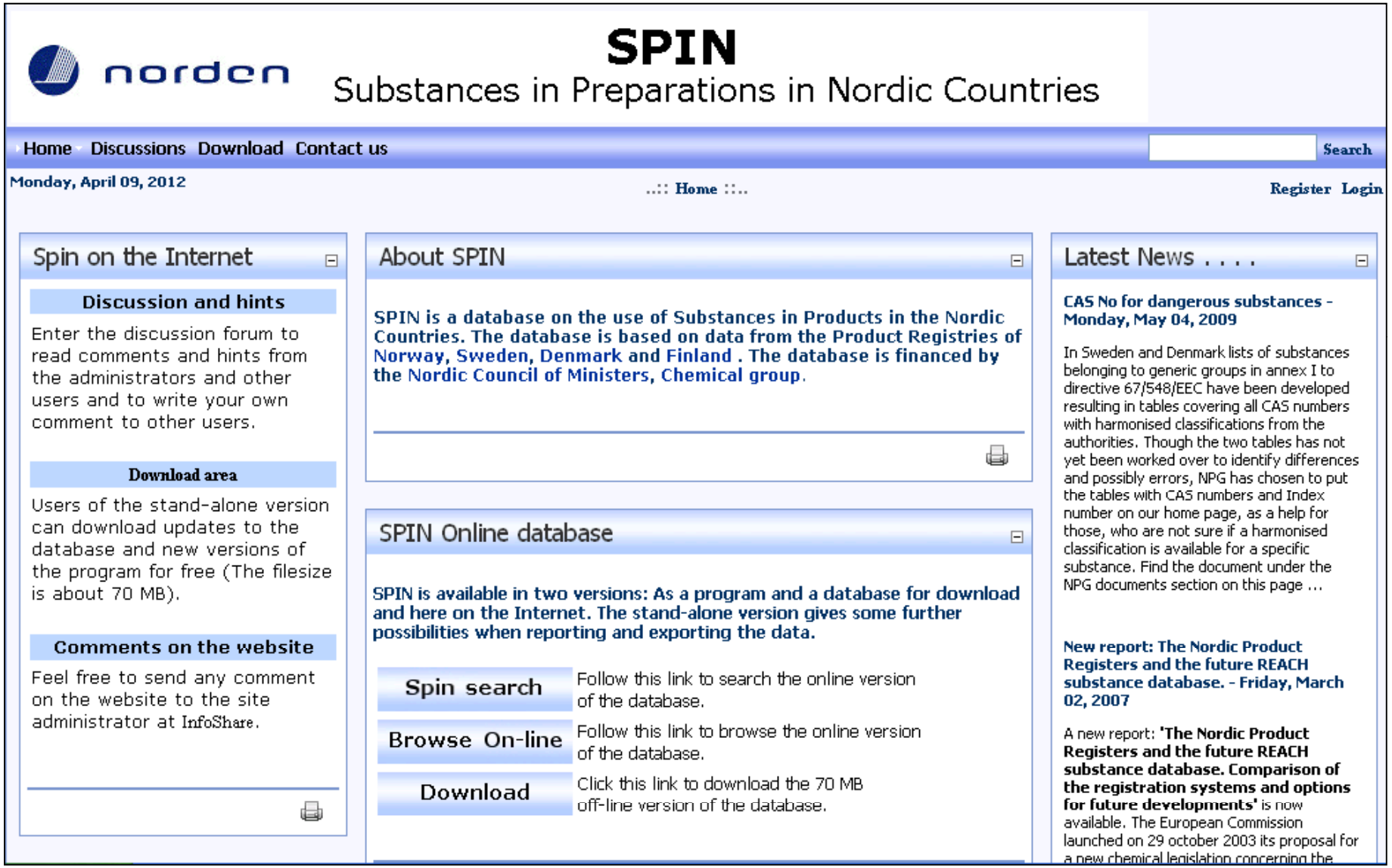
- When searching by product category, the database will display complete company filings that include all products notified for during that time period. A company filing may include products outside of the category you are searching for.
- When accessing information for companies that filed through a trade association, the database will display only those products associated with the company you have searched on. The database may not display all products that were part of that particular trade association filing.
- The information presently available may not represent the entire universe of mercury-added products. IMERC continues to receive product Notifications and is in the process of reviewing these filings prior to adding this data to the database.
- The database does not include products that were manufactured prior to the effective dates of applicable states' laws on mercury reduction.
- Aggregated data for a given product category does not necessarily represent the total amount

Other sources of chemical use information

- EPA TSCA S. 8 Chemical Data Reporting. Additional chemical manufacturing level data on how chemicals are used.
- REACH – Manufacturers must account for majority of uses of the chemical and conduct exposure scenarios in chemical safety reports
- Nordic product Registries – SPIN – database of chemicals of concern in formulated products
- Industry databases – IMDS, supplier contracts, etc.

