Options to Reduce and Phase-out Priority Chemicals in Children's Products and Promote Green Chemistry

Report to the Legislature

Minnesota Pollution Control Agency

MINNESOTA MDH DEPARTMENT OF HEALTH

December 2010

Legislative Charge

Minn. Statutes § 116.9401-116.9407

By December 15, 2010, the commissioner of the Pollution Control Agency shall report to the chairs and ranking minority members of the senate and house of representatives committees with primary jurisdiction over environment and natural resources policy, commerce, and public health assessing mechanisms used by other states, the federal government, and other countries to reduce and phase out the use of priority chemicals in children's products and promote the use of safer alternatives. The report shall include potential funding mechanisms to implement this process. The report must include recommendations to promote and provide incentives for product design that use principles of green chemistry and life-cycle analysis. In developing the report, the agency may consult with stakeholders, including representatives of state agencies, manufacturers of children's products, chemical manufacturers, public health experts, independent scientists, and public interest groups. The report must include information on any stakeholder process consulted with or used in developing the report.

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List of Acronyms

ACC	American Chemistry Council
AICS	Australian Inventory of Chemical Substances
ASTDR	Agency for Toxic Substances and Disease Registry
CBI	Confidential business information
CEPA	Canadian Environmental Protection Act
ChAMP	EPA Chemical Assessment and Management Program
CHC	Chemicals of High Concern
CHCC	Chemicals of High Concern to Children
CMR	Carcinogenic, mutagenic or toxic to reproduction
CPSA	Washington's Children's Safe Product Act
CPSIA	Consumer Product Safety Improvement Act
CSCL	Chemicals Substances Control Law
DecaBDE	decabromodiphenyl ether
DEED	Department of Employment and Economic Development
DEP	Maine Department of Environmental Protection
DfE	Design for the Environment
DOE	Washington Department of Ecology
DSL	Domestic Substances List
DTSC	California Department of Toxic Substances Control
EC	European Commission
ECHA	European Chemicals Agency
EPA	United States Environmental Protection Agency
EPP	Environmentally preferable purchasing
EU	European Union
GAO	United States General Accounting Office
GHS	Globally Harmonized System
HHS	U.S. Department of Health and Human Services
HPV	High Production Volume
HSDB	Hazardous Substances Data Bank
IC2	Interstate Chemicals Clearinghouse
IMERC	Interstate Mercury Education and Reduction Clearinghouse
IRIS	Integrated Risk Information System
IUR	Inventory Update Report
LCA	Life cycle assessment
LOAEL	lowest-observed-adverse-effect
LOUS	List of Undesired Substances
MDH	Minnesota Department of Health
MEI	Minnesota Environmental Initiative
MITI	Japanese Ministry of International Trade and Industry

List of Acronyms continued

MnTAP	Minnesota Technical Assistance Program
MPCA	Minnesota Pollution Control Agency
NCS	National Children's Study
NHANES	National Health and Nutrition Examination Survey
NICNAS	National Industrial Chemicals Notification and Assessment Scheme
NIH	U.S. Department of Health and Human Services National Institutes of Health
NLM	National Library of Medicine
NTP	National Toxicology Program
OECD	Organization for Economic Co-operation and Development
OSPAR	Oslo-Paris Commission
PBiT	Persistent, Bioaccumulative and Inherently Toxic
PBT	Persistent, Bioaccumulative and Toxic
PCB	Polychlorinated biphenyl
PFC	Perflorinated chemicals
POP	Persistent Organic Pollutant
(Q) SARs	(Quantitative) Structural Activity Relationships
REACH	Registration, Authorization and Restriction of Chemicals
RoHS	Restriction of Hazardous Substances
SIDS	Screening Information Data Sets
SNAc	Significant New Activities
SOCMA	Society of Chemical Manufacturers and Affiliates
SVHC	Substances of Very High Concern
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act

Executive Summary

The Minnesota Toxic Free Kids Act (Minn. Stat. §§ 116.9401 to 116.9407) became law in May 2009. The legislation required the Minnesota Department of Health (MDH), in consultation with the Minnesota Pollution Control Agency (MPCA), to create a list of Chemicals of High Concern based on hazard by July 1, 2010. It also requires MDH to designate and publish a smaller list of Priority Chemicals by February 1, 2011.

The statute also required MPCA to prepare a report to the legislature by December 15, 2010, that includes the following:

- makes recommendations about mechanisms to reduce and phase out the use of Priority Chemicals in children's products, and promote the use of safer alternatives
- makes recommendations to promote consumer product design that uses green chemistry principles and that considers a product's impact over its life cycle
- discusses potential funding mechanisms to implement these measures
- report on stakeholder processes used to develop this report

As with the January 15, 2010, interim report, the MPCA is collaborating with MDH on the December report.

Debate over chemicals policy and product safety is taking place not just in Minnesota but on a national and international stage as well. In the United States, many in government, business and advocacy groups have called for reform of the 1976 Toxic Substances Control Act (TSCA), which was designed to regulate chemicals in commercial use and control toxic chemicals that have adverse health or environmental effects. Two proposals to reform TSCA were introduced this year in Congress, and the U.S. Environmental Protection Agency (EPA) has made significant changes in how it regulates chemicals using its existing TSCA authorities. Although broad agreement exists that the current law is inadequate and has failed to adequately protect the public from risks of chemicals, there is much debate about the details of reform measures, and it is unlikely that reform measures will be passed this year.

On the international level, many countries have already put in place inventories of chemicals in commerce followed by screening, assessment and sometimes restrictions. Others require information for new chemicals and approval before use in commerce. Perhaps most significant to Minnesota businesses is the European Union's Registration, Authorization and Restriction of Chemicals (REACH) legislation, enacted in 2007. Designed to streamline and improve prior legislation on chemicals, the act applies to all chemicals including those used in industrial processes and in household goods, and places much of the burden of proving the safety of a chemical on the manufacturer or importer. Many Minnesota companies with global sales and operations abroad are affected by REACH, and have been working to meet the new requirements for the past few years.

At the same time, many businesses are working proactively to increase the safety and sustainability of chemicals and products that they produce or sell. These efforts take many forms and are taking place throughout product supply chains from manufacturers of chemicals to retailers who sell products directly to consumers. Some examples of these efforts include sustainability indices that rate a product's use of energy and contributions to greenhouse gases, product ingredient disclosures to increase transparency, and green chemistry standards.

Many companies and organizations, including some in Minnesota, are also developing alternatives in product design and production using frameworks based on commonly used principles of green chemistry and green engineering. First introduced in 1998, the green chemistry principles (see page 6) have been adopted by EPA and the American Chemical Society. These include approaches such as avoiding the use of toxic pollutants and hazardous substances, substitution of less toxic raw materials, and reformulation and redesign of existing products. The MPCA has recently completed the first year of a pollution prevention grant from EPA that explored existing efforts and interest in green chemistry in Minnesota. This work, which included significant stakeholder consultations, informs the MPCA's options and recommendations to promote green chemistry that are presented in this report.

The Minnesota Toxic Free Kids Act was introduced out of concern for toxic substances in consumer products, particularly those used by children. Efforts to improve the system of regulating chemicals, ensuring product safety, and promoting green chemistry raise several dilemmas:

1. Consumers need access to product information to make informed choices. On the other hand, businesses cannot disclose *all* product ingredient information without risking their survival in a competitive global economy.
2. Chemicals and products should be *proven safe* before being allowed on the market. Or, chemicals and products should be allowed on the market unless *proven harmful*.
3. The federal government should run the chemical regulation system, not states. Or, the federal system is broken; states cannot wait for the fix and must act to protect their citizens.
4. Attempts underway to reform federal chemicals policy are shifting and evolving both in Congress, which is considering Toxic Substances Control Act reform, and at EPA (using existing authorities). States ready to act must do so without clear resolution of federal policy.
5. An improved system for chemical regulation, product safety and green chemistry promotion will require funding, in a time of severe revenue shortages in government.

It is helpful, as policymakers and stakeholders wrestle with these dilemmas, to identify desired *outcomes* for an improved system:

1. ***Minnesota protects those most vulnerable to risks:*** Children from fetal stage through adolescence face developmental risks in addition to toxicity effects that can be initiated at all ages.
2. ***Sufficient information and transparency:*** Chemical producers provide timely information needed to demonstrate chemical and product safety. Consumers, business-to-business customers, and retailers have timely, clear information from producers, regulators or trusted third parties to make informed choices in purchasing products.
3. ***Legitimate trade secrets are protected:*** Government has timely access to information needed to verify chemical safety and protect public health, while protecting legitimate confidential information. Confidential business information determinations are not overused.
4. ***Priority system established:*** Acknowledging it is not feasible to address all chemicals at once; state efforts focus initially on a smaller set of Priority Chemicals.
5. ***Minnesota is a leader and magnet for green chemistry and design for the environment:*** Minnesota seizes this reform opportunity to pave the way for companies ready and willing to be early adopters of green chemistry principles and environmentally friendly products. Minnesota companies are motivated, recognized and rewarded in the marketplace for green innovations.
6. ***Appropriate government involvement:*** Government oversight and incentives are limited to what is necessary, and new work is sufficiently funded.
7. ***Predictable, consistent and adaptable:*** Even with rapid change as the "new normal," Minnesota strives for a system that is predictable, generally consistent with other jurisdictions that are reforming chemicals policy, and adaptable to compelling new information.
8. ***Public confidence:*** Consumers, retailers, and manufacturers believe that the system of ensuring safe consumer products is transparent, trustworthy, effective, efficient, fair and timely.

It is with these dilemmas and outcomes in mind that MPCA and MDH have considered options to reduce and phase out the use of Priority Chemicals, promote the use of safer alternatives and encourage the use of product design using green chemistry. The recommendations below represent a two-pronged approach that broadly encourages green chemistry while at the same time remaining vigilant about protecting children from the risks of a smaller set of Priority Chemicals.

Chemicals policy recommendations

The MPCA recommends that the Legislature consider the following actions to address the data, safety and technology gaps in current chemicals policy and respond to the desired outcomes listed above:

1. Require manufacturers that produce or sell children's products in Minnesota that contain one or more Priority Chemicals (to be named by MDH on February 1, 2011) be subject to reporting requirements.
2. Direct state agencies to develop materials to educate Minnesotans about Priority Chemicals, the concepts of risk and exposure, and ways Minnesotans can limit their exposure to Priority Chemicals.
3. Direct the MPCA and MDH to continue their participation in the Interstate Chemicals Clearinghouse.
4. Authorize the MPCA and MDH to participate in states' initiatives that support TSCA reform, including requiring manufacturers to provide necessary information to EPA to demonstrate the safety of chemicals; making confidential business information (CBI) submitted by industry to EPA accessible to states with appropriate protections; reforming CBI provisions so that manufacturers are required to substantiate their claims of CBI; and adopting TSCA reform measures that preserve (and do not pre-empt) states' authorities.
5. Direct the MPCA and the Minnesota Department of Administration to evaluate the efficacy of adapting Minnesota's existing preferential purchasing initiatives to give preference to products that do not contain Priority Chemicals.

Recommendation 1 is needed to increase Minnesota's base of knowledge about the use of Priority Chemicals in children's products and provide incentive for manufacturers that produce or sell such products to reduce or phase out their use of Priority Chemicals. Recommendation 2 will provide needed context about the hazards, risks and routes of exposure by which children and the public may be exposed to Priority Chemicals. Recommendation 3 maintains Minnesota's charter membership in the IC2 and enables the state to continue collaborating with and learning from other states that are addressing similar issues in lieu of federal chemicals policy reform. Finally, Recommendations 4 and 5 allow Minnesota to add its voice to other states that are encouraging federal chemicals policy reform, and to lead by example by implementing, if feasible, governmental preferential purchasing for products formulated without Priority Chemicals.

These recommendations can be implemented in ways that limit their cost to manufacturers and also minimize the additional responsibility placed on government, while taking important steps toward safer children's products.

Green chemistry recommendations

Based on its experience in the state's 20-year-old pollution prevention program, a year of researching green chemistry potential, and other stakeholder input and processes, the MPCA offers the following recommendations to promote green chemistry and product design:

1. Given green chemistry's promise to diversify business, grow market niche and reduce risk and cost, the Legislature should consider establishing formal green chemistry policies to help direct the efforts of state agencies, technical assistance programs and private sector businesses.
2. The MPCA should continue to track and report on green chemistry's development using its existing biennial report to the Legislature on pollution prevention activities. Policy makers should consider adding additional program components, incentives, resources, and revenue sources to the effort as needed.
3. The MPCA should establish a policy to promote green chemistry and product design as part of its pollution prevention programs to enhance Minnesota businesses' competitiveness in all markets. These promotional efforts should include both the broad clientele of the pollution prevention program as well as users of chemicals targeted by Minnesota, other states, EPA and other countries.

4. Over the next biennium, MPCA should direct a minimum of one FTE of existing staff resources to explore and promote green chemistry and design across sectors, supply chains and state government using the tools below:
    - partnerships
    - assistance
    - technology transfer and diffusion
    - data gathering to support assistance, outreach and measurement of progress
    - grants and loans to support education and implementation
    - state government purchasing preferences
    - tax-based incentives and services

Once the MPCA's basic program has shown success and is reported back to the Legislature, additional resources could enable the agency to enhance its assistance activities. Further discussion of these recommendations for green chemistry program components and the documentation of research supporting those options are contained in the main text of this report.

Funding/incentives

As the Legislature considers these options, it is important to consider resource limitations. Currently, the agencies have no staff or programmatic resources dedicated to regulating chemicals in children's products beyond those allocated for implementing the Toxic Free Kids Act requirements from the 2010-2011 budget.

A variety of mechanisms can be used to fund collection of information from manufacturers on children's products and the other chemicals policy recommendations listed above, including reporting fees, or fees on chemicals use. In addition to covering the costs associated with information collection, these funding mechanisms can serve as disincentives for continued use of certain chemicals or as incentives to evaluate the use of alternatives. The MPCA has analyzed potential funding mechanisms for chemicals policy work and green chemistry, and this information is found on pages 53-54.

A number of mechanisms also exist that are targeted at assisting businesses and for which green chemistry and design research and implementation projects would likely be eligible. These include: tax credits, sales tax exemptions, tax deductions and enterprise zones. One example is the Small Business Investment Tax Credit which was passed in 2010 and provides a 25 percent tax credit to investors in certain high technology fields, including green chemistry.

While these mechanisms are available for use by green chemistry projects, none currently give priority to green chemistry. So when funds are limited, green chemistry projects compete with all other economic development projects including job creation. The Legislature could consider monitoring the use of these funding mechanisms and, if necessary, adapt them to carve out some portion for green chemistry. Several non-government programs also provide cash and in-kind services to help businesses implement clean technologies. A more detailed description of existing incentives and programs can be found on page 60.

Next steps

Implementing the recommendations described in this report represents new work to state agencies, particularly in chemicals policy and regulating chemicals in children's products. State agencies lack experience in many of these areas. As a next step, the Legislature should charge state agencies with developing the details of implementation. Agencies that might have some involvement in these efforts include the Minnesota Department of Commerce, Minnesota Department of Employment and Economic Development (DEED), MDH, MPCA and the Minnesota Department of Public Safety.

Introduction

The Minnesota Toxic Free Kids Act (Minn. Stat. 116.9401 – 116.9407) became law in May 2009. It establishes a framework by which the Minnesota Department of Health (MDH), in consultation with the Minnesota Pollution Control Agency (MPCA), compiles a list of chemicals of high concern. It also requires MDH to designate and publish a list of Priority Chemicals in children's products by February 1, 2011.

The statute requires the MPCA to prepare a report for the legislature by December 15, 2010 in which it does the following:

- makes recommendations about mechanisms to reduce and phase out the use of Priority Chemicals in children's products, and promote the use of safer alternatives
- makes recommendations to promote consumer product design that uses green chemistry principles and that considers a product's impact over its life cycle
- discusses potential funding mechanisms to implement these measures
- report on stakeholder processes used to develop this report

As with the January 15, 2010, report required by this legislation, the MPCA and MDH have again collaborated to provide one comprehensive report that reflects the contributions from both agencies.

This report is organized with the first section as an introduction, followed by five sections describing chemicals policy regulation and green chemistry initiatives currently in place in the U.S., Minnesota, other states and other countries. Also included in these sections is a sampling of the many private sector initiatives to promote product safety and green chemistry. The next section focuses on stakeholder efforts, including the MPCA's green chemistry stakeholder effort funded by EPA that informed much of the green chemistry recommendations in the report. The final four sections of the report describe desired outcomes, key issues, options to reduce and phase out Priority Chemicals in children's products, and options for incentives and promotion of green chemistry.

Minnesota's toxics in children's products legislation passed at the very end of the 2009 Session, following substantial debate on the subject of unregulated and potentially toxic chemicals in consumer products, especially children's products. These debates were sparked by headlines in newspapers and television news stories about lead and cadmium in toys imported from China, plasticizers in consumer products, and bisphenol A in baby bottles. Consumers and an array of advocacy groups continue to voice their concerns about the presence of toxic chemicals in products people use every day.

With passage of the 2009 legislation, Minnesota joins other states that have adopted chemicals policy regulation, most notably Maine, Washington and California. In each case, it has been the ineffectiveness of the federal Toxic Substances Control Act (TSCA) coupled with action taken by other nations, most notably the European Union (EU), that prompted individual states' action to address chemical policy gaps.

Consumer concern about toxic chemicals in commerce and in consumer products, in particular, has not lessened in the months since Minnesota's act was passed. Indeed, it may have accelerated, as evidenced by the introduction in Congress of both House and Senate TSCA reform legislation, the strong new steps taken by EPA with regard to TSCA under Administrator Lisa Jackson, and continued activity and progress by states with their own chemicals policy initiatives. The central question in the chemicals policy debate is not whether chemicals policy reform is needed, but rather how much reform, and how to approach it.

At the same time, businesses are making strides to improve the safety of chemicals in their supply chains and increase the sustainability of their products. The need for greener chemicals is emerging as companies look to develop processes that demand less energy and generate less waste. It is also evident in the quest to develop plant-based plastics as businesses look to reduce their reliance on petroleum in their processes and products.

Many companies and organizations are also developing alternatives in product design and production using frameworks that are based on the 12 Principles of Green Chemistry. First introduced in 1998, the principles have been adopted by the EPA and the American Chemical Society (relating to chemical products and processes).

These principles were followed in 2003 by 12 Principles for Green Engineering, which mirror those above for chemistry. Both sets of principles support Minnesota's existing Toxic Pollution Prevention Act (Minn. Stat. 1990, ch. 115D) by focusing prevention efforts at their highest-leverage point: the beginning of product and process design.

Twelve Principles of Green Chemistry

1. **Prevention** — better to prevent waste than to treat or clean up waste after it has been created
2. **Atom economy** — incorporate all materials used in the process into the final product
3. **Less hazardous chemical syntheses** — use and generate substances with little or no toxicity
4. **Designing safer chemicals** — effect a desired function while minimizing chemical product toxicity
5. **Safer solvents and auxiliary substances** — should be made unnecessary or innocuous when used
6. **Design for energy efficiency** — minimize energy use (e.g., use of heat and pressure in synthesis)
7. **Use of renewable feedstocks** — wherever practicable, raw material should be renewable
8. **Reduce derivatives** — should be minimized; extra steps require reagents and can generate waste
9. **Catalysis** — catalytic reagents (as selective as possible) are superior to stoichiometric reagents
10. **Design for degradation** — should break down into innocuous, non-persistent degradation products
11. **Real-time and in-process monitoring and control** — prior to the formation of hazardous substances
12. **Inherently safer chemistry for accident prevention** — minimize potential for releases, explosions, fires

Many Minnesota businesses have forged ahead in using green chemistry techniques to develop safer products for that growing group of consumers seeking such products and in many cases, willing to pay a price premium for them. While green chemistry is not yet a mainstream consideration across the economy, manufacturing and retail sectors which develop products for consumption, direct skin contact (personal care products), building supplies, and home and workplace maintenance are particularly engaged and actively developing products which can be marketed as safer to use.

Federal Chemicals Policy and Toxic Substances Control Act Reform

In order to evaluate the best options available to reduce and phase out the use of Priority Chemicals in Minnesota, it's important to understand the history and current landscape of chemicals policy at the national level, in particular issues surrounding the Toxic Substances Control Act (TSCA). The next sections will describe major features of TSCA, its limitations and recent proposals to reform it. It also outlines the substantial changes in chemicals management that EPA has taken in the last year under its existing authorities. It will also provide a description of federal resources that provide information about children's exposure to chemicals. Because the landscape of chemicals policy is changing rapidly, references to websites include the date the websites were most recently accessed.

The U.S. Congress enacted TSCA in 1976 to provide the EPA with authority to obtain information on chemicals in commercial use and control those chemicals that are toxic or have adverse health or environmental effects. Prior to this time, chemical substances entered the marketplace with little or no pre-market review or control (Lowell, 2003).

TSCA authorizes EPA to collect information on and regulate the production of new and existing industrial chemicals. TSCA specifically requires EPA to 1) create an inventory of existing chemicals already in commerce, 2) regulate unreasonable risk from new chemicals introduced into commerce subsequent to the act, and 3) make health and safety information available for examination while protecting manufacturers' confidential business information (CBI). TSCA does not apply to pesticides, tobacco, nuclear material, firearms and ammunition, food, food additives, or drugs and cosmetics, because these products are regulated under other laws.

Note that TSCA treats new and existing chemicals differently, with pre-manufacture information required for new chemicals. A "new chemical substance" is defined as "any chemical substance which is not included in the chemical substance list compiled and published under [TSCA] section 8(b)." This list, called the TSCA Inventory, is a list of all chemical substances in commerce prior to December 1979 and includes about 62,000 different chemical substances (Lowell, 2003). Since then, EPA has added 23,000 chemicals to the inventory (EPA, 2010h).

The need for Toxic Substances Control Act reform

The limitations of TSCA and its effectiveness in controlling risks posed by industrial chemicals have been discussed for years. In 1994, the U.S. General Accounting Office (GAO) outlined three key shortcomings apparent in EPA's implementation of TSCA. The first was that EPA regulates few chemicals under TSCA. Although the authorities provided in TSCA could be important tools in a comprehensive chemical regulation program, the GAO found "…the Act's legal standards are so high they have usually discouraged EPA from using these authorities. In addition, EPA has generally interpreted TSCA as giving preference to dealing with chemical risks under other laws. As a result, EPA has issued regulations to control only nine chemicals in almost 18 years."

GAO's second finding was that EPA has not fully assessed chemical risks. TSCA does not require the routine testing of chemicals, and thus limited toxicity data is available for most new chemicals. Consequently, in most cases, EPA predicts the health and environmental effects of new chemicals using structure activity relationships, which predict the behavior of a new or unknown chemical based on a chemical with similar molecular structure for which behavior is known. GAO cited this as a concern because a study showed that structure activity relationship tools used at that time were often found to be inaccurate in predicting chemical physical properties (e.g., vapor pressure), which are important in estimating exposure.

For new chemicals, the exposure assessments are usually based on the pre-manufacture information provided about anticipated production volume and market uses. Since these often change once production actually begins, the potential risks posed by new chemicals coming into commerce are often evaluated using inaccurate or outdated information. For chemicals already in commerce (i.e. existing chemicals), the burden is on EPA to compile and evaluate the information needed to conduct the risk assessments, a task that is both time-consuming and costly. This is underscored by the fact that over the 15-year period between publication of the TSCA Inventory and GAO's 1994 report, EPA succeeded in reviewing the risks of fewer than 1500 existing chemical substances.

GAO's third and final finding was that, large amounts of TSCA's data are claimed as confidential. The GAO cited a 1992 study that found more than 90 percent of the pre-manufacture notices that the firm reviewed contained information claimed as confidential. This means EPA cannot disseminate the information to state health and environmental officials or others that would find the information useful. While some portion of the claims are recognized as necessary to protect trade secrets, the number of claims appears to be excessive. TSCA's provisions to challenge CBI are burdensome and costly, and thus, rarely used.

Sixteen years after publication of the GAO report, the EPA Office of Inspector General issued an evaluation report on February 17, 2010, that cites many of the same issues and describes in detail the limitations of TSCA as currently implemented by EPA with regard to the regulation of new chemicals (U.S. EPA, 2010h).

