Chemical Policy Reform as a Driver for Green Chemistry

Mike Belliveau

12 June 2013

Great Lakes Green Chemistry Webinar

www.preventharm.org
“Our children should not be used as guinea pigs. It’s time to update the law to protect them.”
Terms

• **Chemical policy reform** – changes to laws and regulations that improve management of broad classes of existing and new chemicals

• **Driver** - something that provides impulse or motivation (*but* not always direction/decision)

• **Green chemistry** - the design of chemical products and processes to reduce or eliminate substances harmful to health & environment
Regulation & Innovation


• Stringent regulations can spur innovation
  – EXAMPLE: PCBs in products, lead in gasoline

• Weak regs can perpetuate health hazards
  – EXAMPLE: Asbestos in workplace

• Regulatory uncertainty stifles innovation

www.preventharm.org
Lead Air Quality, 1980 - 2010
(Based on Annual Maximum 3-Month Average)
National Trend based on 31 Sites

1980 to 2010: 89% decrease in National Average
Hex Chrome in Cooling Towers

- 1989 Cal. Toxic Air Contaminant regulation
- Corrosion inhibitor
- Potent carcinogen
- Several safer substitutes available
- Chromate use ended

www.preventharm.org
Proposition 65 Exposure Warnings

- 1986 ballot measure by California voters
- ~ 884 substances listed as known to cause cancer or reproductive toxicity
- Requires warning of exposure unless no significant risk

Lead in soft vinyl lunchboxes
– Prop 65 lawsuit: Center for Environmental Health, 2005

www.preventharm.org
Chlorofluorocarbons (CFCs)

- 1987: IBM emitted 1.4 million pounds of CFC-113 in SJ, CA
- Among first Toxics Release Inventory (TRI) reports, by CBE
- Substitute: high tech soap and water

www.preventharm.org
Strict Laws are Driving Alternatives to Phthalates

Source: Center for International Environmental Law, “Driving Innovation” (Feb 2013)
Phthalates Restrictions & Innovation

Strictly Laws Trigger Innovation by Major Chemical Manufacturers

Number of patented inventions by Eastman Chemical (formerly Kodak Eastman), Exxon Mobil and Dow Chemical from 1972-2010 for phthalate alternatives.

Source: CIEL (2013)
Many spurred to innovate

Nearly 100 Companies Patented an Alternative to Hazardous Phthalates

Source: CIEL (2013)
Broader Phthalate-Free Inventions

Classes of Products for Patented Phthalate-free Inventions

1. Miscellaneous (including veterinary supplies, chemicals with multiple uses, and textiles) - 16%
2. Plasticizer Production (mostly for PVC production) - 22%
3. Polymer Production - 5%
4. Infant and Children - 5%
5. Cosmetics - 3%
6. Medical/Dental Supplies and Equipment - 11%
7. Coatings, Paints, and Resins (use in construction, automotive industry, and other manufacturing) - 14%
8. Pharmaceuticals - 7%
9. Bonding, Adhesives, and Sealants - 7%
10. Food Industry - 1%
11. Photo Production - 9%

Source: CIEL (2013)
Regrettable Substitutes

• *Regrettable Substitution*: The unsatisfying transition that replaces one chemical of concern with another chemical of concern

• *Safer Alternative*: An alternative that, when compared to a priority chemical that it could replace, would reduce the potential for harm to human health or the environment *or* that has not been shown to pose the same or greater potential for harm to human health or the environment as that priority chemical. 38 MRSA 1691(12)
Ozone-Destroying TCA replaced Smog-Producing VOCs

1980s – Clean air regulations restrict hydrocarbons but exempt TCA (aka methyl chloroform)

1990s – TCA emissions steadily increase, eroding ozone layer

2000s – TCA finally phased out as ozone-destroying chemical
Nerve Damage for Cancer: n-Hexane for Chlorinated Solvents

n-Hexane causes permanent damage to nerves in feet, legs, hands and arms (i.e. peripheral neuropathy)

Use increased as a result of crack down on chlorinated solvents
TSCA: 20,000 New Chemicals

• New chemicals undergo only a brief review by EPA that is time-limited and data-constrained

Example: Firemaster 550 replaced PentaBDE:

TBB now known to be:
• Persistent
• Bioaccumulative
• Toxic

TBB, 183658-27-7

www.preventharm.org
EPA Has Allowed Many New PFCs

PFOA (C8) - EXISTING
- Very Persistent
- Half-life humans = 2.7 yrs
- Toxic: Cancers, Thyroid, Cholesterol, Immune, etc.