EPA Chemical Data Reporting – Useful for Prevention?

- 2012 reporting builds on Inventory Update Rule to include:
  - Required electronic submission
  - Change frequency from 5 to 4 years
  - Replace the 300,000 lb reporting threshold for processing and use information with lower threshold (2012 – 100,000lbs and future 25,000lbs., 2,500lbs for chemicals subject to orders)
  - Change in "readily obtainable" standard to "known or reasonably ascertainable by"
  - Change in industrial function categories
  - Separate reporting for consumer or commercial categories and the reporting of the number of commercial workers reasonably likely to be exposed to the subject chemical substance
- CBI issues?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Substances in Preparations in Nordic Countries
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Discussion and hints
Enter the discussion forum to read comments and hints from the administrators and other users and to write your own comment to other users.
Download area
Users of the stand-alone version can download updates to the database and new versions of the program for free (The filesize is about 70 MB).
Comments on the website
Feel free to send any comment on the website to the site administrator at InfoShare.
About SPIN
SPIN is a database on the use of Substances in Products in the Nordic Countries. The database is based on data from the Product Registries of Norway, Sweden, Denmark and Finland . The database is financed by the Nordic Council of Ministers, Chemical group.
SPIN Online database
SPIN is available in two versions: As a program and a database for download and here on the Internet. The stand-alone version gives some further possibilities when reporting and exporting the data.
Spin search
Follow this link to search the online version of the database.
Browse On-line
Follow this link to browse the online version of the database.
Download
Click this link to download the 70 MB off-line version of the database.
Latest News . . . .
CAS No for dangerous substances - Monday, May 04, 2009
In Sweden and Denmark lists of substances belonging to generic groups in annex I to directive 67/548/EEC have been developed resulting in tables covering all CAS numbers with harmonised classifications from the authorities. Though the two tables has not yet been worked over to identify differences and possibly errors, NPG has chosen to put the tables with CAS numbers and Index number on our home page, as a help for those, who are not sure if a harmonised classification is available for a specific substance. Find the document under the NPG documents section on this page ...
New report: The Nordic Product Registers and the future REACH substance database. - Friday, March 02, 2007
A new report: 'The Nordic Product Registers and the future REACH substance database. Comparison of the registration systems and options for future developments' is now available. The European Commission launched on 29 october 2003 its proposal for a new chemical legislation concerning the

http://www.norden.org/pub/sk/showpub.asp?pubnr=2008:596

Use data critical for prioritization and alternatives assessment

- Use often thought of as a surrogate for exposure
- But can think about in three ways:
  - *Functional use: how* a chemical is used and describes the purpose of the substance in products or industrial processes (e.g. surfactant, solvent).
  - *Applicative use:* the *way in which* the chemical is used or incorporated into a product or industrial process (e.g. closed system, dispersive use, applied to surface, incorporated into the matrix).
  - *Volumetric use:* the question of *how much* is used, produced, or imported.

From data to prioritization

- Can prioritize by:
  - Chemical Hazards
  - Exposure Potential
  - Functional uses
- Most chemical prioritization to date focused on hazard with exposure (quantity or to sensitive sub-populations) as a secondary prioritization
- Focus still on identifying individual chemicals of concern that might be subject to future preventive actions