Toxic Substances Control Act reform efforts

Despite the numerous reports documenting concerns about the adequacy of TSCA to control risks posed by industrial chemicals, serious efforts to reform TSCA did not gain ground until after 2007, the year that the EU's new chemical regulatory system—Registration, Evaluation and Authorization of Chemicals, or REACH came into force. This new system greatly affects U.S. businesses, which export about $186 billion in goods to EU countries each year (http://www.chemicalspolicy.org/chemicalspolicy.eu.reachindetail.php). About this same time, dissatisfaction with the federal government's lack of progress in controlling chemical risks led legislators in several states to propose and in some cases enact regulations that would address their concerns about chemicals in consumer products. Soon, talk about reforming TSCA began to be heard in Congress.

In September 2009, the EPA announced its core principles for legislative reform of TSCA. The principles, listed below, are intended to guide Congress in fixing the flaws of TSCA:

1. Chemicals should be reviewed against safety standards that are based on sound science and reflect risk-based criteria protective of human health and the environment.
2. Manufacturers should provide EPA with the necessary information to conclude that new and existing chemicals are safe and do not endanger public health or the environment.
3. Risk management decisions should take into account sensitive subpopulations, cost, availability of substitutes and other relevant considerations.
4. Manufacturers and EPA should assess and act on Priority Chemicals, both new and existing, in a timely manner.
5. Green chemistry should be encouraged and provisions assuring transparency and public access to information should be strengthened.
6. EPA should be given a sustained source of funding for implementation.

More information on these principles is available at:
http://www.epa.gov/oppt/existingchemicals/pubs/principles.html.

Following the EPA's announcement of reform principles, a number of organizations released statements of their principles for TSCA reform, including the National Conference of State Legislatures (http://www.ncsl.org/default.aspx?TabID=773&tabs=855,23,667#855) and the Environmental Council of States (http://www.ecos.org/content/policy/detail/4195/). An independent group of 13 states also released the

States' Principles on Reform, and the Safer Chemicals/Healthy Families campaign and the American Chemistry Council (ACC), the chemical manufacturers' advocacy group, issued sets of principles as well. (These last three are available at http://www.chemicalspolicy.org/us.federal.tscareform.php).

Despite their varied origins, a great deal of similarity can be found among the resolutions. All include calls for placement of responsibility on manufacturers to provide chemical health and safety data, and the principle of protection for the most vulnerable subpopulations. Most call for development of chemical safety standards based on sound science; preservation of states' authority to implement measures to manage chemicals of concern; enhanced coordination and communication between the states and the federal government; use of alternatives assessments; and promotion of safer chemicals and products and green chemistry.

Congressional Toxic Substances Control Act reform proposals

Congressional proposals to reform TSCA were announced in both the House and Senate on April 15, 2010. In the Senate, Sen. Frank Lautenberg (D-NJ) introduced the Safe Chemicals Act of 2010 after a lengthy period of anticipation. Simultaneously, House Energy & Commerce Committee Chairman Henry Waxman (D-CA) and commerce subcommittee Chairman Bobby Rush (D-IL) released a discussion draft of the Toxic Chemicals Safety Act of 2010. House Committee staff then embarked upon an extended stakeholder process to obtain input on the draft bill, which culminated in formal introduction of the Toxic Chemicals Safety Act of 2010 (H.R. 5820*)* on July 22, 2010. A link to the congressional hearings, a selection of TSCA reform principles, and links to the full text of the bills is available can be found at:
http://www.chemicalspolicy.org/us.federal.tscareform.php.

The call for TSCA reform has been widely embraced by states, industry groups and advocates from environmental and health organizations. However, since the congressional proposals to reform TSCA were announced in April, industry groups have expressed concern about the reform measures.

Both businesses and advocates also generally concur with the major shift of authorizing EPA for the first time to determine whether chemicals on the market are safe. However, Calvin Dooley, the president and CEO of the ACC called the bills' requirements for extensive information about potential exposures to chemicals, "almost impossible to meet." The Society of Chemical Manufacturers and Affiliates (SOCMA), another industry association, says the bill would "significantly hamper innovation and impose stringent regulatory burdens on batch, specialty, and custom chemical manufacturers," particularly the small and midsized companies that the group represents. ACC and SOCMA are also concerned about the modifications to CBI contained in H.R. 5820, which would end protections after five years (C&EN, 2010).

Representatives of both industry and environmental groups believe it is unlikely Congress will pass a TSCA reform bill before the 2010 Congress adjourns. The results of mid-term elections will further influence chances of TSCA reform.

Recent Environmental Protection Agency changes in chemical management

Since EPA announced its TSCA reform principles, the agency has instituted a number of significant changes in how it manages chemicals. These efforts, described below, include new regulatory risk management action plans, chemical action plans for chemicals of concern, requirements for information to understand chemicals risks and increase transparency, greater public access to information on chemicals and changes to its Inventory Update Reporting Rule (U. S. EPA, 2010b). EPA's Inventory Update Reports (IURs) are used to identify high production volume (HPV) chemicals, and Minnesota's legislation established HPV chemicals as a prerequisite for chemicals to be named to Minnesota's Priority Chemicals list. HPV chemicals are produced in the United States or imported at quantities of one million pounds or more per year.

Regulatory risk management actions

EPA has taken new risk management actions on several chemicals of concern including lead, mercury, formaldehyde, polychlorinated biphenyls (PCBs), glymes (specialty solvents) and certain carbon nanotubes. A summary of these action plans can be found at the following website: http://www.epa.gov/oppt/existingchemicals/pubs/enhanchems.html#newreg

Chemical action plans

In addition, EPA is developing chemical action plans, which outline the agency's risk management efforts for chemicals of concern. The plans are based on EPA's review of available hazard, exposure and use information and outline risks each chemical may present and specific steps EPA will take to address concerns. Potential EPA actions include authority under Section 6 of TSCA to label, restrict or ban chemicals. The first chemical action plan for bisphenol A was released on March 29, 2010. By August 13, 2010, EPA had released action plans for the following chemicals:

- Benzidine dyes
- Bisphenol A (BPA)
- Hexabromocyclododecane
- Nonylphenol)/nonylphenol ethoxylates
- Perfluorinated chemicals (PFCs)
- Penta, octa and decabromodiphenyl ethers (PBDEs) in products
- Phthalates
- Short-chain chlorinated paraffins

Details of these action plans can be found at http://www.epa.gov/oppt/existingchemicals/pubs/ecactionpln.html

Information to understand chemical risks

EPA is also planning to require additional information to ensure that it has hazard, use and exposure data needed to prioritize chemicals and make risk management decisions. Specifically, EPA intends to require that companies submit information to fill remaining gaps in basic health and safety data on high production volume (HPV) chemicals, make the reporting of chemical use information more transparent, useful and useable by the public and require some additional reporting on nanoscale substances. Additional information on these efforts can be found at: http://www.epa.gov/oppt/existingchemicals/pubs/enhanchems.html#info

Efforts to increase transparency and reform Confidential Business Information policies

EPA has also taken several actions to increase transparency and public access to information it has collected on chemicals. These actions include adopting a more stringent review of industry confidentiality claims and making the public portion of the TSCA inventory available free of charge on the EPA website. The inventory is also now available on Data.gov as a dataset and as an extraction tool, which makes the data easier to evaluate (U.S. EPA, 2010b). Additional information on how to access the inventory is available at: http://www.epa.gov/oppt/newchems/pubs/invntory.htm

TSCA provides protection for confidential business information (CBI) that reveals the manufacturing processes of a chemical or mixture, and data that reveal the composition of a mixture. The CBI requests granted by EPA apply to information including the chemical manufacturer, chemical name, facility location, and quantity of chemical produced.

In its Office of Inspector General Evaluation Report, EPA staff estimated manufacturers and importers were sending in a large percentage of submissions with requests for CBI protections (as high as 90 percent for premanufacture notices (PMNs) and 50 percent for Section 8(e) notices, which are required when "a manufacturer becomes aware of new information that indicates their chemicals present a substantial risk of injury to human health or the environment" (Lowell 2003). Currently, EPA does not conduct systemic verification or validation of the requests; commonly, the CBI requests have no expiration date (U.S. EPA, 2010h).

One objective of TSCA is to make chemical health and safety data available to the public. However, the current practice is to make the health and safety data for CBI-protected chemicals available to the public without including the identity of the chemical to which it applies. As a consequence, the data are of limited value. TSCA CBI provisions also prohibit EPA from discussing CBI with states or other countries such as Canada or the European Union, unless companies explicitly provide permission to do so.

Since January 1, 2010, EPA has taken a number of specific steps to improve its CBI practices. These include issuing a new CBI policy to increase information on the potential risks posed by certain chemicals, by rejecting CBI claims for certain chemicals under specific conditions. On May 27, 2010, EPA announced its plans to generally deny confidentiality claims for the identity of chemicals in health and safety studies filed under TSCA, except in specified circumstances, and began review of both new and existing CBI claims on August 25, 2010. More information about recent actions taken by EPA to increase the public's access to chemical information is available: http://www.epa.gov/oppt/existingchemicals/pubs/transparency.html.

High Production Volume chemicals and Inventory Update Reporting rule

Under TSCA, the EPA tracks HPV and other chemicals in commerce periodically using the IUR.

Background: Since the mid-1980s EPA has required manufacturers to report on production of organic chemicals every four years (U.S. EPA, 2010i). EPA aggregates the data received, listing chemicals by Chemical Abstract Service Registry number, name, and total quantity produced or imported. Inventories from 1986 to 2006 are currently available for download from the EPA website (U.S. EPA, 2010e).

In 2003 and 2005, the IUR was modified. The threshold reporting quantity for any chemical at a single site was raised from 10,000 pounds to 25,000 pounds, and basic inorganic chemical information was required for the 2006 submission. In addition, manufacturers or importers of more than 300,000 pounds of a chemical at a single site were required to report use and domestic processing information (U.S. EPA, 2010e), such as whether the chemical was used in products intended for children (U.S. EPA, 2007).

Current status: The reporting cycle has been lengthened from every four years to every five years. The next inventory reporting period will occur during June through September 2011, and will require submission of information about chemicals produced or imported during the 2010 calendar year (U.S. EPA, 2010d). During this reporting cycle, more complete information on inorganic chemicals will be required, such as use information, when applicable (U.S. EPA, 2007). In addition, EPA is working to facilitate more electronic reporting (U.S. EPA, 2010d) and EPA notes that more confidentiality claims made by businesses will be denied.

Further, EPA is working to make more information about HPV chemicals available by publishing results of toxicity studies for chemicals that were not "sponsored" under the HPV Challenge Program. EPA continues to develop and publish "Hazard Characterizations" that provide summary information about HPVs (U.S. EPA, 2010b). Hazard Characterizations are very similar to the Screening Information Data Sets (SIDS) Initial Assessment Reports (SIAR) created by the Organization for Economic Co-operation and Development (OECD). These chemical monographs were used frequently in the review of chemicals for the Minnesota Chemicals of High Concern list.

Proposed changes: On August 13, 2010, the EPA announced proposed changes to the IUR rules (U.S. EPA 2010c). These changes are related to EPA's recent efforts to strengthen chemical management under TSCA, and are intended to better the quality, availability, and usefulness of chemical data. Some highlights of the proposed changes include:

- The frequency of reporting would be changed from every five years to every four years.
- The data from each of the four prior calendar years would be required to be submitted during the reporting period, rather than data from only the calendar year immediately preceding the reporting period.
- If a quantity of more than 25,000 lbs of chemical was produced at a single site during any year prior to the data submission period, reporting would be required. For example, for the 2015 reporting period, if a chemical was produced at 30,000 lbs in 2012, reporting would be required for all years (2011-2014) covered by the 2015 reporting period. Currently, reporting is required only if the chemical is manufactured or imported in a quantity of 25,000 lbs during the calendar year immediately before the reporting year. For some chemicals, the 25,000 lbs requirement would not apply and reporting would be required regardless of the quantity produced.
- More information about each chemical would be required, such as how much of the chemical is being exported, how by-products are handled, and what business sectors are using the manufactured chemicals downstream.
- All manufacturers or importers of non-exempt chemicals would be required to provide information about how the chemical is used in the calendar year before the submission period. For example, if a chemical was produced at 30,000 lbs at a single site in 2012, the use data for the chemical for 2014 would be required to be reported during the reporting period in 2015, regardless of the amount produced in 2014. Currently, use information is required only if the chemical is manufactured or imported in a quantity of 300,000 pounds or more in the calendar year before the reporting period.
- Some chemicals, such as water and some polymers, would be fully exempt from reporting under the proposed revisions, while other chemicals would be ineligible for exemptions (U.S. EPA, 2010c).

In addition, more substantiation for confidentiality claims would be required and some of the types of information reported would be modified (U.S. Federal Register, 2010). A copy of the proposed rules is available from http://www.regulations.gov/search/Regs/home.html#documentDetail?R=0900006480b2ff32.

Whether or not EPA finalizes the proposed IUR rule changes, it will take a few years to determine if EPA's new IUR approaches will produce information which is more useful at the state and facility level to track chemical usage and volumes.

Federal resources for information on children's exposure to chemicals

In addition to information available through the IUR, the U.S. government is also engaged in ongoing studies that can help provide information on children's exposures to chemicals. These studies are briefly described below.

National Health and Nutrition Examination Survey

The National Health and Nutrition Examination Survey (NHANES) is an ongoing survey designed to assess the health and nutritional status of children and adults in the U.S. The National Report on Human Exposure to Environmental Chemicals, part of the NHANES effort, is a survey of exposure of the U.S. population to chemicals. There are 212 chemicals being measured in people's blood or urine, with samples drawn every two years from participants. Data are reported by age, sex and race/ethnicity groups. More information is available at http://www.cdc.gov/exposurereport/index.html

National Children's Health Study

The National Children's Study, also called the NCS, is a federally funded study that will help us understand how to improve the health of young people, from infancy to adulthood.

It will answer questions about the most important health conditions affecting young people today, such as asthma, birth defects, diabetes, obesity, autism and other behavioral or mental conditions. Researchers will study a representative sample of 100,000 U.S. children, following them from the time their mothers become pregnant – or even before they become pregnant – until the children reach age 21. A potential side benefit of the NCS is that it could also answer important questions about reproductive health, since it will follow 100,000 mothers prior to and during pregnancy. There will be about 1,000 enrollees from Ramsey County.

Minnesota Chemicals Policy

Minnesota's involvement in the regulation of toxic chemicals dates back to the early 1990s with passage of the Minnesota Toxic Pollution Prevention Act. This legislation required facilities in certain waste-generating categories to develop pollution prevention plans and provided technical assistance with pollution prevention activities through the Minnesota Technical Assistance Program (MnTAP). These pollution prevention activities are funded by fees on facilities that are required to report releases under the federal Emergency Planning and Community Right-to-Know Act. In 2009, $1.25 million was generated from 540 Minnesota facilities.

Shortly after passage of the pollution prevention act, the state Legislature passed additional laws regulating mercury emissions reduction and toxics in packaging. Since that time, many new initiatives addressing toxic chemicals have been adopted including the Minnesota Toxics Free Kids Act that is the subject of this report. This section provides an overview of existing Minnesota rules and regulations addressing chemicals policy and outlines Minnesota's progress in implementing the 2009 Toxic Free Kids Act.

Overview of existing Minnesota laws and rules

A summary table of existing Minnesota rules applying to chemical regulation and green chemistry was originally developed by MPCA and MDH for Minnesota Environmental Initiative's Phase 1 Minnesota Chemical Regulation Project. This table, A Practice Guide to Existing Minnesota State and Local Rules and Regulations Applying to Chemical Regulation and Green Chemistry can be found on pages 28-35 of Appendix B.

A review of the table indicates that many of Minnesota's existing regulations were passed incrementally to deal with problem materials or products. For example, state laws addressing mercury in products were first adopted in 1992 and have been amended eight times from 1993 to 2008. Almost all of Minnesota's existing rules are focused on waste reduction and pollution prevention; there are few incentive-based approaches to reduce the use of toxic chemicals or develop better alternatives. One example is the Small Business Investment Tax Credit which was passed in 2010 and provides a 25 percent tax credit to investors in certain high technology fields, including green chemistry.

Over the past five years several new laws about toxics in products have been proposed or enacted in Minnesota. These have arisen out of growing concern for children's health raised by the public and legislators. Some of the recent legislation is very narrowly focused on a single chemical in one application; e.g., cadmium in children's jewelry. There are no programs associated with some of these statutes.

Minnesota also has legislation and an executive order promoting environmentally preferable purchasing (EPP) by state government. Environmentally preferable products are defined as goods that have a lesser or reduced effect on human health and the environment when compared to competing products that serve the same purpose. To reduce the quantity and toxicity of waste in Minnesota, state law requires state agencies and other public entities to purchase recycled, repairable, and durable goods.

In Minnesota, most EPP requirements are implemented at the local government level. The MPCA's EPP effort works to increase the availability of environmentally preferable products on state contracts and assist public entities such as cities and counties with green procurement programs. To implement this program, the MPCA works with the Materials Management Division at the Department of Administration to develop environmental specifications for target product and service contracts. Current state contracts containing environmental and human health specifications are available for low and no-VOC paint, cleaning products, janitorial paper products, compostable bags and foodware, office supplies, computers and copiers. The MPCA's EPP program also works with the agency's Product Stewardship team on issues surrounding standards, certifications and ecolabels.

Progress in implementing toxics in children's product legislation

The toxics in children's products legislation enacted in 2009 sets the stage for developing broader chemical policy by having MDH identify chemicals of high concern based on hazard, and from that list identifying Priority Chemicals. Minnesota's progress in implementing this legislation including documentation of the process for creating the chemicals of high concern list and progress toward selecting Priority Chemicals is shown below.

Minnesota's Chemicals of High Concern list

Under Minn. Stat. § 116.9402, MDH is required to create a list of chemicals called Chemicals of High Concern (CHC). The statute provides qualifying hazard criteria for chemicals eligible for the list, such as neurotoxicity or reproductive toxicity. MDH published its CHC list on July 1, 2010, which can be found at the following link: http://www.health.state.mn.us/divs/eh/hazardous/topics/toxfreekids/highconcern.html#list

This list contained 1,756 chemicals, including 414 high production volume chemicals (HPV). With the HPV classification correction for inorganic chemicals in October 2010 (described below), the number of HPV chemicals rose to 443. The CHC list was assembled by reviewing chemicals to determine if they met the criteria of the statute. Briefly, the process was as follows:

1. **Use of Maine's CHC list as a basis**
   The state of Maine has a statute very similar to Minnesota's, and published a CHC list at the time Minnesota was beginning work on the Minnesota CHC list. Because many of the chemicals on the Maine CHC list were appropriate for the Minnesota CHC list, Maine's list was used as a basis for the Minnesota CHC list.

2. **Removal of excluded chemicals**
   Minn. Stat. § 116.9405 lists chemical categories that should be excluded from the provisions of the statute. Many of the exclusions refer specifically to Priority Chemicals, but some appeared to apply to both the CHC and the Priority Chemicals. In particular, Minn. Stat. § 116.9405, subd. (7), which excludes pharmaceuticals and biologics, was applicable to the CHC list. The Maine list was reviewed for statutorily excluded chemicals and 320 chemical records were removed.

3. **High production volume chemicals**
   Minn. Stat. § 116.9403 requires that Priority Chemicals be HPV chemicals named by EPA. HPV chemicals are manufactured or imported into the United States at quantities of one million pounds or more per year. Because Priority Chemicals must be selected from the CHC list, the CHC list needed to contain HPV chemicals that met the CHC criteria.

   To select HPV chemicals for the CHC list, IUR lists from EPA for approximately the past 20 years (1990, 1994, 1998, 2002 and 2006) were downloaded and queried. Because reviewing 4,755 HPV chemicals from all of the inventories was not feasible in the time available, different systems for obtaining a representation of the chemicals were evaluated. The system chosen was a union of HPV chemicals appearing in the 2006 inventory and three of the four remaining inventories (1990, 1994, 1998, 2002), resulting in a total of 1,895 chemicals. These chemicals were reviewed for the CHC list.

   Note: The system described above was used in creating the initial CHC list. However, in October 2010, a slight modification to the categorization of HPV chemicals was made, based on data available for inorganic chemicals. For the 2006 IUR inventory, EPA began requiring information about inorganic chemicals. As of 2010, the 2006 inventory is the only IUR inventory available for which inorganic chemical information was mandated. The system MDH used for selecting HPV chemicals to review, described above, did not account for this difference in inorganic chemical data. Therefore, in October 2010, MDH revised its HPV categorization to better convey which inorganic chemicals met HPV criteria.

The CHC list was updated and republished on October 11, 2010, with an "x (2006)" in the HPV column for the qualifying inorganic chemicals. No chemicals were added to or removed from the CHC list during this update: only the HPV categorization was corrected. Chemicals with changed HPV status are listed in Table 1.

Table 1: Inorganic chemicals on the 2010 Minnesota Chemicals of High Concern list designated as high production volume based on the 2006 EPA Inventory Update Reporting inventory

CAS number	Chemical name
7440-36-0	Antimony
1303-28-2	Arsenic oxide, arsenic pentoxide, diarsenic pentaoxide
1327-53-3	Arsenic trioxide, diarsenic trioxide
10043-35-3	Boric acid
7440-42-8	Boron
7440-43-9	Cadmium
10049-04-4	Chlorine dioxide
7758-19-2	Chlorite (sodium salt)
1333-82-0	Chromium (VI) trioxide
1344-37-2	C.I. Pigment Yellow 34 (Lead chromate)
1307-96-6	Cobalt [II] oxide
7646-79-9	Cobalt dichloride
7440-48-4	Cobalt metal powder
10124-43-3	Cobalt sulfate
302-01-2	Hydrazine
7439-92-1	Lead
7439-96-5	Manganese
7439-98-7	Molybdenum
7440-02-0	Nickel (Metallic)
1313-99-1	Nickel oxide
12035-72-2	Nickel subsulfide
10024-97-2	Nitrous oxide
7790-98-9	Perchlorate and perchlorate salts
7664-38-2	Phosphoric acid
7723-14-0	Phosphorus
14808-60-7	Silica, crystalline (inhaled in the form of quartz or cristobalite from occupational sources)
7440-22-4	Silver
1314-62-1	Vanadium pentoxide (orthorhombic crystalline form)
7440-66-6	Zinc

To further review the chemicals, a guideline for determining if the chemical exhibited a hazardous characteristic with a "high degree of probability" was needed. Because time and resource limitations prohibited development of a full evaluation process, the methodology for classifying hazards of chemicals developed by the EPA Chemical Assessment and Management Program (ChAMP) was used. The ChAMP methodology uses a measure obtained from toxicity studies, called a lowest-observed-adverse-effect-level (LOAEL), to rank chemical hazard into categories of "low," "moderate," and "high." Because the Toxic Free Kids Act statute refers to children, a more sensitive sub-population, the chemicals with LOAEL in categories of moderate and high were deemed appropriate for the CHC list. In addition, chemicals with corrosive, burning, strong irritation, or sensitization characteristics were considered eligible for the CHC list.

Toxicity information about these chemicals was sought from the following sources:

1. EPA
    a. Chemical Assessment and Management Program (ChAMP) (for categorization)
    b. High Production Volume Challenge Program
        - Hazard Characterizations
        - Risk-Based Prioritizations
    c. Integrated Risk Information System (IRIS)
    a. U.S. Department of Health and Human Services National Institutes of Health (NIH)
    b. National Library of Medicine (NLM)
    c. Hazardous Substances Data Bank (HSDB)
    d. National Toxicology Program (NTP)
    e. Agency for Toxic Substances and Disease Registry (ASTDR)
2. Organization for Economic Co-operation and Development (OECD)
    a. High Production Volume Chemical Program

Minnesota Health-Based Guidance was also considered during the review of HPV chemicals, when available.

3. Review and selection of chemicals from other sources.
   Chemicals from several other sources were reviewed, such as:
    a. Chemicals with non-cancer endpoints in EPA IRIS
    b. Oregon Priority Persistent Pollutant list
    c. Minnesota Health-Based Guidance
    d. California Proposition 65
    e. European Union Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) Substances of Very High Concern
4. MDH internal review and review by Minnesota Pollution Control Agency
5. Limitations
    a. Persistence and bioaccumulation information
       In the statute, two qualifying characteristics for the CHC list are persistence and bioaccumulation. The Maine list contained chemicals with these characteristics, as did some of the chemicals added during the review process. Unfortunately, some of the chemicals that were already on the Maine list might have different parameters for persistence and bioaccumulation than the guidelines from ChAMP. This could be particularly true for chemicals initially named by the Oslo-Paris Commission or the Canadian government. There was insufficient time to review all of the chemicals initially on the Maine list, so they were retained on the first CHC list and will be reviewed for future iterations of the list.

b. Assessment of Maine's list for toxicity
As with the persistence and bioaccumulation information, the intent was to review the rest of the chemicals initially on the Maine list to ensure uniformity with the ChAMP criteria used for other selected chemicals. Again, time was insufficient to complete this review, and it will be important to complete this screening for the next version of the CHC list.