PFHxA (C6) - NEW
- Very Persistent
- Half-life humans = ???
- Less Toxic ???
  (insufficient data)
# TSCA – Existing Chemicals Bias

<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing chemicals in commerce in 1979</td>
<td>62,000</td>
</tr>
<tr>
<td># of potential concern due to usage &amp; design</td>
<td>&gt; 16,000 (26%)</td>
</tr>
<tr>
<td># internally reviewed</td>
<td>~ 1,200 (2%)</td>
</tr>
<tr>
<td># with testing required</td>
<td>&lt; 200 (&lt;0.3%)</td>
</tr>
<tr>
<td># with bans or restrictions on use</td>
<td>5</td>
</tr>
</tbody>
</table>
EPA Couldn’t Even Ban Asbestos
State Chemical Policy - PBDEs

Trends in Chemicals in Breast Milk, Sweden

Concentration (ng/g lipid)

Year


PCBs DDT Metabolite PBDEs

Source: NRDC

THE GREEN SCREEN FOR SAFER CHEMICALS:
Evaluating Flame Retardants for TV Enclosures

www.preventtharm.org
Kid Safe Products Act (Maine)

• 1,385 Chemicals of Concern
• 49 Chemicals of High Concern
• 2 Priority Chemicals (BPA & NPEs)

Hasbro ended use of polycarbonate in toys to avoid reporting BPA

BPA phased out in baby food packaging due to alternatives assessment

www.preventharm.org
Children’s Safe Products Act (WA)

- Lead, cadmium and phthalates banned
- 66 Chemicals of High Concern to Children
- Children’s product manufacturers must report use annually, phased in over 7 years

Learn more at www.watoxics.org/chemicalsrevealed
Safer Consumer Products (CA)

All Chemicals
(100,000+)

Candidate Chemicals
(CCcs)
(~1,200)

Products with
CCcs
(~230)

Priority Products and their COCs requiring:
- Alternatives Analyses
- Regulatory Response(s) for selected Alternative and/or Priority Product

Final regulations may be adopted by fall 2013

Will name initial list of five Priority Products that contain Chemicals of Concern (COCs)

www.preventharm.org
TSCA Reform – a Work in Progress

1. Take immediate action on the most dangerous chemicals

2. Require basic information to identify chemicals of concern

3. Use the best science to protect all people and vulnerable groups

www.preventharm.org
# How does Chemical Safety Improvement Act measure up?

<table>
<thead>
<tr>
<th>POLICY</th>
<th>TSCA (1976)</th>
<th>CSIA (S.1009)</th>
<th>SCA (S.696)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prioritize Chemicals</td>
<td>NO</td>
<td>2 tiers</td>
<td>4 tiers</td>
</tr>
<tr>
<td>Close Data Gaps</td>
<td>If potential risk</td>
<td>For high priority</td>
<td>For most chemicals</td>
</tr>
<tr>
<td>Expedite Action</td>
<td>NO</td>
<td>NO</td>
<td>Reduce PBTs exposure</td>
</tr>
<tr>
<td>Report Chemical Use</td>
<td>NO</td>
<td>For processors</td>
<td>And (maybe) downstream</td>
</tr>
</tbody>
</table>