Examples of chemical prioritization efforts

- States
- Canada
- US EPA

State Chemicals Prioritization Efforts

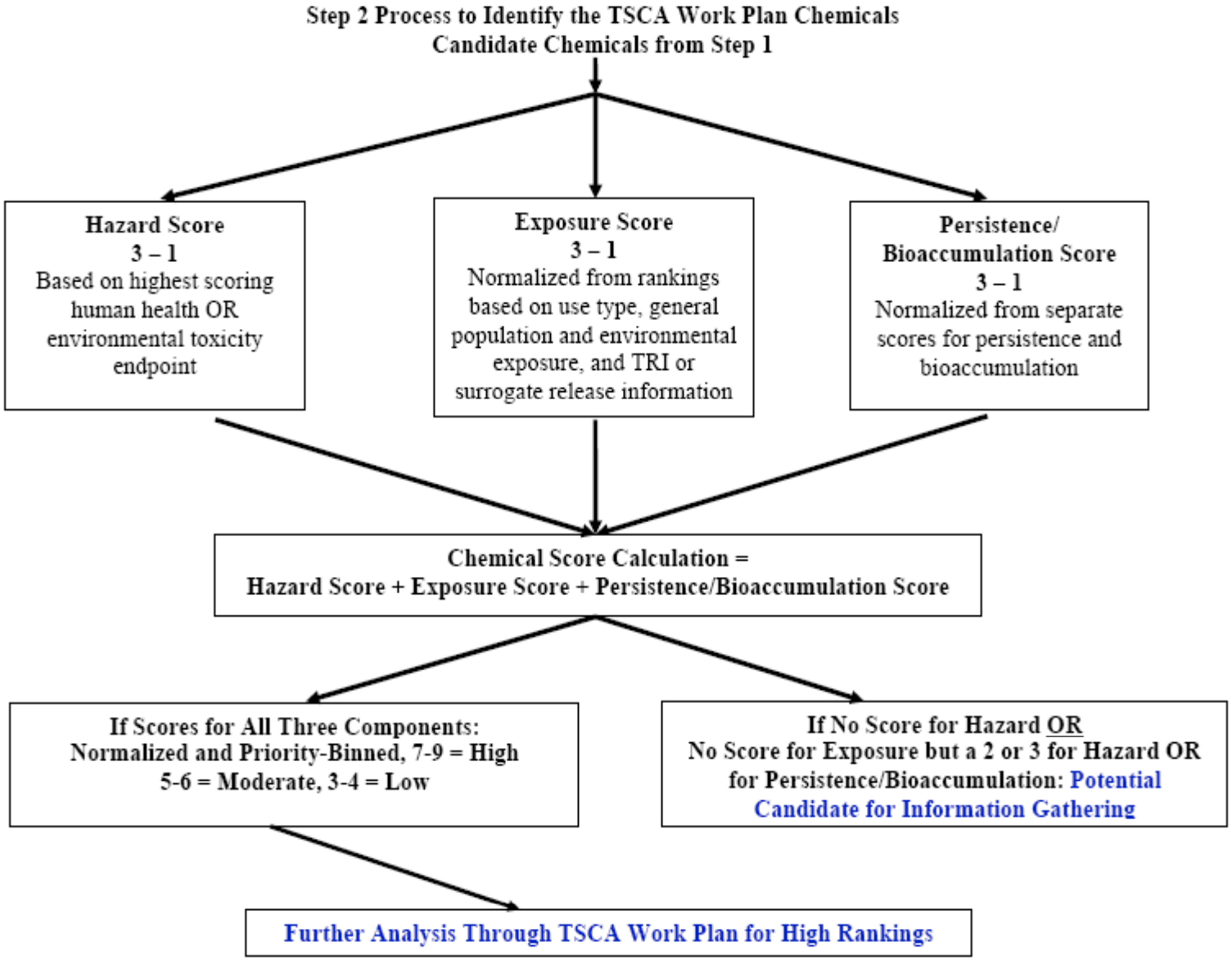
- Maine's Toxic Chemicals in Children's Products Law
  - July 2009—Published list of ~1,700 chemicals of high concern
- Washington's Children's Safe Products Act
  - July 2009—Published list of 2,044 high priority chemicals
  - January 2010—Published draft reporting list of 66 chemicals of high concern to children
- Minnesota's Toxic Free Kids Act
  - July 2010—Published list of ~1,700 chemicals of high concern
- California Safer Consumer Products draft regulations
  - Initial list-based screening to identify chemicals of concern
  - Secondary screening to identify products of concern
- Focus of prioritization on chemical lists (hazards) for endpoints of concern and exposure to high concern populations (biomonitoring, etc.)

Canadian DSL Chemicals Screening

- Domestic Substances List (DSL) of existing chemicals published in 1994, contains 23,000 substances
- Enactment of the Canadian Environmental Protection Act (CEPA) in 1999 required that all DSL chemicals be screened and categorized
- The screening was jointly conducted by Health Canada and Environment Canada, 2006
- 4000 chemicals designated high hazard based on hazard and exposure based prioritization

EPA TSCA Prioritization - 2012

- Designed to identify TSCA Work Plan Chemicals – ones to consider for further review
- Step 1 – list based review similar to state processes – PBT; CMR; use in children's products
- Exclusion of chemicals covered under other laws or with low concern or naturally occurring
- Step 2 – more indepth hazard and exposure scoring based on DfE criteria, uses, and releases
- Approximately 80 chemicals identified as TSCA Workplan Chemicals