For more information about the methods used in creating the CHC list, please see http://www.health.state.mn.us/divs/eh/hazardous/topics/toxfreekids/chclist/methodology.pdf

Selection of Priority Chemicals

MDH is currently in the process of selecting Priority Chemicals. Under Minn. Stat. § 116.9403, MDH in consultation with MPCA, may designate a Chemical of High Concern as a Priority Chemical if the chemical is

1. a high production volume chemical, and
2. meets any of the following criteria:
    a. the chemical has been found through biomonitoring to be present in human blood, including umbilical cord blood, breast milk, urine, or other bodily tissues or fluids
    b. the chemical has been found through sampling and analysis to be present in household dust, indoor air, drinking water, or elsewhere in the home environment
    c. the chemical has been found through monitoring to be present in fish, wildlife, or the natural environment

There are also 11 exclusions in Minn. Stat. § 116.9405 that further restrict chemicals eligible to be Priority Chemicals. These include:

1. chemicals in used children's products
2. Priority Chemicals used in the manufacturing process, but that are not present in the final product
3. Priority Chemicals used in agricultural production
4. motor vehicles as defined in chapter 168 or watercraft as defined in chapter 86B or their component parts, except that the use of Priority Chemicals in detachable car seats is not exempt
5. Priority Chemicals generated solely as combustion by-products or that are present in combustible fuels
6. retailers
7. pharmaceutical products or biologics
8. a medical device as defined in the Federal Food, Drug, and Cosmetic Act, United States Code, title 21, section 321(h)
9. food and food or beverage packaging, except a container containing baby food or infant formula
10. consumer electronics products and electronic components, including but not limited to personal computers; audio and video equipment; calculators; digital displays; wireless phones; cameras; game consoles; printers; and handheld electronic and electrical devices used to access interactive software or their associated peripherals; or products that comply with the provisions of directive 2002/95/EC of the European Union, adopted by the European Parliament and Council of the European Union now or hereafter in effect
11. outdoor sport equipment, including snowmobiles as defined in section 84.81

Currently, MDH is reviewing each of the 443 HPV chemicals to determine which, if any, are excluded under Minn. Stat. § 116.9405. Of those that remain eligible, each chemical will be reviewed to determine if they have been found in human tissues or body fluids; in household dust, indoor air, drinking water, or elsewhere in the home environment; or in fish, wildlife, or the natural environment. The chemicals that remain after these screenings will be reviewed in consultation with MPCA and with other MDH staff to determine which are appropriate for a Priority Chemical designation. The list of Priority Chemicals will be published in the *State Register* and on MDH website on February 1, 2011.

Private Sector Leadership in Product Safety and Green Chemistry

Many private sector businesses are working proactively to increase the safety and sustainability of chemicals and products that they produce or sell. These efforts take many forms and are taking place throughout product supply chains from manufacturers of chemicals to retailers who sell products directly to consumers. The following section contains a few examples of ongoing efforts in the private sector to improve product safety, increase sustainability and develop greater transparency in supply chains. It includes a specific summary of green chemistry activity in Minnesota and descriptions of EPA's Design for the Environment Program (DfE) and Green Chemistry Challenge Program. An analysis of product stewardship and life cycle analysis tools used in the private sector is also included.

Data from outside the state also demonstrates growth in the number of companies in the private sector that are taking many steps to promote and implement product safety and green chemistry practices throughout supply chains. While green chemistry is by no means a mainstream consideration across the economy, manufacturing and retail sectors which develop products for consumption, direct skin contact (personal care products), building supplies, and home and workplace maintenance are particularly engaged and actively developing products which can be marketed as safer to use. (Green Chemistry and Commerce Council, 2009)

- Patagonia and REI have collaborated with Bluesign to provide environmental health and safety certification for suppliers in the textile products sector.
- With permission from suppliers participating in the third-party process GreenWERCS, Walmart and other retailers can download data that will assist in legal compliance at the federal, state, and local levels. Smaller suppliers can access a support network of independent experts to help them provide the necessary data to GreenWERCS.
- Ecolab is developing a sustainability approach that looks at impact of their products over the life cycle considering such factors as water and energy use and packaging as well as toxicity.
- For trading partners in the Global Data Synchronization Network, it communicates product changes or new product introductions across the supply chain to all affected parties to ensure that all partners are trading with the same product information.
- Through an alliance between Cytec (specialty chemicals), Sopheon (life cycle management software and services), and Beyond Benign (green chemistry education and training non-profit), the iSustain Green Chemistry Index provides a methodology to generate a sustainability-based score for chemical products and processes. See https://www.isustain.com/ for more information.
- Whole Foods developed a Premium Body Care Standard for their products which is described at http://www.wholefoodsmarket.com/products/premium-body-care.php. More than 400 ingredients have been identified as unacceptable for products to meet this standard.
- Procter and Gamble uses a Supplier Sustainability Scorecard to rate suppliers on energy usage, water usage, waste disposal, green house gas emissions, what P&G sustainability initiatives they have adopted and what ideas they have suggested that P&G has adopted. P&G is making its scorecard public and open for use by others.
- Johnson & Johnson developed the EARTHWARDS™ program, which encourages teams to find ways to develop earth-friendly products. For more information, see http://www.investor.jnj.com/2009annualreport/consumer/naturally-sweet.html
- Nike has developed a number of Restricted Substances Lists available at http://www.nikebiz.com/responsibility/considered_design/restricted_substances.html. Nike has chemical restrictions for every material and every component in their apparel, equipment, and/or footwear products.

- The Sustainable Biomaterials Collaborative has developed BioSpecs for Food Service Ware, which are described at http://www.sustainablebiomaterials.org/index.php?q=bio_specs. These specifications outline the criteria and recognition levels for food service ware made from compostable biobased materials.
- The Institute for Market Transformation to Sustainability rates building products, fabric, apparel, textile, and flooring. The Institute has developed SMART Standards available at http://mts.sustainableproducts.com/SMaRT_product_standard.html. These standards give maximum credit/recognition over all product stages/entire supply chain for 100 percent reduction of over 1300 pollutants covering 12 environmental impacts.

This small sampling reflects the proliferation of standards in the marketplace which drive or support implementation of green chemistry. Minnesota companies in many sectors and of all sizes are seeking suppliers that can give them products with greener attributes sought by customers. Minnesota's green chemistry effort should support the state's businesses in successfully qualifying to be part of these green chemistry supply chains.

Minnesota Green Chemistry activity

As part of MPCA's Green Chemistry and Design project described on page 32, MPCA staff networked with 25 companies that are active in green chemistry, or active in pollution prevention and energy use reduction and seeking opportunities to apply green chemistry. As was mentioned above, the survey identified a larger group reporting green chemistry activity and interest, and offered some other interesting insights:

- Minnesota sectors active in implementing and influencing green chemistry changes are far beyond the chemical manufacturing sectors and include those who commonly use chemical preparations in their products or their manufacturing or production operations.
- The types of green chemistry activities in manufacturing include basic product chemistry (on-site or purchased), ancillary chemistry such as pigments or fragrances, protective additions like coatings or lubricants, product components or sub-assemblies, bio-based feedstocks, shift to non-chemical technology, reformulated packaging, reduced use of sensitizers, and many more.
- Green chemistry activities in retailing include locating and selling products that:
  - use lower-impact renewable materials
  - avoid bisphenol-A or PVC
  - are easily reusable or recyclable
  - have lower lifetime environmental or human health impact

Environmental Protection Agency's Design for the Environment

EPA's Design for the Environment (DfE) is a partnership with the private sector that promotes safer chemicals. To relate DfE and green chemistry, green chemistry and engineering are rigorous frameworks which are applied very specifically at the design stage of product development. In this way, green chemistry and engineering are uniquely focused, while DfE principles and tools can be applied anywhere along the product chain (including design). The differences between the two are in focus and nature (green chemistry as framework versus DfE as toolbox), but in practice they are often intertwined.

There are three main program activities that are part of DfE: alternatives assessment, safer product labeling and best practices for worker safety (U.S EPA, 2010c). EPA's DfE staff support EPA's TSCA program by initiating voluntary collaborations with commercial sectors using chemicals which are a high priority for replacement with safer alternatives. Currently, existing chemical action plans found at http://www.epa.gov/opptintr/existingchemicals/pubs/ecactionpln.html are the primary source for identifying chemical candidates for risk management and specifying actions EPA proposes to further evaluate the chemicals and address risks. Alternatives assessments are one of the risk management approaches that may be

specified. Alternatives assessments characterize chemical hazards based on a full range of human health and environmental information. Chemical choices made based on these assessments can minimize the potential for unintended consequences that might occur in moving from a chemical of concern to a poorly understood alternative, which could be more hazardous. DfE staff are now applying this approach for BPA and will apply the approach to additional action plan chemicals including:

- The flame retardant Decabromodiphenylether (DecaBDE)
- Phthalates used as plasticizers and in other applications

DfE also has a Safer Labeling Program that allows manufacturers to put the DfE label on household and commercial products that meet its criteria for human and environmental health. Design for the Environment labels are found on a variety of chemical-based products, like all-purpose cleaners, laundry detergents, and carpet and floor care products.

As part of this program, DfE has worked with formulators to develop a Standard for Safer Cleaning Products to make the criteria used to define safer cleaning products more transparent and accessible. DfE and the GreenBlue Institute have worked together to design a searchable database of ingredients for use in formulating cleaning products with improved human and environmental health profiles. This database called CleanGredients can be used by formulators and is found at the following website http://www.cleangredients.org (CleanGredients, 2010).

For situations in which safer chemicals have yet to be identified as viable substitutes, DfE's Best Practices Program http://www.epa.gov/dfe/best_practices.html shows workers how to protect themselves and their communities' health by using chemicals safely and minimizing exposures.

The MPCA has promoted DfE at the state level for several years as a natural outgrowth of its pollution prevention and solid waste source reduction investments, and has funded a handful of grant projects which used DfE tools to develop greener product attributes.

More information on state level DfE projects is available at: http://www.pca.state.mn.us/index.php/topics/preventing-waste-and-pollution/product-design-and-the-environment/design-for-the-environment-archive.html

EPA's DfE page is available at http://www.epa.gov/dfe/index.htm

Presidential Green Chemistry Challenge awards

The Presidential Green Chemistry Challenge provides national recognition of chemical technologies that incorporate the principles of green chemistry into chemical design, manufacture, and use, and that have been utilized by industry in achieving their pollution prevention goals. The program provides annual awards in five categories. Currently, the program has three focus areas: use of greener synthetic pathways, use of greener reaction conditions and design of greener chemicals.

Other tools in the private sector

Product stewardship and life cycle assessment bring attention to other costs associated with product manufacturing, use and disposal. These include: increased health costs (public and private insurance); public sector monitoring; research, assessment and oversight; the reduced fertility and productivity both of human and food supply populations such as fish; and the overall reduction of ecosystem services which support human health and prosperity.

Product stewardship

As stated in MPCA's 2009 Product Stewardship Recommendations Report, the principle of product stewardship is that all parties involved in designing, manufacturing, packaging, selling, and using a product take responsibility for reducing environmental impacts at every stage of that product's life. In addition, the

greater the ability of a party to influence the life-cycle impacts of the product, the greater the degree of responsibility the party has for addressing those impacts.

These principles would appear to be very similar to those of green chemistry and product design. In practice, however, product stewardship has thus far been focused on the process and costs of recycling products at the end of their useful lives. In contrast, green chemistry is focused primarily on the front end of product chemistry and design.

Life Cycle Assessment

Life cycle assessment (LCA) is an evaluation tool to identify the multiple product impacts (environment, human and ecosystem health, energy, etc.) over the life of the product from raw materials extraction to final product disposition. Green chemistry and eco-design often uses life cycle considerations in choosing product materials, manufacturing processes, and end of life management or recovery and may use LCA tools as part of its process, but the two terms are not synonymous.

While attempts to standardize LCA processes have been completed and are in the marketplace (e.g., the ISO 14040 series) and many company- or sector-specific LCA tools and standards are also in use or development by larger companies, they are less commonly used by smaller companies due to cost, lack of expertise, or inaccessible data.

Translating the results of LCAs to external audiences to compare products is a significant challenge. The life cycle of a product and its components produced and distributed through a global supply chain will inevitably result in complex impacts linked to all inputs and process steps:

- upstream or downstream processing steps (e.g., the LCA stops at the home facility or the next facility's "gate")
- end-of-life disposal (the "grave")
- recovery of embodied energy or materials for reuse in the same or another product ("cradle-to-cradle")
- new concerns for which little data or modeling are available as inputs to an LCA (for example, endocrine disruption impacts)
- impacts to ecosystems and the value of what they provide to humans (clean air, clean water, protection against flood, etc.)

In spite of imperfections, LCAs remain the best available and most widely used means to develop an objective comparison of a previous generation product to the new product designed to replace it. This is largely because of the similarities of data inputs and considerations, making the comparisons more "apples-to-apples." Comparing products from different companies with different supply chains and data inputs is much less reliable and useful.

All this suggests that:

- relying on auditable (e.g., ISO 14040 series) LCAs by companies can drive continuous improvement
- government oversight of chemical phase-outs and phase-ins through LCA submittals by companies will be limited until LCA cost, scaling, and transferability issues are resolved
- public interests should be engaged in LCA research, design and improvement efforts

States' Chemicals Policy Initiatives and Green Chemistry Activities

The following section outlines activity among U.S. states in the areas of chemical policy and green chemistry.

States' chemicals policy initiatives

U.S. states are active in the chemicals policy arena, as is readily apparent upon a quick review of the Lowell Center for Sustainable Production's State Chemicals Policy Database (http://www.chemicalspolicy.org/chemicalspolicy.us.state.php). A search of this database (accessed September 9, 2010) for enacted chemicals policy in states and cities relating to children's products showed 43 entries. Many of the policies focus on single chemicals such as bisphenol A or lead in children's products. Broader chemicals policy legislation that applies to multiple chemicals such as Minnesota's children's product legislation has been enacted in fewer states. The states of Maine, Washington and California passed multiple chemicals policy in 2008. However, an additional eight states (CT, IL, IN, MI, NY, OR, VT, WI) proposed such legislation during the 2009-2010 legislative session. A summary of these proposals can be found at (http://www.chemicalspolicy.org/downloads/StateLegislativeSessionsSummary2009-2010.pdf).

A summary of Maine, Washington and California's legislation is provided below. Also described are Oregon's legislation focusing on persistent priority pollutants and New York's recent policy decision to require ingredient disclosure for cleansing products sold in that state. This section also describes two interstate chemicals policy efforts.

Maine's Act to Protect Children's Health and the Environment from Toxic Chemicals in Toys and Children's Products

In May 2008, the Maine legislature passed the Act to Protect Children's Health and the Environment from Toxic Chemicals in Toys and Children's Products (LR 2877). The act establishes a process by which the Maine Department of Environmental Protection (DEP) develops a list of Chemicals of High Concern (CHCs). From the list of CHCs, the DEP will select at least two Priority Chemicals by January 2011. Once the Priority Chemicals are identified, the act invokes a set of notification requirements for manufacturers and distributors of children's products that contain them. The act provides the DEP with authority to ban sale or distribution of children's products containing Priority Chemicals in cases when a safer alternative is available, and also the authority to require manufacturers to conduct alternatives analyses. The act also required that a stakeholder group be convened to provide recommendations regarding implementation.

Maine published its list of CHCs in July 2009; the list contains approximately 1700 chemicals. In February 2010 Maine adopted rules establishing the process the DEP will use to designate Priority Chemicals, and in May 2010 Maine adopted rules establishing fees to recoup DEP's costs to administer the rules.

Currently, Maine is conducting rulemaking to designate Priority Chemicals. Bisphenol A is proposed as the first priority chemical; public comment on the rules ended November 17, 2010. The proposed rule: requires manufacturers of toys, childcare articles and tableware that contain intentionally-added BPA to submit to the department information about the presence of the chemical in the products and likelihood that children may be exposed to the chemical from those products; requires manufacturers of baby food and formula sold in containers that contain intentionally-added BPA to report to the department information about the presence of the chemical in the containers; and prohibits sales of reusable food and beverage containers that contain intentionally-added BPA. In addition, manufacturers of infant formula and baby food sold in containers that contain bisphenol A are required to conduct an alternatives assessment.

The chemical class nonlyphenol and nonylphenol ethoxylates was proposed as the second priority chemical; the public comment period on these proposed rules expired October 18, 2010. The proposed rule requires manufacturers of household and commercial cleaning products, cosmetics and personal care products, and home maintenance products sold, marketed or intended for use by consumers that contain intentionally-added nonylphenol to report on chemical usage in those products.

More information and links to pertinent documents are available on the Maine DEP website: http://www.maine.gov/dep/oc/safechem/index.htm

Washington's Children's Safe Product Act

The state of Washington passed the Children's Safe Products Act of 2008 in June 2008. The act included two parts, the first of which calls for the virtual elimination of phthalates, lead, and cadmium in children's products. This part of the act was substantially pre-empted by the action of Congress, which passed the Consumer Product Safety Improvement Act (CPSIA) in July 2008. The CPSIA is administered by the federal Consumer Product Safety Commission.

The second part of the act is similar in many respects to Maine's legislation. It calls for the Washington Department of Ecology (DOE) to identify CHCs using criteria similar to those used by Maine. Then, from the list of CHCs, the DOE is charged with identifying a list of chemicals of high concern to children (CHCC). The Children's Safe Products Act requires that the CHCCs be selected by considering a child's potential for exposure to the chemical, which is a significantly more complex and involved process compared to Maine's. Finally, once CHCCs have been identified, the act calls for manufacturers and distributors of children's products containing CHCCs to provide notice to DOE. Unlike Maine's law, Washington's legislation does not include a regulatory structure for banning the sale of products or for requiring manufacturers to conduct alternatives analysis. Due to the concerns of business owners and other stakeholders following passage of the Act, the governor of Washington established an advisory group to provide feedback and comments during implementation of the act.

DOE's proposed Children's Safe Products Act reporting rule was posted for comment on October 22, 2010, with the comment period continuing until December 31, 2010. The proposed rule contains a list of 59 CHCCs and outlines annual reporting requirements for manufacturers who use any of the CHCCs in children's products sold in Washington.

Extensive documentation of the process used to identify the CHCCs, develop the notification requirements for manufacturers and distributors of children's products containing CHCCs, and the rule, are available at the DOE's website: http://www.ecy.wa.gov/programs/swfa/rules/ruleChildSafe.html

California safer consumer products alternatives

California is also undertaking a significant effort to identify chemicals of concern in consumer products and to develop an approach to limit exposure or the level of hazard associated with the chemicals of concern in products. Two bills passed by the California legislature in September 2008 are driving current activity: Assembly Bill 1879, the consumer products legislation, and Senate Bill 509, which requires establishment of an online Toxics Information Clearinghouse to provide public access to information on the toxicity of chemicals. Both bills were passed in response to recommendations contained in the California Green Chemistry Initiative (GCI).

It is worth noting that California took a much earlier leadership role in chemicals policy with its passage in 1986 of the Safe Drinking Water and Toxic Enforcement Act, more commonly known as Proposition 65. The intent of Proposition 65 is to protect California citizens and the state's drinking water sources from chemicals known to cause cancer, birth defects or other reproductive harm, and to inform citizens about exposures to such chemicals. Under the law, the California EPA publishes an updated list of chemicals of concern annually; the list contains more than 700 unique substances and classes of chemicals (Washington DOE, 2009). Businesses are required to label products that contain one or more listed chemicals over the levels specified in statute; the labels do not necessarily specify which chemicals are present or at what levels.

The newer AB1879 requires the California Department of Toxic Substances Control (DTSC) to adopt regulations that establish a process by which chemicals of concern in products, and their potential alternatives (as identified via an alternatives analysis) are evaluated to determine how best to limit exposure or reduce the level of hazard posed by a chemical of concern. California's legislation is more far-reaching than either Maine's or Washington's in that it addresses chemicals of concern in all products, not just children's products; in addition, the regulations must include a process to determine "how best" to limit exposure or reduce hazard of chemicals of concern in products. AB1879 requires the DTSC to propose actions that the department may take to address chemicals of concern, including imposing restrictions on the use of a chemical of concern in a product or prohibiting its use. Finally, AB1879 requires the DTSC to establish a Green Ribbon Science Panel to advise the department, and also establish a procedure for handling confidential business information.

On September 14, 2010 DTSC announced the release of proposed regulations that are based upon a June 23 draft and more than 762 pages of comments received by DTSC from more than 90 stakeholders, legislators and the public. The official public comment period on the proposed regulations runs from September 17 to November 1, 2010. Regulations must be adopted by January 1, 2011.

More information is available at the DTSC website:
http://www.dtsc.ca.gov/PollutionPrevention/GreenChemistryInitiative/index.cfm.

Figure 1 is a conceptual plan of the proposed Safer Consumer Products regulation. The plan depicts the three-step process contained in the proposed regulations. Step 1 incorporates the prioritization scheme to be used by DTSC to prepare a proposed list of Priority Chemicals and a proposed list of Priority Products. Step 2 is the alternatives assessment step. Responsible entities (e.g., product manufacturers) must notify DTSC when their product is named a Priority Product, and this information is posted on the DTSC website. Alternatives assessments must be performed by the responsible entity for each priority chemical contained in a listed Priority Product, with the objective of identifying and selecting a viable safer alternative (if one exists). Note that the proposed regulations include 20 pages of guidance and requirements for conducting the alternatives assessment. In the third step, DTSC is charged with identifying and imposing a regulatory response to effectively limit the public health and/or environmental threats, if any, posed by the consumer product (due to the priority chemical) of the threats posed by the alternative chemical/product selected to replace the Priority Product.