www.preventharm.org
## More Comparison – TSCA Reform

<table>
<thead>
<tr>
<th>Policy</th>
<th>TSCA (1976)</th>
<th>CSIA (S.1009)</th>
<th>SCA (S.696)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine Safety (existing)</td>
<td>NO mandate</td>
<td>YES, High Priority (Low = likely safe)</td>
<td>YES, For top 3 tiers</td>
</tr>
<tr>
<td>Apply Safety Standard</td>
<td>Unreasonable Risk AND Least Cost</td>
<td>Unreasonable Risk (health-based only)</td>
<td>Reasonable Certainty of No Harm</td>
</tr>
<tr>
<td>Protect Most Vulnerable</td>
<td>NO</td>
<td>Must consider</td>
<td>Must protect</td>
</tr>
<tr>
<td>Aggregate Exposure</td>
<td>NO</td>
<td>May consider</td>
<td>Must consider</td>
</tr>
</tbody>
</table>
More Comparison – TSCA Reform

<table>
<thead>
<tr>
<th>POLICY</th>
<th>TSCA (1976)</th>
<th>CSIA (S.1009)</th>
<th>SCA (S.696)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Best Science</td>
<td>Not specified</td>
<td>YES, not defined</td>
<td>YES, consider NAS recs.</td>
</tr>
<tr>
<td>Meet Deadlines</td>
<td>NO</td>
<td>Mostly NO</td>
<td>YES, clear mandates</td>
</tr>
<tr>
<td>Allow New Chemicals</td>
<td>Unless EPA Acts</td>
<td>If deemed likely safe</td>
<td>If deemed likely safe</td>
</tr>
<tr>
<td>Act on Toxic Hot Spots</td>
<td>NO</td>
<td>NO</td>
<td>Develop list &amp; action plans</td>
</tr>
<tr>
<td>POLICY</td>
<td>TSCA (1976)</td>
<td>CSIA (S.1009)</td>
<td>SCA (S.696)</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>States Remain Free to Act (Preemption)</td>
<td>NO after EPA adopts rules (ambiguous &amp; untested)</td>
<td>YES for info requirements; NO after prioritization</td>
<td>YES, except if compliance with both impossible</td>
</tr>
<tr>
<td>Assess Alternatives</td>
<td>NO</td>
<td>EPA burden to justify bans</td>
<td>Industry: for exemptions, new chems.</td>
</tr>
<tr>
<td>Push Green Chemistry</td>
<td>NO</td>
<td>NO</td>
<td>Authorize and fund programs</td>
</tr>
<tr>
<td>Don’t Keep Secrets</td>
<td>Much abuse</td>
<td>Must justify</td>
<td>More specific</td>
</tr>
</tbody>
</table>

More Comparison – TSCA Reform

www.preventharm.org
Explicit Green Chemistry Policy

• **Safe Chemicals Act of 2013**: Sec. 31. Safer Alternatives and Green Chemistry & Engineering:
  – Expedited review of new, safer chemicals
  – Formal recognition of safer alternatives
  – Green chemistry research centers & grants
  – Workforce training and education

• **Toxic Chemicals Safety Act of 2010 (HR 5820)**
  – Also defined alternatives assessment process and safer alternatives (Sec. 35)
Strengthening the CSIA in 2013

Safer Chemicals, Healthy Families commends bipartisan effort and calls for strengthening improvements within proposed framework to:
1. Protect vulnerable populations
2. Preserve state authority
3. Expedite action on worst chemicals
4. Establish deadlines and timetables
5. Require adequate data to prioritize chemicals
Post-TSCA Reform: Role of States

- Focus on consumer products
- Prioritize chemicals for action
- Require chemical use reporting
- Require alternatives assessments
- Require safer alternatives through use restrictions, when feasible
CONCLUSION

• Strictest regulation of existing toxic chemicals is the strongest driver
• Absence of TSCA reform continues uncertainty and will stifle innovation
• Weaker reform spurs weaker response
• Firmer direction and demand must be provided to ensure safer alternatives
Mike Belliveau
mbelliveau@preventharm.org
@preventharm

Executive Director
www.preventharm.org

Senior Advisor
www.saferchemicals.org

ENVIRONMENTAL HEALTH STRATEGY CENTER

SAFER CHEMICALS, HEALTHY FAMILIES

www.preventharm.org