Step 2 Process to Identify the TSCA Work Plan Chemicals
Candidate Chemicals from Step 1
Hazard Score
3 – 1
Based on highest scoring human health OR environmental toxicity endpoint
Exposure Score
3 – 1
Normalized from rankings based on use type, general population and environmental exposure, and TRI or surrogate release information
Persistence/ Bioaccumulation Score
3 – 1
Normalized from separate scores for persistence and bioaccumulation
Chemical Score Calculation =
Hazard Score + Exposure Score + Persistence/Bioaccumulation Score
If Scores for All Three Components:
Normalized and Priority-Binned, 7-9 = High
5-6 = Moderate, 3-4 = Low
If No Score for Hazard OR
No Score for Exposure but a 2 or 3 for Hazard OR for Persistence/Bioaccumulation: Potential Candidate for Information Gathering
Further Analysis Through TSCA Work Plan for High Rankings

Defining Alternatives Assessment

- **Alternatives Assessment**. A process for identifying and comparing potential chemical and non-chemical alternatives that could replace chemicals or technologies of concern on the basis of their hazards, performance, and economic viability
- **Comparative Chemicals Assessment**. The process of comparing chemical alternatives on the basis of their chemical hazards.
- **Informed Substitution**. A considered transition from a chemical of particular concern to safer chemicals or non-chemical alternatives.

Alternatives Assessment – Defining the Process

- *A process for identifying and comparing potential chemical and non-chemical alternatives that could replace chemicals or technologies of concern on the basis of their hazards, performance, and economic viability*
- Goals:
  - Reduce risk by reducing hazard
  - Avoid regrettable substitutions

- Finding a safer alternative and getting industry to adopt the use of it are not the same thing

Focus of Alternatives Assessment

- Alternatives assessment is a step-defined process which may require several iterations
  - Focus on function of chemical of concern
  - Focus on hazard reduction
  - Considers the “necessariness” of a chemical
  - Done at different levels – production/implementation, functional use, chemical
- Alternatives may be: Drop in chemicals; Changes in production processes; changes in product design; Changes in how functions are performed; Non-chemical solutions; New systems of consumption