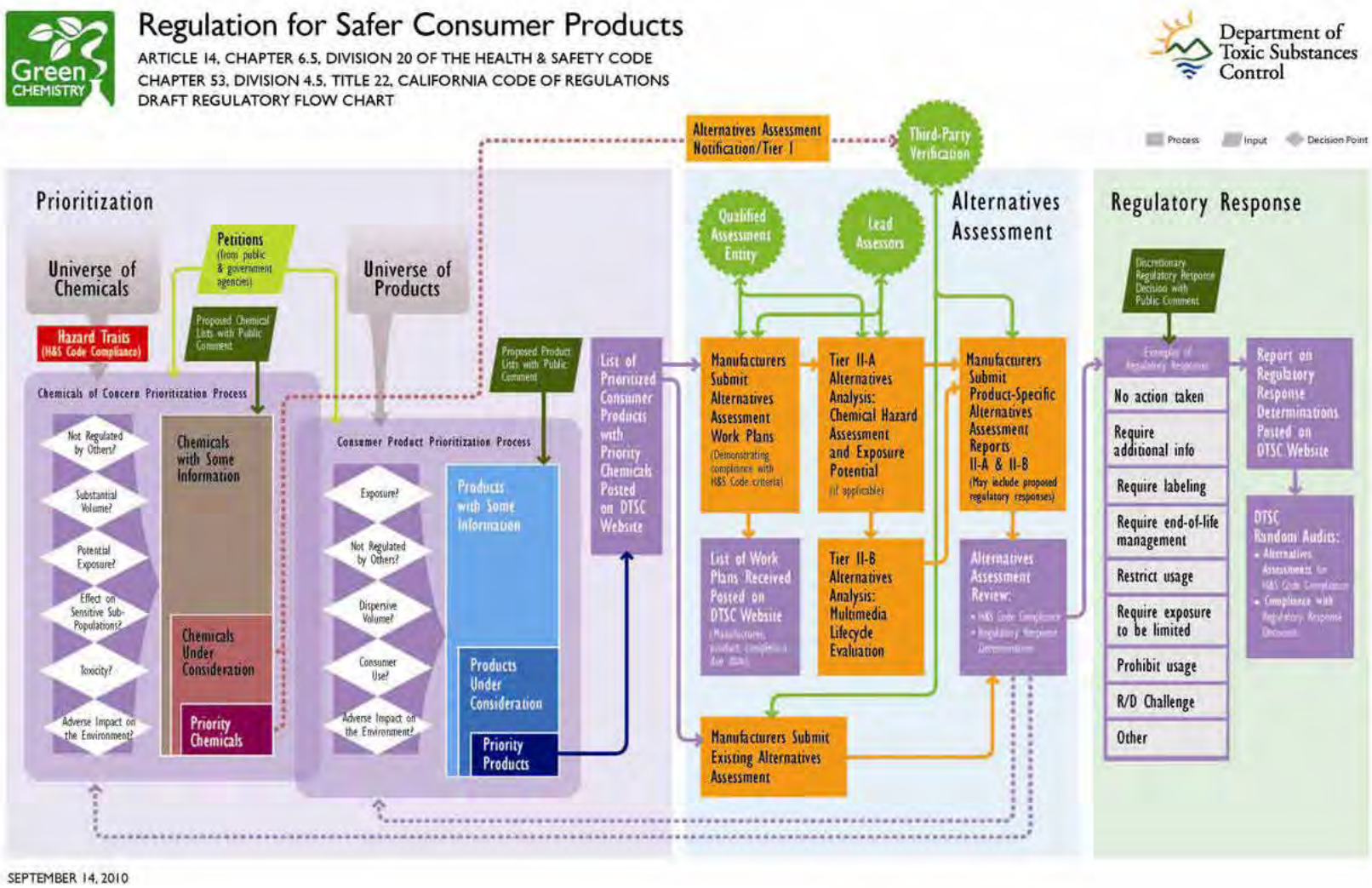

Figure 1: Schematic of California regulations for safer consumer products

Oregon persistent priority pollutants

In 2007 the state of Oregon passed legislation (SB 737) mandating a priority list of toxic, persistent and bioaccumulative pollutants that have a documented effect on human health, wildlife and aquatic life. The final list was published in October 2009. It contains two types of toxic pollutants: substances that either persist in water environments or accumulate in the tissues of people, wildlife or plants; and chemicals that have been banned or restricted for years but remain in sediment and tissue samples at detectable levels. The list will be used to help the state identify sources of pollutants and develop ways to reduce their amounts in Oregon waters. The final list, which contains 118 chemicals, is available at: http://www.deq.state.or.us/wq/SB737

A June 2010 rulemaking established the trigger levels of persistent pollutants in municipal permittees' wastewater which, if exceeded, will initiate the requirement for the permittee to prepare a persistent pollutant reduction plan. Oregon's 52 largest municipal treatment plants will develop toxic reduction and targeted pollution plans by July 2011 to reduce persistent pollutants occurring in their effluent at levels above the trigger levels.

New York ingredient reporting in cleansing products

The New York Department of Environmental Conservation this year decided to require manufacturers of domestic and commercial household cleaning products distributed, sold or offered for sale in the state to disclose the ingredients of their products. The department has the authority to require reporting of the chemical constituents contained in cleansing products sold in the state under a decades-old law addressing phosphorus concerns. See the following web link for the legislation granting this authority:
http://www.dec.ny.gov/regs/4617.html

Interstate Chemicals Clearinghouse

For the past two years, the MPCA has collaborated with several other states on chemicals policy issues through participation in the Interstate Chemicals Clearinghouse (IC2). The goals of the clearinghouse are to:

- Reduce duplication and enhance efficiency and effectiveness of state, local, and tribal government initiatives on chemicals by facilitating collaboration.
- Build capacity to identify and promote safer chemicals and products.
- Ensure that government agencies, businesses, and the public have ready access to high quality and authoritative data, information, and assessment methods.

Both MPCA and MDH participated in an IC2 planning committee for the past 18 months formed by participating state and local governments, which designed a governance proposal, conducted information sharing-activities and identified data needs. States have recently completed the planning process and 10 states have joined the IC2.

The IC2 sponsored information-sharing webinars on the following topics in 2010:

- Alternative Assessment Wiki
- Globally Harmonized System for classification and labeling of chemicals
- U.S. Environmental and Biomonitoring Data Sources (USGS and CDC)
- U.S. and Canadian Action on Priority Chemicals
- Defining Safer Alternatives

The IC2 has also identified the following data priorities: online access to integrated state lists of Priority Chemicals, coordination of chemical use data collection and management and coordination with the state of California on the Toxics Information Clearinghouse. The IC2 has also adopted development of the

Alternative Assessment wiki, originally housed in the Toxics Use Reduction Institute at the University of Massachusetts Lowell. Representatives from IC2 are also participating in two alternatives assessment processes organized through EPA's DfE program: use of bisphenol A in thermal printing paper and alternatives to Deca-BDE.

Additional information on the IC2 is available at: http://www.newmoa.org/prevention/ic2/

Interstate Mercury Education and Reduction Clearinghouse

The Interstate Mercury Education and Reduction Clearinghouse (IMERC) is a collaborative project of 13 states including Minnesota, and was launched in 2001 with the Northeast Waste Management Officials' Association in response to legislation passed by states in the Northeast and other parts of the country focused on reducing mercury in products and waste.

The primary purpose of IMERC is to provide technical and programmatic support "to states that have enacted mercury education and reduction legislation;" and to serve as a single point of contact for industry and the public for information on mercury-added products and member states' mercury education and reduction programs." In addition, IMERC maintains a Mercury-added Products database that is available to the public and provides information about the amount and purpose of mercury in consumer products. The database consolidates the information received from several states with requirements that firms selling mercury-added products submit specified information to the centralized database. Further information is available: http://www.newmoa.org/prevention/mercury/imerc.cfm

States' green chemistry activities

Following are highlights of activities in other states which are most relevant to green chemistry policy and program development.

California

California is developing some of the components of a green chemistry assistance program, and is convening experts and industry leaders to raise awareness of green chemistry techniques and tools. Of particular benefit to Minnesota and other states is California's offering of free green chemistry webinars focused on alternatives analysis. Alternatives analysis seeks less toxic ingredients to use in the manufacture of products and the webinars help scientists, manufacturers and stakeholders understand and develop the alternatives analysis process. For more information on the webinars, see http://www.dtsc.ca.gov/pollutionprevention/GreenChemistryResources/PastGCSymposia.cfm

California also sponsors Green Chemistry Student Awards and has proposed to create a series of 5-10 public-private partnerships between the Department of Toxic Substances Control and interested academic, governmental, for-profit and nonprofit entities. These partnerships would apply green chemistry principles to reducing the use or presence of hazardous substances in consumer products in order to demonstrate the practical applications and value of green chemistry to consumers and businesses alike. For more information on the Green Chemistry Student Awards see http://www.dtsc.ca.gov/PollutionPrevention/GreenChemistryInitiative/GCawards.cfm

For more information on California's public-private partnerships, see http://www.dtsc.ca.gov/PollutionPrevention/GreenChemistryInitiative/P3.cfm

Maine

To implement 2008 legislation described earlier, Maine has developed lists of high-concern and Priority Chemicals and mechanisms for requiring assessment of alternatives by companies using Priority Chemicals. While legislation is focused on driving companies to safer alternatives through regulation, Maine's pollution prevention program is developing forms of assistance (including green chemistry) targeted at Priority Chemicals.

Michigan

The Michigan Green Chemistry program was created in 2006 by an executive directive. Its goal was to promote green chemistry for sustainable economic development and protection of public health. The Green Chemistry program has responsibility for promoting and coordinating green chemistry activities such as research, development, demonstration, education and technology transfer. The directive also established a Green Chemistry Roundtable, which meets quarterly. Michigan held a state Green Chemistry Conference and Green Chemistry Awards in September 2009 and a second one took place in October 2010.

Oregon

The Oregon Environmental Council convened the Oregon Green Chemistry Advisory Group, which met for six months and issued a report: "Advancing Green Chemistry in Oregon" in July 2010. This report provided four key recommendations focused on supporting the development and use of safer chemicals:

1. Increase understanding and awareness of the benefits of using green chemistry among key decision makers
2. Enhance Oregon's existing and future workforce through education and training that supports the use of green chemistry
3. Expand Oregon's public and private green chemistry research and development capacity
4. Commit state and local resources to support green chemistry innovation

The report also contains case studies that demonstrate the breadth of opportunities for green chemistry innovations, including profiles of a cleaning products manufacturer, an outdoor tools manufacturer, a forest products manufacturer and an athletic shoe manufacturer as well as discusses opportunities and barriers related to green chemistry implementation. The full report is available online http://www.oeconline.org/resources/publications/reportsandstudies/advancing-green-chemistry-in-oregon.

Washington

The state of Washington has developed lists of chemical priorities, and pursuing education and assistance on green chemistry to replace Priority Chemicals through its existing pollution prevention program and services.

International Efforts in Chemical Evaluation and Control

Health and environmental concerns about chemicals used in commerce throughout the world has been growing, and many national governments are working toward better understanding of the hazards and risks associated with chemicals in modern society. Some countries have created inventories of chemicals in commerce during certain time periods, followed by screening, assessment and restriction on some of these chemicals. In addition, several countries require information about new chemicals or new uses of existing chemicals to be submitted to the government and approved before use in commerce begins.

The number of countries with chemical evaluation and control measures in place is significant and includes Australia, Canada, Denmark, Japan, Norway, and the 27 member states of the European Union. Perhaps most significant in its effects on Minnesota businesses is the European Union's Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) legislation, enacted in 2007. Designed to "streamline and improve" former legislation on chemicals, it applies to all chemicals, including those used in industrial processes and in household goods (ECHA, 2007a). REACH places most of the burden of proving the safety of a chemical on the manufacturer or importer, which must show that risks related to the chemical have been "identified and managed." Minnesota companies with global operations such as 3M and Ecolab are covered under REACH and have been working for several years to meet the information requirements of this legislation.

Descriptions of the efforts in place in the countries listed above as well as a number of international collaborations and agreements on chemical evaluation and control can be found in Appendix A.

Stakeholder Processes

MPCA green chemistry research and design process

Since mid-2009, the MPCA has gathered information on the possibilities for state government action to broaden the use of green chemistry in Minnesota. This effort flowed out of the 20-year old voluntary pollution prevention program and a desire to enhance it, and later intersected with the Legislature's need for more information on options for green chemistry support. MPCA has examined:

- green chemistry activity in other states and jurisdictions (described earlier)
- businesses with interest or opportunity
- non-governmental organization interest in transforming product chemistries
- chemicals information already in place or necessary in the future
- where Priority or High Concern chemicals are actually in evidence in Minnesota's economy

Discussions (focus groups, interviews, information meetings)

Focus groups — MPCA conducted four focus groups to gather thoughts and recommendations regarding a possible Green Chemistry and Design initiative to be established for Minnesota. One focus group was comprised of small manufacturers; two were comprised of large manufacturers, with one primarily consisting of manufacturers that develop products for general consumers and the other of manufacturers that develop products for other businesses and institutions. The final focus group consisted of a mix of small and large retailers. Each focus group involved 10-12 participants. The focus groups were held in fall 2009 and winter 2010.

Interviews — In addition to the group discussion process, MPCA staff conducted one-on-one interviews with representatives of academia (five researchers and educators), activists (two) and policymakers (two), plus an additional out-of-state manufacturer.

Information meetings

- July 15, 2010 — MPCA staff provided an overview of the Chemical Regulation and Green Chemistry landscape and the summarized learning from input gathered and analyzed to that point. Small group discussions followed and focused on longer-term, systemic MPCA/partner activities. Twenty-eight stakeholders attended and participated in four small groups.
- September 30, 2010 — MPCA staff presented a distillation of the input and research obtained, presented options to spur discussion of the more difficult issues of gathering chemical information to support green chemistry assistance, raising the revenue necessary to provide state green chemistry service and incentives, and overall policy goals for green chemistry. This was the final face-to-face opportunity to provide input on a potential green chemistry program. Twenty-two stakeholders attended; nine spoke during the full group discussion that followed the presentation.

Summary of discussions — Following is a combined summary of considerations and actions that focus group, interview and meeting participants suggested that MPCA and state government undertake to support wider use of green chemistry practices. As can be seen, discussions tended to widen from green chemistry to include advice on activity or policy relating to chemical regulation.

Stakeholders recommended MPCA look at many tools and services when proposing a state green chemistry program, including:

- state government support through state purchasing, funding, networks and federal coordination
- regulations, permitting, inspections which phase out priority or high-concern chemicals and facilitate quicker implementation of their alternatives
- standards which are objective, harmonized with other standards, and outcome-oriented
- environmental, consumer, and worker health effects research

- market-based but government-supported mechanisms to reduce the price or implementation cost of alternatives
- government-based incentives such as tax credits or exemptions (sales or corporate income)
- state-funded financial assistance such as grants to business for technology adaptation, chemical safety testing, or market development grants; to academia for curriculum development; to NGOs for consumer education
- chemistry research (University of Minnesota or other), both in bio-based and in greener petroleum-based substitutes
- special support for smaller manufacturers and retailers to buy down costs of product development or third-party product testing, and to facilitate information transfer and networking between purchasers and suppliers
- direct technical assistance (MnTAP and/or private consultant network), adding green chemistry expertise and services to established pollution prevention and process improvement services
- education of consumers, property owners/landlord, businesses and students (secondary, post-secondary, continuing education)

MPCA also elicited feedback on the more difficult issues of how to develop, pay for and sustain these state services:

- Policy – policies and goals for the need, scope, metrics, and chemical focus of a state green chemistry program remain unclear; stakeholders do not understand that voluntary programs like pollution prevention (and possibly green chemistry in the future) have supported regulatory goals or mandates for many years.
- Incentives – state and private sector incentives should be brought to bear to support more green chemistry activity; few public or private incentives are targeted specifically at green chemistry, green products, or clean technology as opposed to research and development and economic growth in general.
- Information – stakeholders are unclear on how information can both drive and support green chemistry assistance; existing state or federal reporting programs provide incomplete information on where Minnesota, other states' or federal priority or high-concern chemicals are demanded by purchasers or used by suppliers.
- Revenue for state green chemistry program – while there is demand for state-based assistance and incentives, there is little appetite for raising new revenue to supply it; MPCA and the state cannot provide sustained service in the high-demand areas (assistance, grants, and incentives) without new revenue.
- Advisory group – a coordination group with significant private leadership provided by early adopters of green chemistry will be instrumental in promotion, technology diffusion and possible policy development; state government's role in this promotion and diffusion effort requires new resources.

Please see these links for full summary material.

Green Chemistry and Design Focus Group
http://www.pca.state.mn.us/index.php/download-document.html?gid=13888

Green Chemistry and Design Interviews Summary
http://www.pca.state.mn.us/index.php/download-document.html?gid=13889

Green Chemistry and Design: July 15 and September 30 Meeting Materials
http://www.pca.state.mn.us/index.php/download-document.html?gid=14119

Survey

Conducted in June 2010, this survey was aimed at manufacturing and retail businesses and ideas central to their interest (not all ideas) as indicated in focus groups and interviews. The survey was designed to generate more stakeholder input; it was not designed to be scientific or generate data which could be analyzed using statistical methods. The electronic survey had 18 multiple choice questions for manufacturers and 17 for retailers. In general, MPCA asked about barriers, benefits, and options for state government support of green chemistry implementation. 113 manufacturers and eight retailers completed the survey, about a 26 percent response from the approximately 450 receiving notice of the survey.

Almost 40 percent of respondents (44) reported being active in green chemistry in the past year. In that time, 121 green chemistry actions were reported completed and 39 were planned. The top responding sectors were:

- Chemicals
- Fabricated metal products
- Computer and electronics
- Miscellaneous manufacturing (medical equipment/supplies, jewelry, silverware, sporting/athletic, office supplies except paper, toys/games, signs)
- Food products
- Others: paper, electrical equipment, non-electrical machinery, plastics and rubber, wood products

The following table indicates how survey respondents ranked categories of actions state government could take to support green chemistry.

Table 2: Preferred state government actions to support green chemistry by category

Category	Top choices	Bottom choices
Financial incentives	Tax credits to lower costs of alternatives Environmental fees tied to performance	State government purchasing
Assistance	Direct independent or consultant assistance, especially for smaller businesses Publicize company success stories	Publicize green chemistry products
Regulatory	Streamline permitting for green chemistry operational changes Increase incentives	Increase company capacity
Clearinghouse	Maybe, maybe not, but if done, focus on cases and practices of other companies	Information from consultants or through conferences
Green labels/claims	Unifying standards Consumer education	Information on and analysis of various standards

Notably absent from the stated mix of considerations driving business to implement green chemistry was concern for public health, although consumer concerns and preferences were leading issues in some sectors. For complete analysis of the survey, see Green Chemistry Survey Data (http://www.pca.state.mn.us/index.php/download-document.html?gid=13924) and Green Chemistry and Design Survey Data Analysis (http://www.pca.state.mn.us/index.php/download-document.html?gid=14118).

Green chemistry demonstration project

The MPCA is using part of its funding from the EPA for a green chemistry demonstration project. This project's primary purpose is to stimulate the development of new or redesigned products that incorporate green chemistry and design. It is intended that new or redesigned products developed through the project will produce measurable life-cycle environmental and energy use impact reductions in such areas as direct and indirect (upstream or downstream in the supply chain) chemicals of concern replaced, production waste avoided or energy consumption reduced. The project will produce case studies in the partnerships, resources and expertise necessary to develop green chemistry products and generate non-proprietary information which can be useful to similar Minnesota companies interested in pursuing green chemistry improvements.

The project will also inform potential future grant making for green chemistry by testing whether a particular level of funding (size of grant, in this case around $80,000) is sufficient to stimulate projects and if so, under what circumstances. Responses in the survey detailed above suggest $80,000 is on the small side for this kind of project, roughly half of what might be viewed as providing the most incentive. Other feedback received during focus groups and interviews provided valuable insights in framing the project and communicating the project's intent through the Request for Proposals (published August 3 and closed October 7).

The grant could co-fund basic chemistry research, move research or development already in progress closer to completion, or adapt off-the-shelf green chemistry technology. Internal teams and external partnerships will be vital, possibly including the company designing the product or component, their customer(s), their production supply chain, and either internal or third-party (external) technical resource providers such as consultants, graduate research students, labs or testing facilities, mentoring companies, or others.

Notice of the availability of the Request for Proposal for the demonstration project was sent in early August 2010 to about 2,500 companies in a wide range of business sectors that manufacture, process or use chemicals. Three complete proposals had been received by MPCA by the October 7 deadline. Evaluation has been completed; negotiations are ongoing with two companies with award and grant agreement execution intended by early December. If grant agreement negotiations are successful, two demonstration projects will be conducted. Projects are scheduled to be completed in 2012. Interested parties can find updates on these projects at http://www.pca.state.mn.us/greenchemistry (demonstration projects).

Other ongoing stakeholder processes

In addition to the MPCA Green Chemistry Stakeholder Project which directly informed this report, other ongoing stakeholder efforts taking place are briefly described below.

The Minnesota Chemical Regulation Project

The Minnesota Chemical Regulation Project is a stakeholder process convened by the Minnesota Environmental Initiative (MEI) involving public and private sector leaders convened to recommend improvements to Minnesota's approach to chemical regulation and the promotion of green chemistry.

In early 2010, MEI convened a Work Group of diverse stakeholders representing industry, government, academic and nonprofit advocacy interests to assess and refine the issues and opportunities relevant to state chemicals policy. At the conclusion of Phase I, the Work Group recommended by consensus that the stakeholder dialogue proceed to a Phase II. During Phase II of the project, the Work Group would develop specific recommendations regarding Minnesota's system of regulating and managing chemicals. The final report from the Phase 1 process is included as Appendix B of this report and can be found at the following web link: http://www.mn-ei.org/projects/ChemReg.html

Minnesota Green Chemistry Forum

The Minnesota Green Chemistry Forum was started by the Institute for Agriculture and Trade Policy in November 2009 to foster a common understanding among businesses, government, non-governmental organizations (NGOs) and academia to advance green chemistry practice and policy in Minnesota and nationally. Its goals are to build momentum and create awareness for green chemistry; capitalize and invest in current green chemistry activities and promote a healthy business environment for Green Chemistry in Minnesota. The Forum is currently co-led by the Institute for Agriculture and Trade Policy and a representative from business.

Key Issues and Overview of Chemicals Policy Options

Minnesota's Toxic Free Kids Act was introduced specifically to address people's concerns about potentially toxic substances in consumer products, particularly those used by children. The following section describes a model that identifies key gaps in U.S. chemicals policy, and discusses key issues that must be weighed when choosing options for Minnesota. These discussions are followed by a summary table describing chemicals policy choices used by other states or that have been proposed for Minnesota. The MPCA considered this broad range of options as it developed its recommendations to reduce and phase out the use of Priority Chemicals in children's products, and promote the use of safer alternatives.

Introduction

An excellent source of information about the types and impacts of various chemicals policy choices is the Lowell Center's 2008 Resource Guide, *Options for State Chemicals Policy Reform*. The Guide uses the conceptual model developed by Michael Wilson of the University of California Berkeley Center for Occupational and Environmental Health as the foundation upon which to propose improvements to our existing regulatory scheme.

The model holds that the weaknesses of TSCA have produced three overarching gaps in U.S. chemicals management policy: the data gap, the safety gap, and the technology gap. The model is described in the 2008 report commissioned by the California Environmental Protection Agency *Green Chemistry: Cornerstone to a Sustainable California*, prepared by researchers from the University of California Berkeley and UCLA Centers for Occupational and Environmental Health.

> "As a consequence of long-standing weaknesses in federal policy, the health and environmental effects of the great majority of some 80,000 industrial chemicals in commercial use in the U.S. are largely unknown. This condition has produced a flawed market in which buyers, from individual consumers to the largest companies in California, lack the information they need to choose the least hazardous chemicals and products.
>
> Buyers therefore choose chemicals and products primarily on the basis of their function, price, and performance, with much less attention given to their safety for human health and the environment. Most of the ensuing costs of health and environmental damage caused by hazardous chemical exposures, pollutants and waste rest with the public."

Moreover, because health and safety information about chemicals in commerce and in products is not available, and because the costs of dealing with health and environmental damage caused by hazardous chemicals are not related to the generation and use of the chemicals over their life cycle, manufacturers have little incentive to seek out less hazardous chemical alternatives or invest in development of safer products. So, the status quo continues. Figure 2 from the January 2009 National Institute of Environmental Health Sciences publication, Environmental Health Perspectives, illustrates the concept.

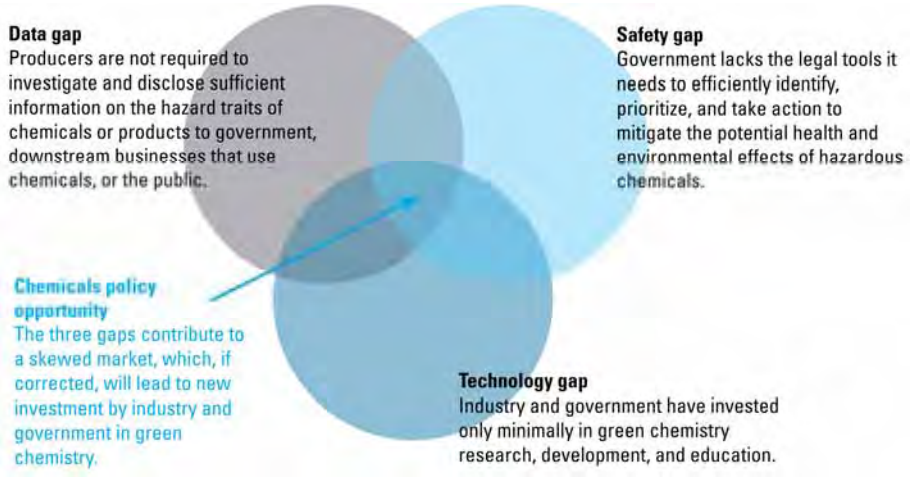

Figure 2: Safety, data and technology gaps (Wilson and Schwarzman, 2009)

Key issues

The following paragraphs discuss two important considerations for chemicals policy in more detail—the extent to which a hazard vs. risk approach is taken and the merits of mandatory and voluntary approaches.