The Process of Assessing Alternatives

www.ic2saferalternatives.org

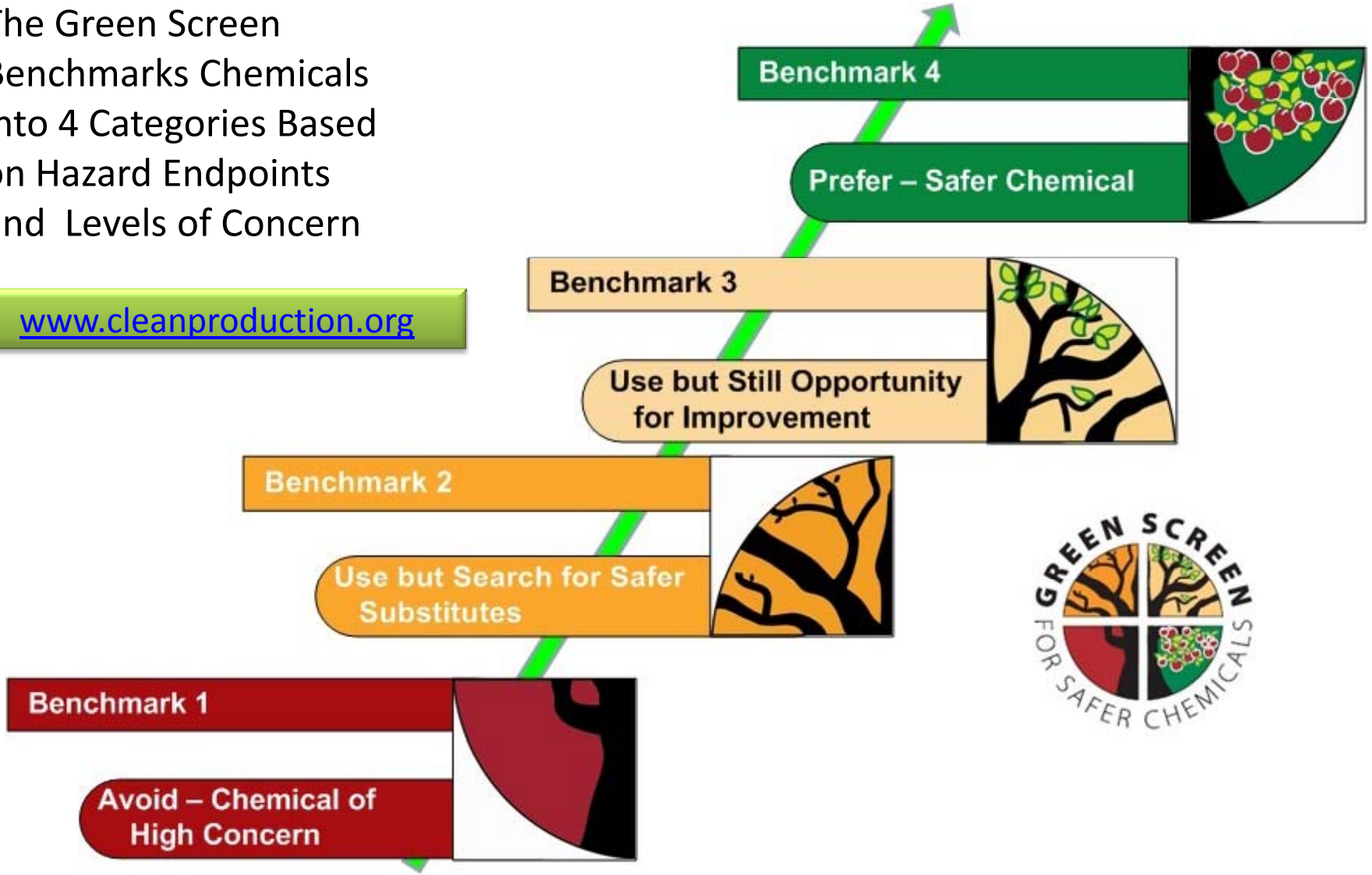
Comparative Chemicals Hazard Assessment

- Tools for comparing chemical alternatives on the basis of intrinsic chemical hazards (many built off of GHS process)
  - TURI's Pollution Prevention Options Analysis System (P2OASys)
  - German Column Model
  - Swedish Prio
  - EPA's DFE Chemical Hazard Assessment Framework
  - Clean Production Action's Green Screen
  - Washington DOE's QCATs

Clean Production Action Green Screen for Safer Chemicals

The Green Screen Benchmarks Chemicals into 4 Categories Based on Hazard Endpoints and Levels of Concern

www.cleanproduction.org



Functional use is key for evaluating alternatives

- *Functional use* is the "service" a chemical provides and what one tries to substitute in a process or product (if necessary).
- It is critical to chemical selection – chemicals exist for their functions.
- Once substances are grouped by function, it becomes possible to comparatively evaluate each option with regards to hazard, based on a range of human health and environmental attributes.
- Volumetric and applicative use become important at firm level evaluation

EPA Design for Environment

- DfE works in partnership with industry, environmental groups, and academia to advance informed substitution and through hazard reduction and incentives for adoption.
- Two programs
  - Safer Product Labeling -uses EPA's chemical expertise/tools to evaluate products and to label those that have met the program's standards.
  - Alternatives Assessment - Helps industries choose safer chemicals for specific applications and develops guidance for evaluation

www.epa.gov/dfe

Example – EPA Use Cluster Scoring

- 1990s – tool to systematically identify and screen concerns related to chemicals in commerce and prioritize chemicals for Cleaner Technologies Substitutes Assessments.
- Centered around the creation of chemical use clusters, competing chemicals and technologies for a given use.
- Information on hazard, exposure, pollution prevention potential, and past EPA regulatory interest then evaluated to rank individual chemicals within clusters and to identify high priority clusters to promote prevention

Table ES-1 Screening Level Toxicology Hazard Summary

This table only contains information regarding the inherent hazards of flame-retardant (FR) chemicals. Evaluation of risk must consider both the hazard and exposure associated with FR chemicals, as well as the hazard and exposure associated with combustion and degradation byproducts. Refer to Table 5-1 for more information on exposure.

The caveats listed in the legend and footnote sections must be taken into account when interpreting the hazard information in the table below.

L = Low hazard M[1] = Moderate hazard H = High hazard — Endpoints in colored text (L, M, and H) were assigned based on experimental data.
Endpoints in black italics (*L*, *M*, or *H*) were assigned using estimated values and professional judgment (Structure Activity Relationships).

[◊] Hazard designations, which are based on the presence of epoxy groups, arise from the analysis of low molecular weight oligomers (molecular weight <1,000) that may be present in varying amounts. The estimated human health hazards for higher molecular weight (>1,000) components, which contain epoxy groups, are low for these endpoints.

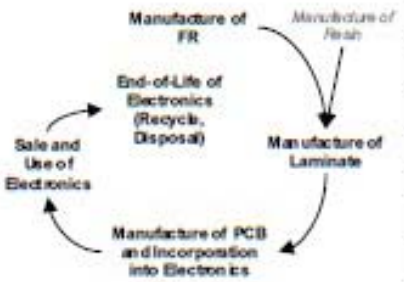
‡ Concern based on potential inhalation of small particles less than 10 microns in diameter that may be present in varying amounts.

§ Concern linked to direct lung effects associated with the inhalation of poorly soluble particles less than 10 microns in diameter.

[v] Persistent degradation products expected (none found in this report).

[R] Recalcitrant: substance is or contains inorganics, such as metal ions or elemental oxides, that are expected to be found in the environment >60 days after release.

Chemical	CASRN	Human Health Effects									Aquatic Toxicity		Environmental		Exposure Considerations
		Acute Toxicity	Skin Sensitizer	Cancer Hazard	Immunotoxicity	Reproductive	Developmental	Neurological	Systemic	Genotoxicity	Acute	Chronic	Persistence	Bioaccumulation	Availability of FRs throughout the lifecycle for reactive and additive FR chemicals and resins
Additive Flame Retardants[3]															
Aluminum hydroxide															
Aluminum hydroxide	21645-51-2	*L*	*L*	*L*	*M*	*L*	L	*M*	L	*L*	H	M	*H*[R]	*L*	
Exolit OP 930 (phosphoric acid, diethyl-, aluminum salt) (Clariant)															
Exolit OP 930	225789-38-8	L	L	*L*	*M*	*L*	*M*	*M*	L	L	M	*M*	*H*[R]	*L*	
Melapur 200 (Melamine polyphosphate) (Ciba)[4]															
Melapur 200	218768-84-4	L	*L*	*L*	*L*	*L*	*L*	*L*	*M*	*M*	*L*	*L*	*M*	*L*	
Polyphosphoric acid	8017-16-1	L	*L*	*L*	*L*	*L*	*L*	*L*	*L*	*L*	*L*	*L*	L	*L*	
Melamine	108-78-1	L	L	L	*L*	*L*	L	*L*	M	M	L	L	M	*L*	
Silicon dioxide amorphous[5]															
Silicon dioxide amorphous	7631-86-9	L	L	L	*L*	L	L	*L*	H[§]	L	*L*	*L*	*H*[R]	*L*	
Silicon dioxide crystalline[5]															
Silicon dioxide crystalline	1317-95-9	L	L	H[‡v]	H[§]	L	L	*L*	H[§]	H[§]	*L*	*L*	*H*[R]	*L*	
Magnesium hydroxide															
Magnesium hydroxide	1309-42-8	L	*L*	*L*	*L*	*L*	*L*	*L*	*L*	*L*	*L*	*L*	*H*[R]	*L*	