Hazard versus risk

Should the intrinsic hazard traits of a chemical be the basis for its regulation or should a risk assessment approach be taken instead, in which regulation is based solely upon the risk posed by a child's exposure to a chemical used in a specific (children's) product? This is the crux of the issue. If one is concerned about children's exposure to toxic chemicals in products manufactured for children, arguably it makes sense to focus regulatory efforts on that particular exposure pathway. This addresses the stated concern, and is consistent with the traditional risk based approach used by the MPCA and most other state and federal environmental regulatory agencies to evaluate and address chemical risks posed by potential exposures from chemical releases to the environment, such as hazardous waste sites, industrial discharges to surface water, and air emissions from industrial sites.

A hazard-based approach would be a much broader approach to regulating chemicals. For example, if a specific chemical has hazard traits that put it into a particular category (i.e. it is a carcinogen or endocrine active compound, or it is bioaccumulative) or it is present at concentrations that exceed a regulatory threshold, there would be the potential (depending upon how the regulation was set up) that all uses of the chemical could be subject to regulation of some sort.

An example of this type of policy would be the EU's Restriction of Hazardous Substances (RoHS) directive. The RoHS directive, which took effect on July 1, 2006, requires that EU member states ensure that new electrical and electronic equipment put on the market does not contain any of six banned substances: lead, mercury, cadmium, hexavalent chromium, poly-brominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE), in quantities exceeding maximum concentration values. RoHS restrictions are based on hazards—if a substance is hazardous and there are alternatives, then it can be banned. RoHS restrictions can be imposed without a full assessment of the impact of the possible alternatives. It is enough to show that there is a potential risk without evidence of an actual risk.

Minnesota's Toxic Free Kids Act legislation employs elements of hazard and exposure to identify Priority Chemicals, and focuses on a specific exposure route (Figure 3).

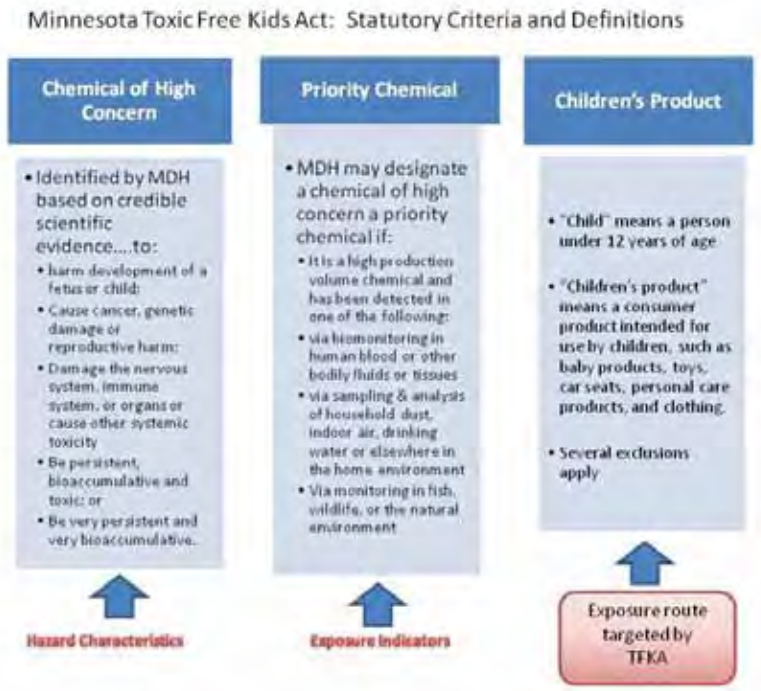

Figure 3: Minnesota Toxic Free Kids Act — Statutory Criteria and Definitions

The chemical industry and manufacturers are generally in favor of the narrower, risk assessment approach to regulation, whereas advocates for children's health tend to favor the hazard approach, because its broader regulatory umbrella gets at the bigger picture problem associated with society's use of chemicals: that many exposure routes exist for most widely used chemicals, and that, cumulatively, exposure from sources other than a children's product can dwarf the exposure a child may have from a product designed just for them (e.g., bisphenol A).

Mandatory versus voluntary

Another key issue centers around whether options to reduce the use of priority chemicals should be mandatory or voluntary. New regulations are rarely welcomed by industry, and the will to impose new regulations on potentially struggling businesses during tough economic times is low. Unfortunately, on a federal level, as well as in Minnesota, compelling evidence shows that voluntary approaches alone do not succeed in effectively addressing some environmental challenges.

MPCA experience clearly illustrates some important lessons when using regulations and incentives to change behavior.

1. Establishing requirements without a mechanism to enforce them creates concern among law- abiding businesses that conform to the requirements that they will have to compete against competitors that are not in compliance and are able to use this advantage to compete on price. Therefore, any law passed should have some mechanism for enforcement and funds for doing so.

2. Requirements that lack an effective mechanism to enforce them usually result in very spotty compliance. An example of this is Minnesota's auto mercury switch removal law, which requires a "good faith effort" to remove mercury switches before a vehicle is crushed. This law targets mercury releases from auto salvage yards, scrap processors, vehicle crushers and related businesses, and has been in effect since 1995. The "good faith effort" language, while well intended, is ambiguous and difficult to enforce especially since there are many sectors or businesses involved in managing a scrapped vehicle.

3. Monetary incentives are often successful while a funding source is available; when the monetary incentive runs out, so does the changed behavior. Again, auto mercury switches provide a good example. EPA and other stakeholders established a national voluntary program for mercury switch collection and recycling in 2006 through which Minnesota's program is now managed. Automakers and the steel industry created a fund for switch removal 'cost recovery' or incentive payments. Nationally, the voluntary program is not meeting its goals. Switch recovery rates have dropped since the fund for switch removal incentive payments has been depleted.

There are pros and cons of voluntary versus mandatory actions. Mandatory actions tend to level the playing field (apply broadly to a range of actors), set clear requirements, and have the force of law behind them (objectives and enforcements). To date, mandatory requirements on chemicals have generally been focused on single chemicals. However, they can be confrontational and become tied up in litigation. Voluntary initiatives, on the other hand, can be more flexible in nature, have more aggressive goals, and address a broader range of materials in a more rapid manner. They are often a good starting point because they engage new businesses and can reward early adopters. But that is not enough to engage everyone, which can lead to the "free rider" syndrome (those choosing not to participate), and so voluntary initiatives typically are not sustained in the long run.

Any initiative needs outreach, enforcement, and a clearly understood definition, throughout the industry and among regulators, of what constitutes compliance or non-compliance.

Chemical policy options

A summary of general chemicals policy options that could be suitable for Minnesota are presented in Table 3. These options have the potential, individually or in combination, to begin to address the data, safety and/or technology gaps described in the introduction above.

Table 3: Choices for Chemicals Policy in Minnesota

Category	Option	Models elsewhere	Comments (benefits, challenges, costs, effectiveness)
State Capacity Building	1. State participates in Interstate Chemicals Clearinghouse to gain knowledge and experience in chemicals policy	(IC2)	• Opportunity to monitor and learn about chemicals policy, prioritization, and programs in other states • Gain contact with other states working in chemicals policy arena • Gain efficiencies by working jointly on projects of interest to more than one state • Annual fee required to be a member
Consumer Education	1. Develop educational materials for consumers about Priority Chemicals and children's products that contain Priority Chemicals		• Provide information on how and why Priority Chemicals were selected • Provide information on how Priority Chemicals are used, and what products they are contained in. • Provide information about how to reduce exposure to Priority Chemicals • Other educational topics as desired or dictated by statute • Potential to be relatively low in cost, depending upon scope and method
Data Collection	1. Require manufacturers to notify state if they use Priority Chemicals	California, Washington, Maine	• Gain knowledge about the use of Priority Chemicals in Minnesota • Currently state does not have a means to obtain chemical use information from businesses • May require development of a state confidential business information policy
	2. Require manufacturers to provide state with information about the amount and function of Priority Chemicals that are intentionally added to children's products.	Washington, California, Maine, Washington, REACH	• Gain knowledge about on the presence of Priority Chemicals in children's products • Manufacturers may not know the composition of all components used in producing a children's product. If testing is required to fulfill this requirement, the cost for smaller companies could be high; however, companies may already be doing testing to fulfill requirements in other jurisdictions • Provides information that is otherwise unavailable.

Table 3 continued: Choices for Chemicals Policy in Minnesota

Category	Option	Models elsewhere	Comments (benefits, challenges, costs, effectiveness)
Data Collection	3. Require manufacturers to share health and safety information they possess about the Priority Chemicals they use	California proposal	• May provide state and others with information that is not available publicly about priority chemical toxicity and improve the pool of information that is available to evaluate priority chemical risk and exposure • Manufacturers and others that sell in international markets may already provide this information under REACH or other international law.
Data Management	1. Create a database to store (and make available) information collected on priority chemical use, presence in children's products, etc.	California Toxics Info. Clearinghouse	• Database would be tailored to information Minnesota requests • Depending on design, database development can be costly; requires updating and maintenance over the long term. • This could be duplicative of other states' efforts.
	2. Participate in joint state effort being made through the IC2 to develop a information portal or shared clearinghouse on Priority Chemicals	Mercury Clearinghouse (IMERC); California Toxics Info. Clearinghouse	• More cost effective to share resources • States have different Priority Chemicals and different information they are collecting. • Differing Confidential Business Information requirements among states could limit actual ability to share information
	3. Set up a Center for Toxics in Products to collect and make available information on priority chemical use, toxicity, alternatives, etc.	Proposed in California as part of Green Chemistry Initiative	• Centralized place to collect information about chemicals of high concern and Priority Chemicals. • Resource for consumers as well as businesses • Effectiveness likely related to existence of requirements or incentives to encourage businesses and manufacturers to explore alternatives to the use of Priority Chemicals
Labeling	1. Require warning labels on children's products that contain a priority chemical	California Prop 65	• Provides information to consumers about the presence of a priority chemical in a children's product • Does not provide any information about risk due to priority chemical • No cost to government; low to moderate cost for business

Table 3 continued: Choices for Chemicals Policy in Minnesota

Category	Option	Models elsewhere	Comments (benefits, challenges, costs, effectiveness)
Labeling	2. Encourage and/or provide incentives for the use of eco-labels by businesses to help consumers identify safe products	Green Seal, DfE Safer Chemicals, Energy Star	• Numerous labeling schemes currently exist; the differences between labels can be confusing to consumers • Labeling criteria is not always transparent • Certification of products for labeling can be expensive for small companies
National Chemicals Policy Reform	1. Actively support TSCA reform initiatives		• Reformed federal chemicals policy is a neater, more comprehensive approach to improve the existing data, safety, and technology gap than the burgeoning movement towards state level chemicals policy • However, substantial uncertainty exists about whether and when TSCA reform will occur, and if it does, to what extent Minnesota lacks a spokesperson or authorized state agency to lead a Minnesota campaign for TSCA reform • Low to no cost
	2. Actively support TSCA reform initiatives as a member of existing organizations	IC2, ECOS, States Coalition	• Advocate for specific provisions that are of particular benefit to states that are implementing state level chemicals policy initiatives, such as: o Providing states with access to chemical and product health and safety information provided under TSCA and other laws o CBI reform, etc.
Preferential Purchasing	1. Require state government to avoid purchase of products containing Priority Chemicals.	New York	• Uses buying power of state to encourage safer chemicals.
	2. Develop specifications for state purchasing contracts that give preference to products that do not contain Priority Chemicals		• State laws and executive orders for environmentally preferable purchasing in Minnesota are already in place. • Uses buying power of state to encourage vendors to use safer chemicals.

Table 3 continued: Choices for Chemicals Policy in Minnesota

Category	Option	Models elsewhere	Comments (benefits, challenges, costs, effectiveness)
Alternatives	1. Support funding for sector-based research and development on alternatives to Priority Chemicals		• Incentives are needed to encourage development of alternatives. • A mechanism to ensure that alternatives are truly safer than existing chemicals would be needed.
	2. Provide incentives to Minnesota companies and their suppliers to encourage development of alternatives to Priority Chemicals.		• Incentives are needed to encourage development of alternatives. • A mechanism to ensure that alternatives are truly safer than existing chemicals would be needed.
	3. Provide grants to Minnesota colleges and universities to support research into development of alternatives		• Promotes learning and capacity building in new area. • Results could help Minnesota companies.
	4. Require manufacturers to conduct formal alternatives assessment for children's products with Priority Chemicals within specified timeframe		• Alternatives assessment processes are expensive and time consuming. • Currently, there is no agreed upon framework for alternatives assessment processes. • High cost to manufacturers.
	5. Encourage Minnesota companies to work with EPA's Design for the Environment program to conduct alternative assessments for products with Priority Chemicals	DfE Alternatives Assessment Program	• DfE alternatives assessment projects are comprehensive and involve many stakeholders. • Very time consuming and may not be able to fully participate because of travel restrictions. • DfE processes are not always very transparent.

Table 3 continued: Choices for Chemicals Policy in Minnesota

Category	Option	Models elsewhere	Comments (benefits, challenges, costs, effectiveness)
Restrictions	1. Restrict the sale of children's products containing Priority Chemicals	Maine	• Presence of priority chemical in product does not equal exposure. • Protects most vulnerable populations based on hazard. • Does not consider if substitutes are available or if substitutes are safer.
	2. Ban the sale of children's products containing Priority Chemicals.	Maine	• Hazard-based approach • Protects vulnerable populations • Does not consider exposure or availability of substitutes • Would require additional legislation

Desired Outcomes for Chemical Regulation and Green Chemistry in Minnesota

Desired outcomes for an improved chemical regulation and product safety system were stated earlier in this report, and it is helpful to revisit them here, prior to discussing the chemicals policy and green chemistry recommendations that follow. Efforts to improve the system of regulating chemicals, regulating product safety, and promoting green chemistry also raise several dilemmas:

1. Consumers need access to product information to make informed choices. On the other hand, businesses cannot disclose *all* product ingredient information without risking their survival in a competitive global economy.
2. Chemicals and products should be *proven safe* before being allowed on the market. Or, chemicals and products should be allowed on the market unless *proven harmful*.
3. The federal government should run the chemical regulation system, not states. Or, the federal system is broken; states cannot wait for the fix and must act to protect their citizens.
4. Attempts underway to reform federal chemicals policy are shifting and evolving both in Congress, which is considering Toxic Substances Control Act reform, and at EPA (using existing authorities). States ready to act must do so without clear resolution of federal policy.
5. An improved system for chemical regulation, product safety and green chemistry promotion will require funding, in a time of severe revenue shortages in government.

It is helpful, as policymakers and stakeholders wrestle with these dilemmas, to identify desired *outcomes* for an improved system.

1. ***Minnesota protects those most vulnerable to risks:*** Children from fetal stage through adolescence face developmental risks in addition to toxicity effects that can be initiated at all ages.
2. ***Sufficient information and transparency****:* Chemical producers provide timely information needed to demonstrate chemical and product safety. Consumers, business-to-business customers, and retailers have timely, clear information from producers, regulators or trusted third parties to make informed choices in purchasing products.
3. ***Legitimate trade secrets are protected:*** Government has timely access to information needed to verify chemical safety and protect public health, while protecting legitimate confidential information. Confidential business information protections are not overused.
4. ***Priority system established:*** Acknowledging that it's not feasible to address all chemicals at once, state efforts focus initially on a smaller set of Priority Chemicals.
5. ***Minnesota is a leader and magnet for green chemistry and design for the environment:*** Minnesota seizes this reform opportunity to pave the way for companies ready and willing to be early adopters of green chemistry principles and environmentally friendly products. Minnesota companies are motivated, recognized and rewarded in the marketplace for green innovations.
6. ***Appropriate government involvement:*** Government oversight and incentives are limited to what is necessary, and new work is sufficiently funded.
7. ***Predictable, consistent and adaptable:*** Even with rapid change as the "new normal," Minnesota strives for a system that is predictable, generally consistent with other jurisdictions that are reforming chemicals policy, and adaptable to compelling new information.
8. ***Public confidence:*** Consumers, retailers, and manufacturers believe that the system of ensuring safe consumer products is transparent, trustworthy, effective, efficient, fair and timely.

Recommendations for Chemicals Policy

The MPCA recommends that the Legislature consider the following actions to address the data, safety and technology gaps in current chemicals policy and respond to the desired outcomes listed above:

1. Require manufacturers that produce or sell children's products in Minnesota that contain one or more Priority Chemicals (to be named by MDH on February 1, 2011) be subject to reporting requirements.
2. Direct state agencies to develop materials to educate Minnesotans about Priority Chemicals, the concepts of risk and exposure, and ways Minnesotans can limit their exposure to Priority Chemicals.
3. Direct MPCA and MDH to continue their participation in the Interstate Chemicals Clearinghouse.
4. Authorize MPCA and MDH to participate in states' initiatives that support TSCA reform, including requiring manufacturers to provide necessary information to EPA to demonstrate the safety of chemicals; making CBI information submitted by industry to EPA accessible to states with appropriate protections; reforming CBI provisions so that manufacturers are required to substantiate their claims of CBI; and adopting TSCA reform measures that preserve (and do not pre-empt) state's authorities.
5. Direct MPCA and the Minnesota Department of Administration to evaluate the efficacy of adapting Minnesota's existing preferential purchasing initiatives to give preference to products that do not contain Priority Chemicals.

Recommendation 1 is needed to increase Minnesota's base of knowledge about Priority Chemicals use in children's products and provide incentive for manufacturers that produce or sell such products to reduce or phase out their use of Priority Chemicals. Recommendation 2 will provide needed context about the hazards, risks and routes of exposure by which children and the public may be exposed to Priority Chemicals. Recommendation 3 maintains Minnesota's charter membership in the IC2 and enables the state to continue collaborating with and learning from other states that are addressing similar issues in lieu of federal chemicals policy reform. Finally, Recommendations 4 and 5 allow Minnesota to add its voice to other states that are encouraging federal chemicals policy reform, and to lead by example by implementing, if feasible, governmental preferential purchasing for products formulated without Priority Chemicals.

These recommendations can be implemented in ways that limit their cost to manufacturers and also minimize the additional responsibility placed on government, while taking important steps toward safer children's products. These recommendations are discussed in more detail below.

Chemicals Policy Recommendation 1: Require manufacturers that produce or sell children's products in Minnesota that contain one or more Priority Chemicals (to be named by MDH on February 1, 2011) be subject to reporting requirements. (**Note:** Retailers of children's products in Minnesota who only sell but do not make or import children's products would not be subject to reporting requirements).

No real progress can be made in reducing the use of Priority Chemicals in children's products without some basic information from manufacturers. Knowledge about the extent to which Priority Chemicals are used in children's products manufactured or sold in Minnesota is necessary to identify opportunities and guide future policy directions and/or actions targeting priority chemical use reduction. In addition, reporting requirements can function as an incentive for manufacturers to consider ways to reduce or phase out the use of Priority Chemicals.

It is helpful to look at how Maine and Washington are addressing reporting requirements as part of children's product legislation enacted in their states. Maine has proposed rules that specify the information manufacturers must report about their use of the two Priority Chemicals selected to date, while Washington state has proposed rules for manufacturers' reporting of their use for 59 proposed chemicals of high concern for children (CHCC). Excerpts from Maine's proposed reporting rule for the priority chemical (class) nonylphenol and nonylphenol ethoxylates appear in Table 4, together with the reporting requirements for CHCCs proposed in Washington. Note that proposed rules for both states require reporting the amount of the priority chemical or CHCC in each unit of the consumer product.

Washington Department of Ecology undertook a relatively involved process to develop the reporting requirements for CHCC that included working with a stakeholder advisory group and development and testing of a pilot reporting rule. The following excerpt from the Executive Summary of Washington's 2009 CSPA Report, in which it reports on some of the concerns it faced in developing its reporting requirements, is informative:

> The Advisory Group identified a number of CSPA reporting requirement challenges, particularly concerning the costs of compliance. Small manufacturers often do not know what chemicals are present in the materials they use to make their products and suppliers appear to be either unable or unwilling to provide this information. Even large manufacturers sometimes run into this problem. This situation raises a concern that in order to comply with the notification requirements, manufacturers would have to test every product for every chemical on the list. The costs incurred to meet such a requirement could make it uneconomical for some manufacturers to market their products in Washington.
>
> Ecology (Washington Department of Ecology) and DOH (Washington Department of Health) evaluated laws from other states and jurisdictions to identify where testing and reporting requirements are already in place. We also examined approaches being used by the private sector to assess chemicals in their products. We concluded that while there are challenges to developing a workable reporting scheme, there are reporting requirements already in use in other jurisdictions or sectors that can be adapted or modified to satisfy CSPA and help mitigate the cost of compliance on manufacturers.

CBI policies that exist in Maine and Washington will be available for use by manufacturers preparing to comply with enacted reporting requirements.

The MPCA recommends that the reporting requirements for manufacturers of children's products sold in Minnesota include generally the same information that Maine and Washington are expected to require, as follows:

- The name of the priority chemical and its chemical abstracts service registry number.
- The product category or categories in which it occurs.
- The product component or components within each product category in which it occurs.
- A brief description of the function, if any, of the priority chemical in each product component within each product category.
- **An estimate** of the total amount of the priority chemical contained in each product component within each product category. An explanation for the estimate must be provided along with an assessment of the estimate's likely accuracy.
- The number of product units sold or distributed in Minnesota or nationally, expressed as a range;
- Any alternatives assessment that has already been performed by the manufacturer.
- Other information the manufacturer deems relevant to the reporting of the chemical.

Note that the MPCA is recommending for now that manufacturers provide *estimates* of the content of the priority chemical within each product and product component, such that chemical analysis of the product or product components is not required. This recommendation is practical since the identity of the Priority Chemicals to be named by MDH are as yet unknown; the availability and cost of analytical methodology to determine priority chemical content in children's products therefore is unknown. This also reduces the cost of compliance for manufacturers and others required to report.

Maine and Washington are requiring manufacturers to provide more specific information about the amount of Priority Chemicals in children's products and expect that in many cases manufacturers will resort to analytical testing of their products to get the required information. Maine will use the reported information to consider the costs and benefits of requiring manufacturers to perform an alternatives analysis, whereas Washington will be considering a broader array of potential next steps.

To implement the MPCA's recommendation, it will be necessary to evaluate Minnesota's existing CBI policy to determine if it provides sufficient clarity for this purpose. The CBI policy should ensure that manufacturers' proprietary products are protected but also enable the reported information to be used to develop sound policy to achieve the goals as provided in the Toxic Free Kids Act. In addition, Minnesota will need to develop a streamlined mechanism to report, receive and store securely the information that manufacturers are required to report.

Table 4: Proposed manufacturers' priority chemical notification requirements in Maine and Washington

State of Maine LR 2877 Proposed Rule for Nonylphenol*	State of Washington Children's Safe Product Act, Proposed CPSA Reporting Rule*
A. …the manufacturer of a consumer product listed in section 4(A) of this chapter that contains intentionally-added nonylphenol or nonylphenol ethoxylates, shall report to the department the following information: (1) A description of the manufacturer's product or products containing nonylphenol, nonylphenol ethoxylates or related substances; (2) The amount of nonylphenol, nonylphenol ethoxylates or related substances in each unit of the product; (3) The function of nonylphenol, nonylphenol ethoxylates or related substances in the product; (4) The number of product units sold or distributed in Maine or nationally, expressed as a range; (5) Any assessment that has already been performed by the manufacturer of the availability, cost, feasibility and/or performance, including potential for harm to human health and the environment, of alternatives to nonylphenol, nonylphenol ethoxylates or related substances and the reason nonylphenol, nonylphenol ethoxylates or related substances are used in the manufacture of the children's product in lieu of identified alternatives; and (6) Other information the manufacturer deems relevant to the reporting of the chemical. *posted September 2, 2010, with a comment deadline of October 18, 2010	The notice required … must be filed annually with the department for each CHCC by product category and component. The notice must include all of the following information: (a) The name of the CHCC and its chemical abstracts service registry number. (b) The product category or categories in which it occurs. (c) The product component or components within each product category in which it occurs. (d) A brief description of the function, if any, of the CHCC in each product component within each product category. (e) The total amount of the CHCC by weight contained in each product component within each product category. The amount may be reported in ranges, rather than the exact amount. If there are multiple CHCC values for a given component in a particular product category, the manufacturer must use the largest value for reporting. *posted October 22, 2010

Chemicals Policy Recommendation 2: Direct state agencies to develop materials to educate Minnesotans about Priority Chemicals, the concepts of risk and exposure, and ways Minnesotans can limit their exposure to Priority Chemicals.