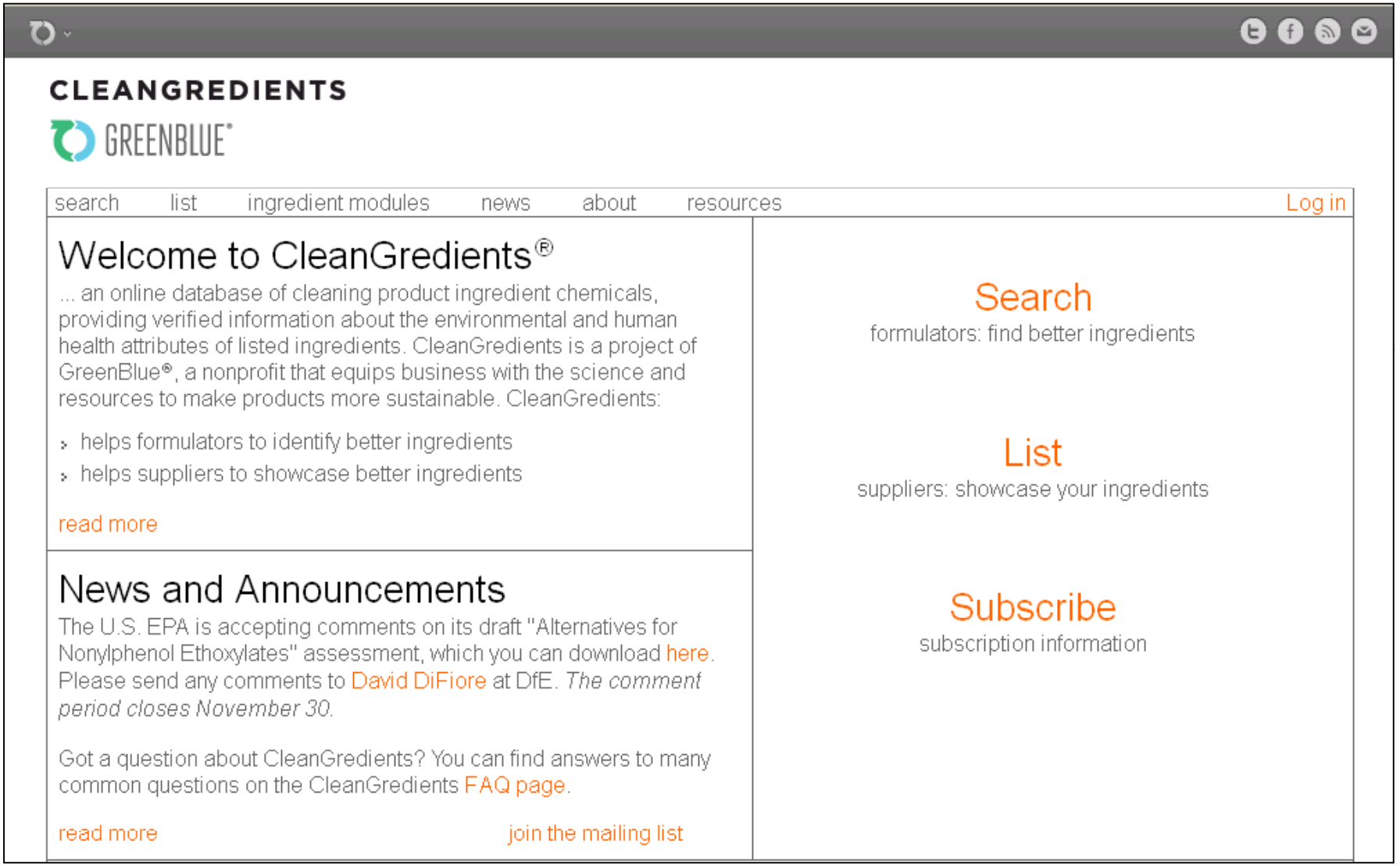


[1] The moderate designation captures a broad range of concerns for hazard, further described in Table 4-3.

[3] Although additive flame retardants are present throughout the lifecycle of the PCB, they are locked into the polymer matrix of the epoxy laminate material.

[4] Melapur 200 dissociates in water to form polyphosphoric acid and melamine ions. For this reason, Table 4-1 includes both dissociation ions.

[5] Representative CAS numbers are included in this summary table. Section 4.2.9 includes a full list of CAS numbers.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... an online database of cleaning product ingredient chemicals, providing verified information about the environmental and human health attributes of listed ingredients. CleanGredients is a project of GreenBlue®, a nonprofit that equips business with the science and resources to make products more sustainable. CleanGredients:
helps formulators to identify better ingredients
helps suppliers to showcase better ingredients
read more
News and Announcements
The U.S. EPA is accepting comments on its draft "Alternatives for Nonylphenol Ethoxylates" assessment, which you can download here. Please send any comments to David DiFiore at DfE. The comment period closes November 30.
Got a question about CleanGredients? You can find answers to many common questions on the CleanGredients FAQ page.
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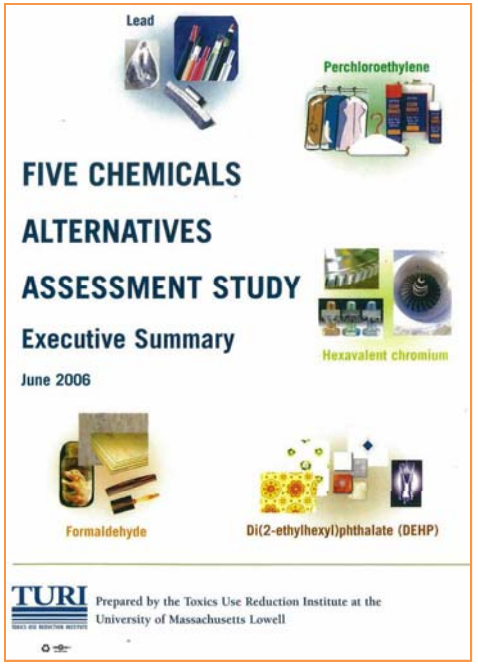
Massachusetts Toxics Use Reduction Program