The high level of concern among Minnesotans about children's exposure to chemicals in daily life was a key factor behind the passage of the Toxic Free Kids Act. Now that MDH has developed a list of chemicals of high concern and will on February 1, 2011, publish a list of Priority Chemicals, there will be a need for consumer education to help illuminate the highly technical science used to evaluate chemical hazards and assess risks.

It is important for consumers in Minnesota to understand that the mere presence of a priority chemical in a children's product does not by itself mean the product is unsafe. Making this determination involves a risk assessment: a risk assessment involves review of the hazard characteristics of the priority chemical, and review of how and to what extent a child could be exposed to the priority chemical during use of a children's product containing the priority chemical.

The Toxic Free Kids Act makes the exposure of children, who may be more vulnerable to the effects of Priority Chemicals than adults, the focus of concern. However, other routes of exposure besides children's products may exist for many Priority Chemicals.

Important topics to be addressed in consumer education include:

- explaining how and why MDH developed the lists of chemicals of high concern and Priority Chemicals
- providing information about the hazard characteristics of the Priority Chemicals
- providing information if available about how the Priority Chemicals are used and in what types of products they might be found
- providing information about ways to minimize exposure to Priority Chemicals

Consumer education can be conducted in a number of different ways and at different levels of cost. Options include web-based education (probably the most cost effective), which can provide rapid access via links to other sources of information such as the NHANES survey and the National Children's Health Study (NCS); public meetings; seminars; written outreach materials; and potentially even a call-in phone line could be set up.

Chemicals Policy Recommendation 3: Direct the MPCA and MDH to continue their participation in the Interstate Chemicals Clearinghouse.

The Interstate Chemicals Clearinghouse provides an effective way to monitor, discuss and learn from the work of other states, to track federal initiatives on TSCA reform, and lend Minnesota's voice to chemicals policy discussions. Also, training and capacity building is an explicit part of the IC2's mission; the IC2 has already held a number of webinars to discuss issues such as alternatives analysis protocol, the definition of "safe" and "safer," and global product classification. The IC2 is also working towards setting up a multi-state chemicals clearinghouse and has been working on defining data requirements that would meet the needs of individual state's chemicals policy requirements.

Participation in the IC2 gives Minnesota the opportunity to learn from other states and fosters consistency among states that are undertaking chemicals policy reform. Minnesota's participation also benefits other participating states by keeping membership strong and spreading the cost of IC2 operations more broadly; overall, the IC2 will help all states move towards Minnesota's desired outcomes and assist in the evolution toward a greener, more sustainable economy.

Chemicals Policy Recommendation 4: The Legislature should authorize the MPCA and MDH to participate in states' initiatives that voice support for TSCA reform.

The need for TSCA reform has been discussed extensively in this report; reform at the federal level in almost any form would help address the gaping need for information that currently exists. The following issues are of particular relevance to states working toward improved chemicals policy.

- requiring manufacturers to provide necessary information to EPA to demonstrate the safety of chemicals
- making CBI information submitted by industry to EPA accessible to states with appropriate protections

- reforming CBI provisions so that manufacturers are required to substantiate their claims of CBI
- adopting TSCA reform measures that preserve (and do not pre-empt) state's authorities

These issues help address the need for basic safety information about chemicals in commerce and may help in providing states with access to safety information about chemicals used within their borders. Minnesota should make clear its position on the need for reform.

This recommendation involves little cost to government, yet has the capacity to improve upon our current chemicals policy landscape.

Chemicals Policy Recommendation 5: Direct the MPCA and the Minnesota Department of Administration to evaluate the efficacy of adapting Minnesota's existing preferential purchasing initiatives to give preference to products that do not contain Priority Chemicals.

Finally, the MPCA recommends that the legislature direct the MPCA to evaluate whether the existing Minnesota EPP policy can be adapted to direct state purchases away from products that contain Priority Chemicals. The preferential purchasing initiative could potentially be modified to achieve this result; by doing so, the government of Minnesota can assume a leadership role in its purchasing choices and further incent manufacturers to reduce or phase out the use of Priority Chemicals in their products.

Policy recommendation summary

Together, these five recommendations constitute measured steps towards obtaining information about Priority Chemicals use and Priority Chemicals in children's products sold in Minnesota. They also provide much needed context about Minnesota's Priority Chemicals that will be helpful to consumers, stakeholders and government, and will help Minnesota keep current with developing chemicals policy in other states.

These recommendations will move Minnesota toward many of the desired outcomes for chemicals policy in Minnesota. Policies that provide incentives to move away from Priority Chemicals can also encourage investment in greener manufacturing and green chemistry.

Although some states such as Maine have a mechanism to require alternatives analysis for priority chemicals, MPCA is not recommending incorporating alternatives analysis into Minnesota's chemicals policy at this time. While alternatives analysis could eventually be an important tool, it is currently a costly undertaking for which no standardized protocol yet exists, and effectiveness is not yet demonstrated. Minnesota first needs to obtain basic information about Priority Chemicals use in Minnesota as a basis for developing a better understanding of if, where and when alternatives analysis might be a productive endeavor with regard to encouraging the use of safer alternative chemicals.

Potential funding mechanisms

Should the Legislature concur with MPCA's recommendations to advance chemicals policy in Minnesota, new funding will be needed. Currently, the regulation of chemicals in children's products (and consumer products in general) is not part of the stated mission of either the MPCA or MDH. Experience and expertise in many key areas is lacking in state government. The MPCA and MDH currently have no staff or programmatic resources dedicated to this endeavor other than those allocated for the purpose of implementing the Toxic Free Kids Act requirements from the 2010-2011 budget.

Other states have used a variety of mechanisms to fund their children's products legislation. Maine's LR2877 provides the DEP with authority to levy a fee on those manufacturers and distributors of children's products subject to reporting requirements to, "…cover the department's reasonable costs in managing the information collected." In addition, DEP may assess a fee on manufacturers or distributors under certain conditions to cover the cost of conducting an alternatives analysis. Rules adopted in 2010 allow Maine to recoup these costs. Washington's Children's Safe Products Act was funded using an existing tax on first use of hazardous substances within the state, which is primarily paid by oil refineries.

In California, SB 509 (Online Toxic Clearinghouse) and AB 1879 (Accelerate Quest for Safer Products) were enacted with each bill including the provision that it became effective only if the other bill was enacted prior to January 1, 2009 (both were enacted on September 29, 2008). Neither of these bills created new funding sources for this work.

A variety of mechanisms can be used to fund collection of information from manufacturers on children's products and the other chemicals policy recommendations listed above, including reporting fees, or fees on chemicals use. In addition to covering the costs associated with information collection, these funding mechanisms can serve as disincentives for continued use of certain chemicals or as incentives to evaluate the use of alternatives. An analysis of these funding mechanisms is included in Table 5.

Table 5: Potential Funding Options for Priority Chemical Tracking and Regulation

Option	Who pays?	Models elsewhere	Comments (benefits, challenges, costs, effectiveness)
Reporting Fee	Companies that manufacture or import children's products containing Priority Chemicals that are subject to Minnesota reporting requirements	Similar structure to Minnesota e-waste law and the 1997 Listed Metals in Specified Products law (Minn. Stat. § 115A.9651)	• Various bases for product-based fees: per product, per units sold, amount in product, etc. • Fees can be structured so they become an incentive to manufacturers to phase out use of a priority chemical and eliminate both the cost and obligation to report; must be set high enough to be significant • For the fee to be fair and effective, the universe of companies required to report and pay fees must be well known and there must be sufficient resources to run an effective enforcement program for those companies that do not comply • MPCA experience is that collection from national companies doing business in Minnesota can be costly in terms of staff time and lack a commensurate return in paid fees (e-waste and toxics in products bill); • Incentive to change is improved when tax credits, no to low cost technical assistance, and/or grants to evaluate alternatives are available.
Reporting Invoice	Companies that manufacture or import children's products containing Priority Chemicals that are subject to Minnesota reporting requirements	Maine (Code of Maine Rules chapter 881)	• Maine will require extensive reporting on products with amounts of Priority Chemicals intentionally incorporated and assessment of alternatives – their reporting-based fees will recoup the cost of staff managing and reviewing the information submitted.

Table 5 continued: Potential Funding Options for Priority Chemical Tracking and Regulation

Option	Who pays?	Models elsewhere	Comments (benefits, challenges, costs, effectiveness)
Priority Chemical Use Fee	Companies that manufacture, purchase or import Priority Chemicals for use in Minnesota	Similar to Toxics Release Inventory but applies to chemical use instead of waste generation	• Anticipated broader pool of fee payers means fees can be set lower compared to a product-focused reporting fee • Universe of companies to which fee applies is easier to determine than for children's products • If fee is too low, it will not act as an incentive for companies to evaluate use of alternatives, since continuing use of priority chemical involves no business risk and the cost is likely lower than changing to an alternative • The challenge is to find a "sweet spot" for volume-based and/or per-chemical fee structures: high enough to create incentive to phase out but not so high as to discourage full and accurate reporting and fee payment • Fees high enough to incentivize reduced use will eventually result in lower revenue and should therefore should not be the primary source of revenue for a sustained regulatory program • Low (much lower-than-typical) reporting thresholds would be required to accurately trigger fee payment • Incentive to reduce or switch to alternatives is improved when tax credits, no- to low-cost technical assistance, and/or grants to evaluate alternatives are available.

Options for Green Chemistry Incentives and Promotion

Introduction

This section discusses recommendations for the immediate future and summarizes longer-term options and considerations for promoting and providing incentives for green chemistry and product design in Minnesota, and potential funding mechanisms for funding those options. The MPCA developed these options with stakeholder consultations using resources from a pollution prevention grant from EPA, and were directed by the 2009 Minnesota Legislature through the Toxic Free Kids Act to report this information in December 2010.

MPCA, the Department of Public Safety (DPS), and the Minnesota Technical Assistance Program (MnTAP) have implemented Minnesota's Toxic Pollution Prevention Act since it was enacted in May 1990. The U.S. Pollution Prevention Act was passed six months later. Together, the state and federal acts define pollution prevention or "P2" as elimination or reduction of pollutants prior to their generation as pollutants, through means which include what are now thought of as "green chemistry" principles: the avoided use of toxic pollutants and hazardous substances, the substitution of less-toxic raw materials, and the reformulation or redesign of products.

When "green chemistry" emerged as a term and set of tools six years later, its originators tied it directly to the P2 definitions established in 1990. Clearly, the current interest in green chemistry is an opportunity to refresh the state's 20-year effort to support voluntary implementation of pollution prevention by providing assistance to reduce and eliminate use of chemicals of concern. While implementation of pollution prevention and green chemistry is voluntary, MPCA and partners have frequently worked with regulated parties to eliminate material uses which can minimize or eliminate regulatory requirements. An impending regulatory issue is often the deciding factor driving pollution prevention.

MPCA's key partner throughout the history of the state's pollution prevention program has been MnTAP. MnTAP is an outreach and assistance program at the University of Minnesota that provides confidential technical assistance on pollution prevention to Minnesota businesses. Established in 1984, MnTAP is funded primarily by a pass-through grant from the MPCA's Prevention and Assistance Division to the University of Minnesota School of Public Health, Division of Environmental Health Sciences. As part of the University, MnTAP has no regulatory responsibilities or obligations. MnTAP's success in facilitating production process improvements has resulted in significant waste reduction; water and energy use reduction and lowered releases to air and water. These improvements and the resulting cost savings for MnTAP clients have been featured in MPCA's Biennial Pollution Prevention Evaluation Reports to the Legislature. With the proper support and skill development, MnTAP can also play a key role in green chemistry assistance to businesses. Housed as it is in the University, MnTAP could also help coordinate assistance with University departments, offices and functions such as chemistry, engineering, management, public policy, research, and technology transfer.

Green chemistry policy direction

A small but growing percentage of consumers and the manufacturers/retailers who supply them have decided to interpret scientific uncertainty as a reason to take a proactive and preventive approach. MPCA's review of the results of several consumer surveys shows anywhere from 10 to 25 percent reporting themselves as strongly motivated to buy greener products indicated, for instance, by their willingness to pay a price premium. The proportion of respondents indicating softer support for green products (e.g., interest, selection preference independent of price) can top 80 percent. While green chemistry and products are not yet dominant market forces, there is little doubt that the market for green products is significant.

A major purpose of Minnesota's green chemistry program should therefore be to support the growth and market position of green chemistry and design products, and the Minnesota companies producing them, for economic development reasons as well as to protect Minnesota's environment, public health and safety. In general, this support should include state resources to provide incentives (state purchasing preferences, tax incentives, grants and loans), as well as direct technical assistance.

Another reason for supporting green chemistry in Minnesota is to proactively address chemicals targeted by Minnesota, other states, EPA and other countries that may affect Minnesota companies. The state could then fill gaps in private research and development with state-funded research in basic green chemistry, product design and application. Minnesota's bio-based materials strategy should be coordinated and integrated with other green chemistry development which uses safer non-bio-based feedstocks as well.

Green chemistry recommendations

In the executive summary, MPCA staff presented a recommended course of action to promote green chemistry and product design for the short term. These recommendations are shown below.

1. Given green chemistry's promise to diversify business, grow market niche and reduce risk and cost, the Legislature should consider establishing formal green chemistry policies to help direct the efforts of state agencies, technical assistance programs and private sector businesses.
2. The MPCA should continue to track and report on green chemistry's development using its existing biennial report to the Legislature on pollution prevention activities. Policy makers should consider adding additional program components, incentives, resources, and revenue sources to the effort as needed.
3. MPCA should establish a policy to promote green chemistry and product design as part of its pollution prevention programs to enhance Minnesota businesses' competitiveness in all markets. These promotional efforts should include both the broad clientele of the pollution prevention program as well as users of chemicals targeted by Minnesota, other states, EPA and other countries.
4. Over the next biennium, the MPCA should direct a minimum of one FTE of existing staff resources to explore and promote green chemistry and design across sectors, supply chains and state government using the tools below:
    - partnerships
    - assistance
    - technology transfer and diffusion
    - data gathering to support assistance, outreach and measurement of progress
    - grants and loans to support education and implementation
    - state purchasing preferences
    - tax-based incentives and services

    Recommendation 4 is discussed further as Option 1 below.

Options for further consideration

Following is a wider presentation of the options identified to date for policymakers to consider in future development of state green chemistry and product design initiatives. The options are presented as packages but of course could be reassembled in many different ways.

Option 1 – Exploratory effort (2 to 4 years)

Current MPCA/MnTAP capacity to coordinate and advance green chemistry efforts on behalf of state government is limited. Following are specific activities which can be carried out in the short term with the resources of the existing pollution prevention program without additional funding.

- Consider establishing general or goal-oriented policy statements in law about the desired role of green chemistry in Minnesota's economy and environment
- Encourage a collaborative private sector program to promote, track and report on green chemistry adoption and implementation
- Promote any existing tax credits, subtractions or amortization incentives for research and development where they can be used for green chemistry purposes
- Incrementally create preferences in state purchasing contracts for products using greener chemistry
- Dependent on available staff and partner time, raise funds through sources outside state government or its authority
- Add general promotion of green chemistry into assistance, awards, grants, Web pages and other existing programs. Additional resources would be needed to add new expertise or capacity for facilitation or analysis
- Report to Legislature and stakeholders through the established Biennial Pollution Prevention Evaluation Report

Option 2 – Sustained but moderate effort

- Develop and promote policy statements on green chemistry
- Apply an annual volume-based fee to an existing chemical reporting mechanism (with possible adjustments such as adding chemicals targeted by Minnesota, other states, EPA and other countries, but avoiding additional administrative costs) to raise up to $500,000 in annual revenue for
    - (50 percent) Three to four grants per year to companies to develop or apply green chemistry technology and to researchers to develop basic and widely-applicable green chemistry materials
    - (50 percent) MPCA and MnTAP - 1 position each
        - As in Option 1, develop networks and expertise and leverage all available incentives and opportunities to incorporate green chemistry and design product preferences into state contracts
        - Target technical assistance (through MnTAP) at chemicals targeted by Minnesota, other states, EPA and other countries, or other chemicals which companies show an interest in eliminating
        - Gather information on company response to messages and assistance
        - Work with partners to develop useful and adaptable tools for comparing life-cycle impacts of chemicals/products proposed as alternatives to chemicals targeted by Minnesota, other states, EPA and other countries
        - Facilitate leadership of green chemistry by the private sector – create an Advisory Group or leverage ongoing work groups to help implement projects, interpret results and form long-term recommendations
        - Investigate the feasibility of additional tax credits, subtractions or amortization incentives which may be specifically dedicated to green chemistry versus research and development in general
- Collect and analyze data to determine whether progress is being made in reducing Priority or High Concern chemical use in products
- Report to Legislature and stakeholders through the established Biennial Pollution Prevention Evaluation Report

Option 3 – Sustained and intensive state government effort

- Make ambitious policy statements which encourage green chemistry implementation across the Minnesota economy

- Provide MPCA with authority and resources to administer new reporting mechanisms which reveal the use and scope of chemicals targeted by Minnesota, other states, EPA and other countries
- Apply volume-based fee structures (e.g., highest for Priority Chemicals and lower for chemicals targeted by Minnesota, other states, EPA and other countries) which act to raise their cost and discourage their use
- Use revenue from graduated fees to administer reporting and fee program and provide research grants to develop and prove safer alternatives to the chemicals being discouraged
- Continue assistance, reporting and monitoring as initial Priority Chemicals are phased out if new Priority Chemicals are listed
- Consider harmonizing Minnesota Priority Chemicals with those listed as highest priority by other states, EPA or other countries so that Minnesota products are widely accepted
- Make strong commitments to new Minnesota products or companies that state government will purchase their green chemistry products when developed
- Provide base funding for state government green chemistry program and investments which is sourced for stability over time
    - MPCA and MnTAP would provide sustained service in the areas outlined in Option 2
- Report to Legislature and stakeholders through the established Biennial Pollution Prevention Evaluation Report

Other consideration in designing a green chemistry program

Gathering necessary information

One of the key elements needed to advance green chemistry in Minnesota is knowledge of how chemicals are used in Minnesota. As the 20-year pollution prevention experience shows, information about who is using, generating or releasing chemicals, where, and in what amounts allows targeting of outreach and support to priority businesses with specific opportunities instead of attempting these activities “in the dark”. Gathering and analyzing information on chemicals in commerce is essential to the state’s assistance effort. Experience shows that this information may reveal aspects of a company’s operations, which had been previously unknown or unanalyzed. As is often said, “what gets measured gets managed.” A few options that MPCA and partners could use to obtain new information on use of chemicals in commerce are shown below.

1. Use existing reporting mechanisms (no new authority needed)
    a. Toxics Release Inventory Form R reporters –potential for greater understanding of the life-cycle impacts of all waste management actions driven by use of listed chemicals, and how that might lead companies to reduce or eliminate their use
    b. Toxics Release Inventory Form A reporters – not currently analyzed, but might prove useful to reach out to this group for further information through surveys
    c. U.S. TSCA Inventory Update Reporting (as amended in 2011) – analyze this data and the companies reporting it to identify opportunities for improvement and more companies willing to undertake voluntary improvement
2. Use an initial voluntary Information Request from MPCA – this tool has provided useful information in the past, particularly where supported by one or more business associations as a means of identifying assistance needs
3. Adjust existing reporting mechanisms (new authority needed through rule or statute)
    a. Add chemicals targeted by Minnesota, other states, EPA and other countries to the list of chemicals reported to the Toxics Release Inventory. This will generate partial life-cycle management

information on a wider number of chemicals and identify many more companies with potential for green chemistry improvement and provision of service. Lower thresholds triggering reporting could be considered for some chemicals.

4. Create new reporting mechanisms (new authority needed)

   a. Add reporting on the use in manufacturing of chemicals targeted by Minnesota, other states, EPA and other countries. Requiring reporting of all use of multi-jurisdictional priority chemicals by Minnesota manufacturers is a reasonable means for identifying risks, presence in products and production, and the universe of Minnesota companies which could make green chemistry and design changes to products. It would also give Minnesota companies the opportunity to look further up their supply chains for green chemistry opportunities. These companies would be high priority for outreach and provision of services. Should they take advantage of the opportunity, the burden of reporting and fees would be offset by technical or financial assistance provided to reduce their priority chemical use and increase their products' competitiveness in multiple markets.

Funding options for green chemistry and product design

The state's Toxic Pollution Prevention Act provided the authority to fund a state pollution prevention program through fees assessed to generators of toxic chemical releases reported to the Toxics Release Inventory (TRI). In 2008 these fees raised $1.25 million, two-thirds of which funds MnTAP's pollution prevention and cost reduction assistance to businesses with the remainder going to grants, loans and program coordination.

Among other initiatives, the federal Pollution Prevention Act authorized EPA to provide annual grants in support of state pollution prevention programs, and those grants have provided a small but steady contribution to the annual state pollution prevention budget. Recent green chemistry work has been funded mostly by these small federal grants, which MPCA has used since 2009 to explore expanded green chemistry services and partnerships. If more state support is desired, new sources of revenue will be necessary. Options for funding green chemistry and product design services are presented in Table 6.

Table 6: Potential Funding Options for Green Chemistry Assistance and Incentives

Option	Who pays?	Models elsewhere	Comments (benefits, challenges, costs, effectiveness)
Broad-based environmental fee	Not product or chemical based; structured to apply to a broad range of companies and/or individuals	Minnesota solid waste fund	• Broad-based fees are predicated on the platform that everyone who is covered contributes to the problem at hand (e.g., products containing Priority Chemicals wind up in landfills and eventually the environment) • Collected and distributed via existing administrative systems so cost for fee collection is low and rate of fee recovery is high • Cost is low and distributed; therefore, broad-based fees typically do not create incentives or disincentives
Surcharge on existing fee	A related population already reporting and/or paying a fee	None identified elsewhere; could be applied to current MN P2 fee payers	• Would not change existing applicability, chemicals, or base rates • Could be sunsetted or require re-authorization as long as need or efficacy continued (e.g., biennial intervals) • Would not incur extra cost to administer • P2 = Pollution Prevention
Fee on Minnesota reporters to the TSCA Inventory Update Report (IUR)	Minnesota reporters to the TSCA IUR	Unknown	• Similar to Minnesota pollution prevention fees, would leverage a national reporting requirement • If EPA's proposed IUR revisions go final, could include volume-based, per-chemical, or per-product presence fees • Based on 2006 IUR data, few Priority or High-Concern Chemicals would be captured unless use is being under- or inaccurately reported
Integrated use/release fees	Minnesota TRI releasers plus new population of High-Concern and/or Priority chemical users	Massachusetts Toxics Use Reduction Act	• Essentially adds use, byproduct and shipped-in-product volume reporting to TRI • Could be altered to include Priority or subsets of High-Concern Chemicals

Financial incentives, assistance and services

Listed below are a variety of existing incentives which can be applied to reduce the costs of green chemistry projects, products, production needs, or new facilities. Most of these are already being promoted by the Department of Employment and Economic Development (DEED) Green Enterprise Assistance program, a cross-functional team of state agencies (http://www.positivelyminnesota.com/Business/Green_Business_Assistance/index.aspx). While this program focuses on clean technology (including green chemistry), there are few incentives that focus solely on green chemistry, green products or clean technology. If incentives or other financial resources were available, MPCA and/or MnTAP might be able to match these incentives with green chemistry projects, providing an additional mechanism for supporting green chemistry projects.

Existing government programs that may benefit new chemical and product alternatives:

- Research and development tax credit, amended effective tax year 2010, provides a state tax credit equal to 10 percent of the first $2,000,000 of the excess (if any) of the qualified research expenses for the taxable year, over the base amount; and 2.5 percent on all of such excess expenses over $2,000,000. If the amount of qualified tax credits exceeds a company's Minnesota tax liability, the balance will be paid as a tax refund. Individual partners of partnerships and shareholders of S corporations are now allowed to claim the credit against their individual income tax.
- In general, a number of DEED assistance or incentive programs are directed to give consideration to projects that advance or promote the green economy as defined in section 116J.437 including green chemistry. The definition of green economy can be found at https://www.revisor.mn.gov/statutes/?id=116J.437

Existing private programs may benefit new chemical and product alternatives:

- Minnesota Cup is an annual business plan competition which provides $20,000 in startup seed capital for winning business plans in each of six categories (including clean technology) and an additional $20,000 for the winner of the overall competition. More information is available at: (http://www.breakthroughideas.org/)
- Clean Tech Open (North Central) is a regional business plan competition focused on clean technology. Regional finalists receive $30,000 in cash, investment or support services; regional winners receive an additional $20,000 equivalent and advance to the national competition; national winner receives an additional $250,000 equivalent. More information on Clean Tech Open is available at: (http://www.cleantechopen.com/app.cgi/content/competition/business/index), North Central (http://www.cleantechopen.com/app.cgi/content/sponsors/north_central)
- Minnesota High Technology Association Tekne Awards
  Recognition of businesses that manufacture environmentally-sound products or solutions that reduce costs, inputs, energy consumption, waste or pollution. More information is available at http://www.tekneawards.org/rules (Cleantech category)

Government programs for new facilities or equipment:

- State of Minnesota angel tax credit
  - 25 percent individual income tax credit for qualified investors, any location
  - Maximum credit of $125,000/year per individual; $250,000 for married/filing jointly
  - Total funding of $12 million/year 2011-2014 (sunsets in 2014)

  More information is available at
  http://www.positivelyminnesota.com/Business/Financing_a_Business/DEED_Business_Finance_Programs/Angel_Tax_Credit.aspx
- State sales tax exemption for industrial capital equipment and replacement parts integral to production of items ultimately sold at retail (refund) – materials used or consumed to produce products for sale are also exempt. More information is available at
  http://taxes.state.mn.us/sales/Documents/publications_fact_sheets_by_number_content_BAT_1100104.pdf)
- State Environmental Assistance loan program for small and medium sized businesses (limited revolving loan fund) – successful applicants can receive 50 percent of project financing up to $100,000 at 0 percent interest. More information is available at:
  http://www.pca.state.mn.us/index.php/topics/preventing-waste-and-pollution/assistance-and-resources/financial-assistance-for-pollution-prevention.html
- USDA has loan guarantee programs which may support the construction of new production facilities in qualifying locations.

Private programs for new facilities or equipment:

- RAIN Source Capital develops networks of angel investors. Existing Minnesota funds exist in Alexandria, Grand Rapids, Mankato, Minneapolis, Montevideo, Northfield, St. Cloud, Willmar, and Worthington. For more information, see http://www.rainsourcecapital.com/

Government programs for new locations/expansions

- State and local location-specific grants, loans and tax incentives http://www.positivelyminnesota.com/Business/Get_Help_from_Our_Experts/Small_Business_Development_Centers/index.aspx
- State and local financing options – local government agencies, foundations, and nonprofits that offer gap loan financing

Federal income/Minnesota corporate deductions that can support any of the above:

- accelerated depreciation
- expensing depreciable business property
- five-year amortization of business organizational and start-up costs
- expensing of research and development costs

Following are additional incentives which could be developed in the future.

State incentives for chemical phase-outs:

- Minnesota volume and/or chemical-based fees structured to influence decisions on chemicals targeted by Minnesota, other states, EPA and other countries.
- Supplemental Environmental Projects in environmental enforcement situations – where use of green chemistry substitutions will solve a situation of noncompliance.

Government incentives for companies:

- Use of clean technology and/or sustainability screens by the State Investment Board in investing various short- and long-term state funds.
- State tax incentives or low interest loan programs specifically targeted toward growing green chemistry operations in Minnesota.

Next steps

Implementing the recommendations described in this report represents new work to state agencies, particularly in chemicals policy and regulating chemicals in children's products. State agencies lack experience in many of these areas. As a next step, the Legislature should charge state agencies with developing the details of implementation. Agencies that might have some involvement in these efforts include the Minnesota Department of Commerce, Minnesota Department of Employment and Economic Development (DEED), MDH, MPCA and the Minnesota Department of Public Safety.

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Appendix A: Detail on International Efforts in Chemical Evaluation and Control

International collaborations

Several counties have been working together to identify hazards and risks associated with chemicals in commerce since the early 1990s. An international organization, the Organization for Economic Co-operation and Development (OECD), has focused on chemicals produced in large volumes, called High Production Volume (HPV) chemicals. HPV chemicals are defined by OECD as those produced in quantities greater than 1,000 metric tons per year. Through OECD, several countries are collaborating to research and record the hazards of chemicals.

Another example of international collaboration is a memorandum of understanding (MOU) of June 2010, between European Chemicals Agency (ECHA) and the Canadian Federal Departments of Environment and Health. The purpose of the MOU is to foster a better scientific dialog among the agencies seeking to gain better knowledge of "emerging risks from chemicals and guidance development" (European Chemicals Agency [ECHA], 2010a). The two governments will also work toward creating another agreement to allow sharing of confidential business information between governments. ECHA will soon be working with the United States and Australian governments to write an agreement similar to the MOU with Canada (ECHA, 2010a).

Australia

From January 1, 1977 to February 28, 1990, Australia collected information about the chemicals used within the country. There are currently about 38,000 chemicals in the Australian Inventory of Chemical Substances (AICS). New chemicals are added after they have been assessed (Australian Government, 2009a).

In the 1990s, the Australian government established the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) under the Industrial Chemicals Notification and Assessment Act of 1989. NICNAS has the charge of maintaining a national notification and assessment system to protect public health and the environment from harmful effects of chemicals, and to assess chemicals for concerns about safety. NICNAS uses the AICS to distinguish between "new" and "existing" chemicals. With a few exceptions, most chemicals not on the AICS are called "new." Companies planning to manufacture or import a new industrial chemical must apply for a certificate or permit from NICNAS. The agency assesses the chemical for safety from an occupational, environmental and public health perspective and publishes a "New Chemical Full Public Report" providing information about the chemical's potential risk to workers, the general public, and the environment. A certificate or permit with safety provisions is then issued for the chemical (Australian Government, 2008).

From the existing chemical lists, the Australian government named certain chemicals as "Priority Existing Chemicals" because of health and/or environmental concerns. The government creates assessments and makes recommendations about how to reduce the risk associated with these chemicals.

In 2004, the Australian government implemented a mandatory NICNAS registration that requires manufacturers or importers of chemicals to register each year and pay a fee related to value of chemicals imported or manufactured. The business name is registered, rather than the chemicals manufactured or

imported (Australia Government, 2009c). In addition, beginning in 2005, chemical manufacturers or importers are required to report annually to NICNAS chemicals that were produced and imported under:

- a commercial evaluation permit
- a low volume chemical permit
- a controlled use permit
- a self assessed assessment certificate
- an exemption

NICNAS names the following exemption categories: 1) a ≤ 100 kg cosmetic exemption; 2) a ≤ 100 kg non-cosmetic exemption; 3) a< 1 percent Cosmetic exemption; 4) ≤ 100 kg research and development exemption; 5) and/or a transhipment exemption (Australia Government, 2009b).

Compliance with registration and reporting is enforced. For more information on the Australia chemical management efforts, see http://www.nicnas.gov.au/.

Canada

During 1984-1986, the Canadian government took inventory of all chemicals in commerce in Canada. A total of about 23,000 chemicals were in this inventory, the Domestic Substances List (DSL) (Environment Canada, 2010). In 1999, the Canadian Environmental Protection Act (CEPA) required the Ministers of Environment and Health to categorize the substances on the list with respect to characteristics of persistence, bioaccumulation, and inherent toxicity (PBiT) to humans or non-human organisms and exposure potential for individuals in Canada (Environment Canada, 2006a).

The categorization process resulted in about 4,000 chemicals considered to have high exposure potential (Environment Canada, 2006b). These chemicals were further sorted into categories of high, medium and low priorities (Government of Canada, 2009).

There were about 500 chemicals in the high priority category (Government of Canada, 2007). To further assess or regulate these 500 high Priority Chemicals, three approaches were used: 1) chemicals believed to be in commerce were put into the "Challenge" program for more assessment (~200 chemicals); 2) Significant New Activity (SNAc) restrictions were put on chemicals not believed to be in commerce (~145 chemicals); and 3) chemicals that were petroleum-based were subject to a specific assessment process (~160 chemicals) (Health Canada, 2010b). These strategies are described further below.

The challenge

Canada is gathering information on the properties and uses of about 200 chemicals under the "Challenge" program. Some of the chemicals have been found no longer to be in commerce in Canada and pose a low risk to humans or the environment. For these, Canada does not plan to take further action. Other chemicals are still considered a potential hazard. For some of these, Canada is planning to apply Significant New Activities (SNAc) provisions (described below) to ensure that new uses have been assessed. Other chemicals have been found to pose a human health and/or environmental risk, as suspected. For these chemicals, Canada is planning to implement new regulations to reduce exposure to the chemical by limiting or prohibiting use. If the chemical has been found to be toxic, persistent, bioaccumulative and is anthropogenic, it could be named to Schedule 1, also called the List of Toxic Substances, which "requires specific actions for regulating the chemicals within a short time period" (Environment Canada, 2009). An example of a control for Schedule 1 under Section 65 (3) of CEPA is Virtual Elimination, whereby a restriction or prohibition is placed on the chemical that will result in its reduction in the environment to non-detectable levels. In addition, the government is creating lists of chemicals that are restricted or prohibited in specific products, such as the Cosmetic Ingredient Hot List (Health Canada, 2010a).

Significant New Activities

This provision of CEPA 1999 applies to chemicals that are not currently in commerce in Canada. If an industry would like to use the chemical in the future, information about the chemical must be submitted to Health Canada and Environment Canada and approved prior to any new use. The SNAc provisions were applied to 145 chemicals of the high Priority Chemicals that were classified as Persistent, Bioaccumulative, and inherently Toxic (PBiT) in June 2008 (Government of Canada, 2010a). More information is available at http://www.chemicalsubstanceschimiques.gc.ca/plan/approach-approche/snac-nac-eng.php.

Petroleum sector stream approach

About 160 of the 500 high Priority Chemicals resulting from the categorization process were complex mixtures from the petroleum sector. Rather than add these chemicals to the Challenge program, the Canadian government addressed these chemicals through a sectoral approach, by collecting information directly from the industry. Depending on results of the assessments, the chemical could be considered for SNAc provisions, or be managed through other means. The government published results from the assessment of the first 10 substances in May 2010 (Government of Canada, 2010b).

More information about Canada's approach to regulating chemicals can be found at http://www.chemicalsubstanceschimiques.gc.ca/about-apropos/canada-eng.php

Denmark

Communication with enterprises

Problems with regulation compliance have prompted the Danish government to try to establish better communication with enterprises, particularly manufacturers and importers. This occurs through four annual meetings, periodic newsletters, and a helpdesk that provides information on regulations (Danish EPA, 2005).

Further measures to control chemicals include initiatives that restrict or ban chemicals in products, especially products for children. For example, a tax has been placed on PVC and phthalates, with plans to increment the tax based on the toxicity of the phthalate used. Another example is a ban on certain types of paint for ships (Danish EPA, 2009a). The Danish government is supportive of the European REACH legislation and will use it to "push enterprises" to substitute problematic substances with less problematic ones (Danish EPA, 2009b).

Other efforts

The Danish EPA has been actively investigating and promoting the use of the (Quantitative) Structural Activity Relationships ([Q] SARs) in effort to identify substances that may be toxic. This information has been used to create an advisory list of over 30,000 substances. In addition, the Danish EPA created a List of Undesired Substances (LOUS) in 1998. This list has been updated most recently in 2004 and contains a wide variety of organic and inorganic substances (Danish EPA, 2009a).

Through these measures, the Danish EPA hopes to remove products from the market that contain substances that are persistent, bioaccumulative and toxic (PBT) or are carcinogenic, mutagenic, or toxic to reproduction (CMR) by 2020 (Danish EPA, 2009a).

More information about the Danish EPA and chemical initiatives can be found at http://www.mst.dk/English/Chemicals/Danish_initiatives/

Europe

In 2007, the European Union (EU) enacted Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) legislation. This legislation was designed to "streamline and improve" former legislation on chemicals. This legislation applies to all chemicals, including those used in industrial processes and those in household goods (ECHA, 2007a).

The European Chemicals Agency (ECHA), formed under REACH, lists the following objectives:

- improve the protection of human health and the environment from the risks that can be posed by chemicals
- enhance the competitiveness of the EU chemicals industry, a key sector for the economy of the EU
- promote alternative methods for the assessment of hazards of substances
- ensure the free circulation of substances on the internal market of the European Union (ECHA, 2007a)

REACH places most of the burden of proving the safety of a chemical on the manufacturer or importer, which must show that risks related to the chemical have been "identified and managed." The legislation is built around following courses of action:

Pre-registration — During June 1 to December 1 of 2008, manufacturers or importers of chemicals in the EU could provide information about chemicals that were already on the market in the EU. Doing this would allow the benefit of completing full registration at a later time.

Registration — All manufacturers or importers of a chemical in a quantity at or above 1 metric ton per year must provide information about the chemical, including health and environmental hazards, and indicate how the chemical can be used safely. A document called a registration dossier must be submitted (ECHA, 2007a). Data sharing among registrants is facilitated through REACH to reduce costs and unnecessary testing (ECHA, 2007c). Under the REACH legislation, a substance manufactured or imported into the EU at quantities of 1000 metric tons or more should be registered by November 30, 2010. If not registered, use will not be allowed. Subsequent registration deadlines depend on the quantity of chemical produced or imported. By 2018, all chemicals used in the EU must be registered (ECHA, 2007d).

Evaluation — ECHA will evaluate the registration dossier to determine if the testing requirements meet standards. If testing is needed, it is coordinated through ECHA with other Member States (ECHA, 2007a).

Authorization — Substances that have been named "Substances of Very High Concern" (SVHC) must have special authorization to be used in the EU. The manufacturer or importer must show that risks associated with the chemical are controlled or that the risk associated with use of the chemical is outweighed by the benefit of using the chemical. The manufacturer or importer must also investigate the possibility of using a safer alternative and make plans for the substitution, if appropriate. As of July 20, 2010, there were 38 substances or categories of substances on the candidate SVHC list (ECHA, 2010b).

Restriction — If the risks of a chemical to health of the environment are not acceptable, the EU can restrict the use of the chemical (ECHA, 2007a).

Another responsibility placed on manufacturers and importers is to provide information about the safe use of the chemical to downstream users, especially by providing information on classification and labeling and Safety Data Sheets. Communication upstream to manufacturers is also required under REACH to ensure the manufacturer or importer knows the use of the chemical and can develop appropriate safety materials (ECHA, 2007b). ECHA is preparing a database that will provide information about the hazards accessible from the Internet.

More information about REACH is available at http://guidance.echa.europa.eu/about_reach_en.htm

Below is an update on the activities of the European Commission reported in the Toxic Free Kids Act January 2010 Interim.

Endocrine disruptor program

There have been no changes posted to this program's webpage since the January 2010 report. However, there was discussion about endocrine disruptors at the December 2009 meeting of the Council of the European Union, where Denmark requested the topic of endocrine disruptors be on the agenda. During this meeting, the Council concluded that further work was needed on the combined effects of chemicals, particularly endocrine disruptors. A news release noted that the EC would discuss issues of combined effect of chemicals, and how these effects are address across the EU, in a report on the implementation of the EU Community Strategy on endocrine disruptors (Europa Press Release Rapid, 2010). The Community Strategy has objectives of identifying the causes and consequences of endocrine disruption and determining appropriate policy action. The Strategy recommends research, international cooperation, communication, and policy to meet these objectives (European Commission, 1999).

Persistent, Bioaccumulative, and Toxic chemicals

The list of Persistent, Bioaccumulative, and Toxic (PBT) chemicals remains available on the website. See http://ecb.jrc.ec.europa.eu/esis/index.php?PGM=pbt

Directive on dangerous substances – 67/548/EEC

This directive was superseded by the EC Regulation 1272/2008 in January 2009. The transition to the Globally Harmonized System (GHS) for classification, labeling and packaging substance is now occurring and must be implemented for certain substances by December 1, 2010. The GHS must be fully implemented for all chemicals by June 1, 2015.

More information is available at http://ecb.jrc.ec.europa.eu/esis/index.php?PGM=cla

Directive concerning placing of biocidal products on the market

Two additional decisions concerning "non-inclusion", which prohibit the sale of biocides in Europe, were published in February 2010. One decision concerned diazinon and the second involved a list of about 380 other chemicals. These products will be prohibited for sale after the date specified by the directive.

For more information, see http://ec.europa.eu/environment/biocides/non_inclusions.htm or http://ec.europa.eu/environment/biocides/pdf/list_dates_product_phasing_out.pdf

Japan

In 1973, after a 1968 incident involving mass human poisoning from polychlorinated biphenyls, the Japan government passed the Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture or "Chemical Substances Control Law" (CSCL) to control manufacture, import and use of persistent, bioaccumulative, and toxic (PBT) chemicals. In 1972, before implementation of the CSCL, the Japanese Ministry of International Trade and Industry (MITI) created an inventory of all chemical substances in use by manufacturers or importers in Japan, totaling about 20,600 chemicals. Chemicals in this initial inventory were called "existing" chemicals. Chemicals introduced later and not on the 1972 inventory were called "new" chemicals. Initially, the government planned to assess existing chemicals and manufacturers were required provide information on new chemicals that were persistent and bioaccumulative (Japan Ministry of Economy, Trade and Industry [Japan METI], 2010).

In 1986, a modification to the law expanded its scope to include chemicals that were persistent and toxic, but not necessarily bioaccumulative. A system for labeling was also required, as was further examination of chemicals without sufficient information (Japan Ministry of the Environment [Japan MOE], 2010). In 2003, another amendment required assessing effects of chemicals on the environment (ecotoxicity) and restricted chemicals based on those effects. Manufacturers and importers were also required to submit information on new and existing chemicals. (Japan METI, Japan Ministry of Health, Labour and Welfare [Japan MHLW], Japan MOE, 2003).

The Japan High Production Volume (HPV) Challenge program began in 2005, modeled after the US HPV Challenge Program. This program was designed to avoid duplication of evaluations already completed through the EPA and OECD HPV programs. A total of 645 chemicals were identified for evaluation, several of which were already being evaluated by the EPA or OECD programs. As of March 2010, 96 of the 126 remaining chemicals had been sponsored by Japanese companies (Japan MOE, 2010).

The CSCL was again amended in 2009 in response to changes in international approaches to assessing and managing chemicals, particularly those arising from the World Summit on Sustainable development in 2002, the Stockholm Persistent Organic Pollutant (POP) essential use clause, and the REACH program (United Nations Department of Economic and Social Affairs, 2009). This new revision is to be enacted in two phases. Phase I, enacted on April 1, 2010, expands regulation to most chemicals, rather than only persistent chemicals. The regulation also expands responsibilities for chemical safety from chemical manufacturers and importers to most handlers of chemicals, which must now do more chemical labeling and adhere to specified handling standards. In addition, certain uses of chemicals will continue to be allowed by the government, per the Stockholm Convention POP essential use clause, under strict control.

In Phase II, to be enacted on April 1, 2011, manufacturers or importers of a chemical substance, including an existing chemical, in excess of one metric ton will be required to notify the Japanese government of the chemical identity and quantity produced or imported each fiscal year. The Japanese government will determine which substances appear to pose the highest risk, and designate them as Priority Assessment Chemical Substances (PACS). Manufacturers and handlers of PACS may be required to provide more information to the government about the chemical, including hazard and uses. If a risk assessment indicates the chemical raises concerns about the effects on human health and the environment, the government might subject the chemical to a provision of Specified Chemical Substances, creating stricter control of the chemical (Japan METI, Japan MHLW; Japan ME , 2009; Japan METI, 2010).

More regulations are expected in 2010 in association with the newly implemented amendments.

More information is available from http://www.safe.nite.go.jp/english/kasin.html and http://www.env.go.jp/en/chemi/index.html.

Norway

While Norway is not currently part of the European Union, it is part of the European Economic Area, and is participating in REACH. However, Norway has several additional environmental regulations increasing safety of chemical products. For example, the Product Control Act, enacted in January 2000, mandates use of the "substitution principle," requiring companies to evaluate whether a hazardous chemical can be replaced. If there is an appropriate less hazardous chemical, the more hazardous chemical must be replaced. This applies to all products used by public and private companies, but not by private consumers (Norway, Ministry of the Environment [Norway ME], 2008c).

Norway has also created lists of hazardous substances. The three lists currently maintained by Norway include:

The list of Priority Substances — First published in 1997, the chemicals on this list are slated for reduction or elimination in target years, including 2000, 2005, and 2010. Many of the criteria for the chemicals on this list were based on work in the European Union and OSPAR (Norway ME, 2008a). As of June 1, 2010, Norway reports substantial reduction in emissions of substances on the Priority List since 1985 (Norway ME, 2010).

The Observation list — Most recently updated in 2002, this list names several chemicals that are widely used in consumer products and are hazardous to health.

The list of Dangerous Substances — This list contains about 3,500 substances that are regarded as dangerous under the European Commission Annex 1 to Directive 67/548/EEC (Norway ME, 2008b). (Footnote - Annex 1 to Directive 67/548/EEC was replaced by Table 3.2 of Regulation (EC) No. 1272/2008 on January 20, 2009. Table 3.2 uses the new Globally Harmonized System (GHS) as a way to depict hazards of chemicals.)

More information about the Norwegian work on control of chemicals is available at http://www.miljostatus.no/en/Topics/Hazardous-chemicals/

Oslo-Paris Commission (OSPAR)

In 1972, the Oslo-Paris Commission (OSPAR) was created to control dumping in the North Sea. The work of OSPAR has expanded to include identification of chemicals that could threaten the North Sea, especially persistent, bioaccumulative, or toxic chemicals. OSPAR has published a list of chemicals of possible concern, in addition to a list of chemicals requiring priority action. These lists were updated periodically, and the next updated was planned for 2009.

Instead of updating the lists, however, the OSPAR website now notes that with commencement of the Water Framework Direction and the REACH program in the European Union, the prioritization work of OSPAR has been put on hold, and OSPAR will collaborate with the European Commission on evaluation and control of chemicals (Oslo-Paris Commission, 2010).

Appendix B: Minnesota Environmental Initiative Minnesota Chemical Regulation Project Phase 1 Report

Appendix B includes the complete Minnesota Environmental Initiative Chemical Regulation Project Phase 1 Report. This report is available online at http://www.mn-ei.org/projects/ChemReg.html.

Appendix B

MINNESOTA > ENVIRONMENTAL < INITIATIVE

Minnesota Chemical Regulation Project

Phase I Final Report

Minnesota Chemical Regulation Project

September 2010

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Executive Summary

The Minnesota Chemical Regulation Project is a stakeholder process involving public- and private-sector leaders convened to recommend improvements to Minnesota's approach to chemical regulation, management and policy.

There is wide agreement about the inadequacy of the current federal system for regulating chemicals present in the environment and those to which humans are exposed, either through products[1] or via environmental pathways. EPA Administrator Lisa Jackson has released a set of principles for federal chemicals policy reform. Legislation to reform the federal Toxic Substances Control Act (TSCA) has been proposed in Congress. EPA has also announced a suite of actions to strengthen their existing programs. In the face of federal inadequacies, several states have tried to address perceived gaps in regulation and Minnesota's current system of regulating chemicals is also viewed as needing improvement.

The Minnesota Environmental Initiative (MEI) launched Phase I of the Minnesota Chemical Regulation Project in January 2010 to collaboratively assess the issues and opportunities facing Minnesota with respect to the state's approach to chemical regulation and the promotion of green chemistry.

During Phase I, MEI identified and convened a diverse Work Group of 18 stakeholders representing industry, government, academic, and nonprofit advocacy interests to develop a needs assessment that refined the issues and opportunities relevant to state chemicals policy. Over the course of four meetings, the stakeholder Work Group performed a review of mechanisms used by other states, the federal government and other countries to evaluate and regulate chemicals and developed agreement around a set of four core opportunities and six priority issues related to Minnesota's current approach to regulating and managing chemicals. An initial identification of specific policy gaps, needs, and barriers also took place in Phase I.

At the conclusion of Phase I, the Work Group recommended by consensus that the stakeholder dialogue proceed to a Phase II through which the group will develop recommendations regarding the state's system of regulating and managing chemicals. In Phase II the Work Group will build on the foundation laid in Phase I and utilize additional facilitated discussions to develop substantive recommendations to realize benefits associated with the following opportunities that were identified and refined in Phase I.

Minnesota's chemicals policy will enable the state to:

- Advance public health and environmental protection through the development of effective chemicals policy using a collaborative dialogue with diverse stakeholders;

[1] "Products" include raw materials, intermediates, finished chemical products, and articles from which chemicals may be released during any stage of the life cycle.