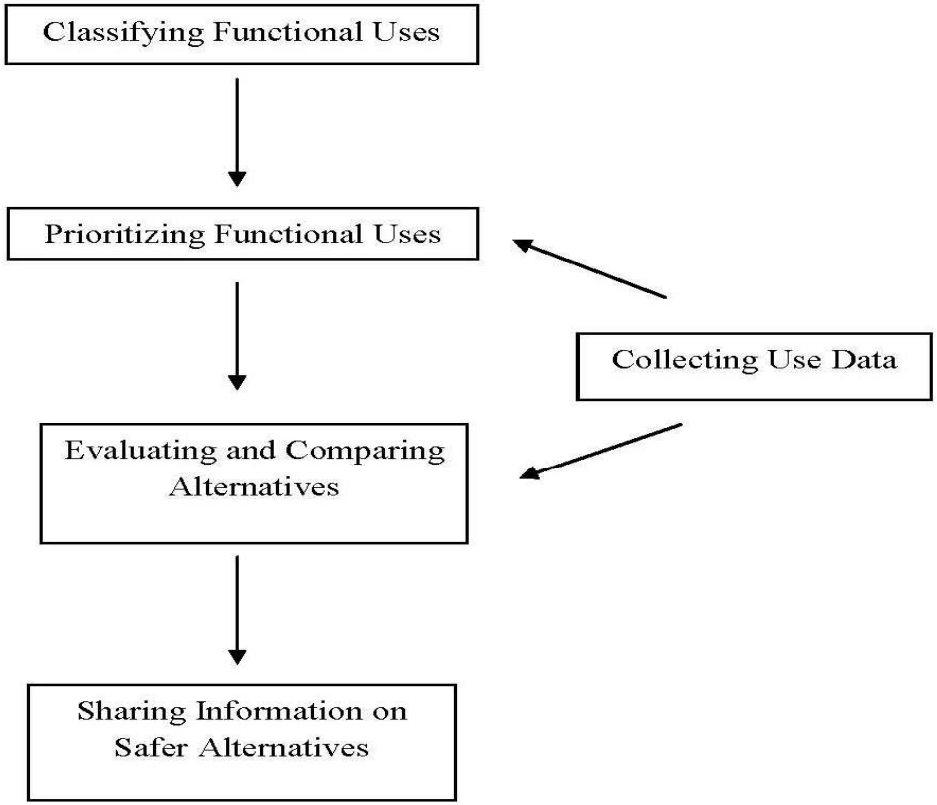
- Five Chemicals Alternatives Assessment Study
- **2005** - State legislature chose five chemicals:
  - Lead
  - Formaldehyde
  - Perchloroethylene
  - Hexavalent chromium
  - Di-(2 ethylhexyl) phthalate (DEHP)



- For each substance, TURI was to:
  - Describe significant uses in manufacturing and products
  - Identify possible safer alternatives, proven and emergent, for selected uses

http://www.turi.org/About/Library/TURI-Publications/2006_Five_Chemicals_Alternatives_Assessment_Study

Moving towards functional use prioritization – a framework



Classifying uses

- Balance between how broadly or narrowly

  “Solvent”, “flame retardant” or “solvent used in dry cleaning”

  – Tools – EPA ChemUSES; ECHA (sectors; product categories; process categories; article categories)

  – Need consistency in classification

Prioritizing functional uses

- Criteria
  - Exposure potential
  - Priority industrial sector
  - Pollution prevention/substitution potential
  - Priority product categories
  - Chemical intensity
  - Regulatory interest
- How much data are necessary; how to identify highest concern functional uses

Evaluating and comparing alternatives and sharing information

- On basis of hazards; lifecycle implications;

- Can categorize alternatives – LMH or benchmarks; how define “safer” is important
- Can create a marketplace for safer alternatives by setting the basic toxicity/performance requirements for alternatives and allowing manufacturers to populate alternatives

Data needs

- Applicative use (way in which it is used)
- Volumetric use (how much is used)
- What chemicals are in what products/processes –

- How many/what chemicals used to perform the function
- Hazard /exposure data for chemicals used
- What safer chemical and non-chemical alternatives might be available

Benefits of Functional Use to Safer Alternatives

- Move from identifying and avoiding chemicals

- Move from burdensome chemical by chemical approach to one focused on rapid screening and prioritization with a focus on alternatives
- Requires new data and ways of thinking: system to classify and prioritize functional uses.