- Demonstrate Minnesota leadership, taking advantage of the state's considerable scientific, industrial and commercial expertise to advance a collaborative vision for state chemicals policy;
- Increase public availability of information and educate the public and decision-makers about chemical risk, benefits and management; and
- Position Minnesota to benefit economically from improved chemical management and green chemistry.

MEI is currently seeking funding to support the continuation of the project into Phase II. If adequate funding is secured, the charge to the Work Group for Phase II will be to:

- Identify and analyze the effectiveness of regulations and policies currently in place at the state and federal levels, and determine if they do (or could) adequately address the opportunities the group highlighted in Phase I
- Where needed, recommend improvements to Minnesota's system of regulating and managing chemicals
- Evaluate opportunities to integrate promotion of and incentives for product design that incorporates principles of green chemistry and life-cycle analysis into a recommended policy framework.

Phase II is anticipated to begin in fall 2010 with all activities concluding by July 2011. Outreach on the Work Group's recommendations will occur in late 2011.

Project Background

There is wide agreement about the inadequacy of the current federal system for regulating chemicals. Signed into law in 1976, there has been no substantive reform of the Toxic Substances Control Act (TSCA) in the subsequent three decades. Furthermore, approximately 60,000 chemicals that were in use in 1976 were "grandfathered in" under the law and presumed safe. Thousands of new chemicals and compounds have since been introduced, and relatively few have been subjected to active regulation. In January 2009, the General Accounting Office (GAO) released a report that was critical of EPA's processes for assessing and controlling toxic chemicals. In response, EPA Administrator Lisa Jackson has made managing chemical risks a top agency priority. In September 2009 EPA released a set of six Essential Principles for Reform of Chemicals Management Legislation:

1) Chemicals should be reviewed against safety standards that are based on sound science and reflect risk-based criteria protective of human health and the environment.

2) Manufacturers should provide EPA with the necessary information to conclude that new and existing chemicals are safe and do not endanger public health or the environment.

3) Risk management decisions should take into account sensitive subpopulations, cost, availability of substitutes and other relevant considerations.

4) Manufacturers and EPA should assess and act on priority chemicals, both existing and new, in a timely manner.

5) Green chemistry should be encouraged and provisions assuring transparency and public access to information should be strengthened.

6) EPA should be given a sustained source of funding for implementation.

Legislation to reform the federal Toxic Substances Control Act (TSCA) has been proposed in both bodies of Congress in 2010.[2] EPA has also announced a suite of recent actions to strengthen their existing programs.

In the face of federal inadequacies, several states have looked to address perceived gaps in regulation. State initiatives have taken the form of specific chemical bans, listings of chemicals of concern, ingredient disclosure laws and "green chemistry" initiatives that provide incentives for product reformulation with safer alternatives. Leadership in state chemicals policy has been recognized most notably in California, Michigan and Maine.

Minnesota's current system of regulating chemicals is also viewed as needing improvement. Recent chemicals policy efforts in Minnesota have been focused on particular chemicals or classes of people,

[2] S.3209 Safe Chemicals Act of 2010: http://thomas.loc.gov/cgi-bin/query/z?c111:S.3209:
H.R.5820 Toxic Chemicals Safety Act of 2010: http://thomas.loc.gov/cgi-bin/query/z?c111:H.R.5820:

rather than a comprehensive approach to assessing the risks posed in context.[3] In 2009, the Minnesota Legislature called on the Minnesota Department of Health and the Minnesota Pollution Control Agency to identify and prioritize the use of "chemicals of high concern" in children's products and to make recommendations to promote green chemistry[4] in Minnesota. Reports on these activities are due to be submitted to the Legislature in December 2010.

Also in 2009, the University of Minnesota's Humphrey Institute of Public Affairs hosted two successful workshops to discuss the current system of managing chemical risk in the state. Stakeholders representing a diversity of perspectives and sectors (including elected officials, state agencies, industry, academic, and environmental and public health advocates) explored approaches to developing an improved system for dealing with chemical risks, discussed the feasibility of a broad stakeholder process for the development of public policy or regulatory recommendations, and identified assumptions, considerations and action steps for development of a stakeholder process. Based on the results of the programs facilitated by the Humphrey Institute, and the recognition of the potential value of stakeholder input by the Legislature, interested parties representing diverse viewpoints asked the Minnesota Environmental Initiative (MEI) to facilitate a stakeholder process to bring academic, business, nonprofit, public policy and citizen stakeholders together with the goal of developing recommendations to state agencies, the Governor and the Legislature regarding improvements to Minnesota's approach to chemicals policy and ways to promote product design that employs the principles of green chemistry.

To accomplish this task, MEI launched Phase I of the Minnesota Chemical Regulation Project in January 2010. Phase I was supported with contributions from 3M, Minnesota Center for Environmental Advocacy, Minnesota Chamber of Commerce, Minnesota Department of Health, and Minnesota Pollution Control Agency.

A stakeholder Work Group (consisting of diverse representation from state agencies, representatives of industry, environmental and public health advocates and members of the scientific community) was convened to assess the issues and opportunities facing Minnesota with respect to the state's approach to chemical regulation and the promotion of green chemistry. Should the Work Group determine that continuation to Phase II was a viable approach, the Work Group would look to develop specific recommendations regarding the state's approach to regulating and managing chemicals in commerce during Phase II. Phase I of the project was focused first and foremost on the overarching system used in Minnesota to regulate chemicals, but did not overlook opportunities to integrate the promotion of greener chemistry practices into product design. The Minnesota

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[3] See Appendix E: A Practical Guide to Existing Minnesota State and Local Rules and Regulations Applying to Chemical Regulation and Green Chemistry

[4] Green chemistry is defined as the utilization of a set of twelve principles[1] that reduce or eliminate the use or generation of hazardous substances in the design, manufacture, and application of chemical products.[2]

[1] *Full description of Twelve Principles of Green Chemistry is available at: http://www.epa.gov/gcc/pubs/principles.html*

[2] *Anastas, Paul; Warner, John; Green Chemistry: Theory and Practice, Oxford University Press: New York, 1998*

Chemical Regulation Project was not designed to specifically address agricultural chemicals or pharmaceuticals, since these types of chemicals are excluded from the 2009 Minnesota legislation and are regulated by other federal statutes and agencies.

The Charge to the Work Group for Phase I[5] was to develop the elements of a Needs Assessment that would:

- Refine the issues and opportunities that are relevant for consideration in Minnesota;
- Assess mechanisms used by other states, the federal government and other countries to evaluate and regulate chemicals and identify approaches that may be applicable in Minnesota;
- Determine the viability of moving to Phase II and recommend whether or not the project should proceed to Phase II, contingent upon the availability of funding.

The Work Group met four times between May and July 2010 to successfully accomplish this task and unanimously recommended the continuation of a collaborative dialogue led and facilitated by the Minnesota Environmental Initiative (MEI) to develop consensus recommendations regarding Minnesota's system of regulating and managing chemicals present in the environment and those to which humans are exposed either through products[6] or via environmental pathways.

Project Methods

In early 2010 MEI identified and assembled a diverse Work Group of eighteen (18) stakeholders representing industry, government, academic, and nonprofit advocacy interests to complete the charge for Phase I. Ron Nargang, MEI's Director of Stakeholder Process, chaired the Work Group and facilitated each of the Work Group meetings. A list of stakeholder Work Group members and alternates[7] is included in this report as Appendix A. Over the course of four half-day meetings between May and July 2010, the stakeholder Work Group reviewed recent chemicals policy activity in Minnesota, as well as approaches to chemicals policy taken in other states, and activities at the national and international scales, to assess policy options and opportunities.

As co-convener of Phase I of the Minnesota Chemical Regulation Project, the Center for Science, Technology and Public Policy (CSTPP) in the Humphrey Institute of Public Affairs at the University of Minnesota provided research and technical support to MEI staff and the stakeholder Work Group as determined necessary by MEI. Prior to convening the first meeting of the stakeholder Work Group, MEI staff, with help from a Research Assistant from CSTPP designated to support the project, compiled several background documents and other suggested readings. These resources are available on the project webpage at: http://www.mn-

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[5] See Appendix C: Charge to the Work Group

[6] "Products" include raw materials, intermediates, finished chemical products, and articles from which chemicals may be released during any stage of the life cycle.

[7] See Appendix A: Work Group Roster

ei.org/projects/ChemReg.html#bkgrdinfo.

Prior to the first meeting of the Work Group, each Work Group member was asked to have read and become familiar with five essential resources that provided background on TSCA, Minnesota's Toxic Free Kids Act, and an assessment of state policy activity compiled by the Lowell Center for Sustainable Production at the University of Massachusetts - Lowell. To provide additional background and context John Linc Stine, who represented Minnesota Department of Health on the Work Group, gave an introduction to the issue of chemical regulation and management at the first meeting of the Work Group on May 10, 2010. Tom DiPasquale of 3M presented further information on TSCA and proposed TSCA reform at the second Work Group meeting on June 7, 2010. At the request of the Work Group, representatives from the Minnesota Pollution Control Agency presented a comprehensive summary of existing Minnesota rules and regulations related to chemical regulation and green chemistry at the third meeting on June 28, 2010. This practical guide was intended to further inform discussions of the Work Group and MPCA and MDH staff later incorporated relevant local policies in addition to state policies. The complete Practical Guide to Existing Minnesota State and Local Rules and Regulations Applying to Chemical Regulation and Green Chemistry is included in this report as Appendix E.

Based on one-on-one stakeholder interviews and an online survey of Work Group members, MEI staff compiled draft lists of identified issues and opportunities related to Minnesota's current approach to regulating and managing chemicals to spur discussion during Work Group meetings. Through a series of facilitated discussions, the Work Group refined and prioritized these issues and opportunities. An initial identification of specific state policy gaps, needs and barriers that warrant further consideration also took place in Phase I. Specific gaps, needs and barriers were not agreed upon by consensus of the Work Group, but have been raised by individual members as examples to support the agreed upon issues and opportunities.

During the final meeting of Phase I on July 19, 2010, the Work Group finalized and developed agreement around a set of four core opportunities and six priority issues related to Minnesota's current approach to regulating and managing chemicals. The Work Group also recommended unanimously that the stakeholder dialogue proceed to a Phase II, during which the group will develop recommendations regarding the state's system of regulating and managing chemicals. In Phase II the Work Group will build on the foundation laid in Phase I and utilize additional facilitated discussions to develop substantive recommendations to realize benefits associated with the opportunities that were identified and refined in Phase I.

An eight-member Planning Team[8] representing a cross-sector subset of the full Work Group met via conference call intermittently throughout Phase I to provide input and advice to MEI. The Planning Team was designed to be an advisory body with no decision-making authority, and all process decisions were made in consultation with the full Work Group during Work Group meetings.

[8] See Appendix B: Planning Team Roster

Opportunities Presented by Improved Chemicals Policy in Minnesota

Given the evolving landscape of chemicals policy at the federal and international levels, the pervasive objective of the Minnesota Chemical Regulation Project is to determine the appropriate role for state policy in managing chemicals in products and present in the environment. Through the course of Phase I, the Work Group has gained an initial understanding of the aspects of chemical regulation and management that are covered under existing federal legislation (TSCA) and how state policy could be used to complement federal policy. Uncertainty regarding what will ultimately be included in reformed TSCA legislation, and if and when TSCA reform will be passed in Congress, complicates the state's determinations and activities. Another variable that further complicates Minnesota's chemicals policy is independent policy actions recently undertaken or considered by other states. Nevertheless, the Work Group has asserted that these uncertainties should not delay continued dialogue at the state level. Furthermore, the Work Group has emphasized repeatedly that any policy actions taken at the state level must integrate with and complement the policy landscape at the federal and international levels.

In addition, the Work Group has stated that the broad economic impacts of recommended policy actions should be considered for all identified issues, and that constrained public and private resources will be a barrier that needs to be addressed in conjunction with all identified opportunities and issues.

The following four consensus opportunities were identified by the Work Group for the Minnesota Chemical Regulation Project. Bullet point items affiliated with each identified opportunity provide additional detail and have also been refined and agreed upon by consensus of the Work Group. It is the intention of the Work Group to utilize additional facilitated discussions in Phase II to build on the foundation of agreement around these considerable opportunities to develop substantive recommendations that will enable the state to realize benefits associated with these four opportunities.

1) Advance public health and environmental protection through the development of effective chemicals policy using a collaborative dialogue with diverse stakeholders
    - Base policy on sound science
    - Fill information gaps
    - Minimize exposure to and risk from chemicals
    - Provide decision-making tools and criteria
    - Optimize the ability to protect the environment and advance public health, consistent with unique state priorities and available resources
    - Increase efficiency and decreases toxicity of processes and products

2) Demonstrate Minnesota leadership to advance a collaborative vision for state chemicals policy
    - Set priorities and articulate a vision and principles to guide policy decisions
    - Inform federal conversation around TSCA reform

- Advocate jurisdictionally appropriate (national or international) solutions to common problems, and Minnesota solutions to unique problems
- Craft appropriate state policy that integrates with federal policy
- Utilize lessons learned from other jurisdictions to aid development and implementation of process reform
- Model collaborative and integrated leadership rather than a piecemeal, patchwork approach
- Lead in the advancement of the green economy by promoting green chemistry innovation

3) Increase public availability of information and educate the public and decision-makers about chemical risk, benefits and management
    - Educate legislature about policy options and their impacts so decision-makers are better informed
    - Ensure more effective risk communication by all stakeholders, especially by regulators to the public

4) Position Minnesota to benefit economically from improved chemical management and green chemistry[9]
    - Identify opportunities and incentives for businesses
    - Identify long-term economic benefit due to improved public health and health of the environment

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[9] Green chemistry is defined as the utilization of a set of twelve principles[1] that reduce or eliminate the use or generation of hazardous substances in the design, manufacture, and application of chemical products.[2]

[1] *Full description of Twelve Principles of Green Chemistry is available at: http://www.epa.gov/gcc/pubs/principles.html*

[2] *Anastas, Paul; Warner, John; Green Chemistry: Theory and Practice, Oxford University Press: New York, 1998*

Issues Related to Minnesota's Current Approach to Chemical Regulation, Management and Policy

The following six consensus issues were identified by the Work Group during Phase I. To provide additional context and detail, Appendix D contains a list of examples of needs and barriers that are associated with each issue statement. Of note, the list of example needs and barriers simply reflects a compilation of brainstormed ideas offered by individual members of the Work Group, and specific example needs and barriers have not been agreed upon by the full Work Group. It is the intention of the Work Group to further develop broad-based understanding and agreement around the needs and barriers associated with each of these significant issues during Phase II.

1) There is a lack of shared vision for improved chemical management in Minnesota, resulting in chemical-specific initiatives unrelated to a comprehensive approach.

2) The status quo of chemical regulation, management, and policy is not sustainable given outdated federal policy and the chaotic approach to chemicals management that is occurring at state and local levels.

3) There are significant data gaps in our knowledge of occurrence, exposure, risk, and impacts of chemicals on ecosystems and human health.

4) Decision making in the face of scientific uncertainty will continue to be a challenge in effective chemical regulation and management.

5) There is inconsistency in regulatory requirements, lack of clarity in "standard" definitions, and an inadequate process to evaluate the effectiveness of policy tools.

6) There is insufficient education and a gap in perception surrounding chemical exposures and risk, government's role and degree of protection, methods for communicating accurately to the public and elected representatives, and restrictions on access to certain information.

Policy Tools for Further Consideration

In addition to refining the issues and opportunities related to chemicals policy, the Work Group discussed various tools that could be employed to improve the state's approach to chemical regulation, management and policy. As a starting point for these discussions, the Work Group looked to an assessment of state chemicals policy compiled in July 2009 by the Lowell Center for Sustainable Production[10] that analyzed state policy activity over the past twenty years and identified thirteen (13) policy categories that can be used to group state actions. An overview of these policy categories, with definitions and examples for each category, is included as Appendix F of this report, and a full database of current state chemicals policy is accessible at http://www.chemicalspolicy.org/uslegislationsearch.php.

The thirteen policy categories identified by Lowell Center for Sustainable Production[11] are:

1. Pollution Prevention/Toxics Use Reduction
2. Single Chemical Restrictions
3. Multiple Chemicals Policies
4. Regulation of Product Categories
5. Biomonitoring/Environmental Health Tracking and Surveillance Systems
6. Data Collection
7. Right to Know
8. Prioritization
9. Alternatives Assessment
10. Green Chemistry/Design for the Environment
11. Product Stewardship
12. Environmentally Preferable Purchasing
13. Precautionary Principle

The Work Group focused its discussions of policy tools around these thirteen categories. Notably, the MPCA's compilation of the Practical Guide to Existing Minnesota State and Local Rules and

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[10] *State Leadership in Formulating and Reforming Chemicals Policy: Actions Taken and Lessons Learned*, Lowell Center for Sustainable Production, July 2009 (http://www.mn-ei.org/projects/images/ChemReg/BkgrdLowell/StateLeadinFormulatingReformingChemPolicy.pdf)

[11] See Appendix F: Summary of Policy Categories Identified by Lowell Center for Sustainable Production, *State Leadership in Formulating and Reforming Chemicals Policy,* July 2009

Regulations Applying to Chemical Regulation and Green Chemistry[12] revealed that legislation currently in place in Minnesota can be similarly categorized, and existing Minnesota rules and regulations apply to twelve of the thirteen policy categories.

Work Group members considered each of the thirteen policy categories to set the stage for discussions in Phase II. For the purposes of documenting this discussion, MEI staff has grouped the Work Group's considerations into two sections: 1) Considerations pertaining to policy categories intended to move chemical management further upstream via product design and pollution prevention strategies; and 2) Considerations pertaining to policy categories designed to address existing problems caused by chemical exposures and/or pertaining to ongoing governmental responsibilities.

These considerations have not been vetted nor agreed upon by the full Work Group and are intended only to reflect an initial brainstorming by individual Work Group members and to provoke further discussion during Phase II.

Considerations Pertaining to Policy Categories Intended to Move Chemical Management Further Upstream via Product Design and Pollution Prevention Strategies

The Toxic Pollution Prevention Act[13] has been in place in Minnesota since 1990, and significant reductions in hazardous and non-hazardous waste have occurred over the subsequent two decades. Related to further pollution prevention and toxics use reduction, the principle question raised by the Work Group is: how can we push the state to achieve greater success in toxic pollution prevention and sustain reduction in toxics use and pollution generation over time, given an overall upward trend in economic growth? Some potential ways to achieve greater success in pollution prevention could include: more inclusive pollution prevention programs that address chemicals beyond those included on EPA's Toxics Release Inventory (TRI), and that account for imported products/chemicals and engage the full supply chain in waste reduction/pollution prevention; better reporting, evaluation, and measurement to acquire better local data about the effectiveness of existing pollution prevention programs; prioritization and effective utilization of limited resources targeted to pollution prevention programs; and appropriate engagement of the research community.

Minnesota currently lacks a framework to effectively assess the safety of alternatives to traditional chemicals and compounds. Further discussion is needed to identify the appropriate role for state policy with regard to alternatives assessment. There is not yet agreement among stakeholders as to whether a new framework for alternatives assessment is needed or whether existing frameworks could be used to assess the safety of alternatives.

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[12] See Appendix E: A Practical Guide to Existing Minnesota State and Local Rules and Regulations Applying to Chemical Regulation and Green Chemistry

[13] 2009 Minnesota Statutes, Chapter 115D. Toxic Pollution Prevention (https://www.revisor.mn.gov/statutes/?id=115D&view=chapter)

Many stakeholders believe that Minnesota state policy should include more incentives for safer alternatives and increased promotion of green chemistry and Design for the Environment.[14] Further examination of incentive programs that have been effective in Minnesota and elsewhere, and evaluation of what factors have contributed to the success of these programs, will enable the development of additional incentive programs to promote the use of safer alternatives. Related to the safety of proposed alternatives, stakeholders recognize that an effective framework to systematically assess the safety of proposed alternatives is also needed, as referenced above.

With regard to product stewardship initiatives, stakeholders from multiple sectors and perspectives have asserted that Minnesota needs a comprehensive framework to implement targeted product stewardship initiatives. In response to a legislative directive set in the 2007-2008 session, the MPCA has compiled a set of recommendations regarding a comprehensive product stewardship framework,[15] which warrants further evaluation and consideration.

Another tool to encourage the use of products with minimal environmental impacts is environmentally preferable purchasing.[16] Minnesota Legislative and Executive Order requirements dictate environmentally responsible purchasing within state agencies and the Materials Management Division at the Department of Administration assists state agencies with purchasing environmentally preferable products that contain fewer toxic materials, minimize waste, contain recycled content, conserve energy and water, and/or contain plant-based materials. However, some stakeholders assert that Minnesota lacks a holistic approach to environmentally preferable purchasing and that the purchasing power of state government could be enhanced and best practices should be modeled for entities beyond government. Sustainability plans in place within federal agencies may contain environmentally preferable purchasing policies that could be translated to the state level and the Work Group could look to such policies for guidance in developing recommendations for Minnesota in Phase II.

The Work Group had robust discussion of the concept known as the precautionary principle during Phase I. Stakeholders on all sides attach deeply held associations to the precautionary principle and its application. As a basis for its discussions, the Work Group relied upon the internationally agreed upon definition employed in Principle 15 of the Rio Declaration on Environment and

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[14] Design for the Environment is a U.S. Environmental Protection Agency partnership program that works with industry, environmental groups, and academia to reduce risk to people and the environment by finding ways to prevent pollution (http://www.epa.gov/dfe/index.htm).

[15] MPCA Product Stewardship Study: Recommendations for establishing a comprehensive product stewardship approach to reducing environmental and health risks posed by the use or disposal of products in Minnesota (http://www.pca.state.mn.us/index.php/topics/preventing-waste-and-pollution/product-stewardship/product-stewardship-study.html)

[16] MPCA Environmentally Preferable Purchasing website: http://www.pca.state.mn.us/index.php/topics/preventing-waste-and-pollution/environmentally-preferable-purchasing/environmentally-preferable-purchasing.html

Development,[17] established at the United Nations Conference on Environment and Development in 1992, which reads: "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." Given the fact that scientific uncertainty exists and will persist, stakeholders recognize that decision-makers need mechanisms to enable policy choices to be made in the absence of scientific certainty. To better enable the Work Group to determine where improvements to existing state policy related to chemical management are needed, all stakeholders need a more thorough understanding of how the precautionary principle is currently applied in Minnesota and at other levels of government, and this could be investigated in Phase II.

Considerations Pertaining to Policy Categories Designed to Address Existing Problems Caused by Chemical Exposures and/or Ongoing Governmental Responsibilities

As evidenced by the Practical Guide to Existing Minnesota State and Local Rules and Regulations Applying to Chemical Regulation and Green Chemistry,[18] many single chemical restrictions are currently in place in Minnesota. However, single chemical restrictions and multiple chemicals policies are currently employed in a piecemeal, rather than systematic fashion. Some stakeholders believe Minnesota should pursue a systematic approach to restricting use of priority chemicals or classes of chemicals and that transitioning to a more systematic approach will allow stakeholders to overcome the loss of confidence in current state chemicals policy that has resulted, in part, from a belief that politics have, in recent years, superseded policy.

With regard to regulation of product categories, state agencies currently lack clear direction regarding the role for the state in consumer product regulation. Furthermore, monitoring mechanisms regarding the current level of compliance with product labeling requirements and consumer education efforts are lacking, which results in a lack of understanding regarding the effectiveness of current programs and regulations. Stakeholders have asserted that increased understanding of the level of compliance with current consumer protection policies is needed in order to effectively employ enforcement of product regulation as a tool.

Since there is no larger state dialogue occurring around right-to-know[19] issues, there may be a need to engage stakeholders throughout the supply chain in a conversation around access to information.

Prioritization of chemicals is a critical exercise in addressing public health and environmental concerns resulting from chemical exposure. The Toxic Free Kids Act, which was signed into

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[17] United Nations Environment Programme – Rio Declaration on Environment and Development, June 1992 (http://www.unep.org/Documents.Multilingual/Default.asp?documentid=78&articleid=1163)

[18] See Appendix E: A Practical Guide to Existing Minnesota State and Local Rules and Regulations Applying to Chemical Regulation and Green Chemistry

[19] Right-to-know is defined as a category of policies that require or encourage the provision of information or disclosures about exposures and health risks associated with chemicals to the general public. (See Appendix E: A Practical Guide to Existing Minnesota State and Local Rules and Regulations Applying to Chemical Regulation and Green Chemistry)

Minnesota law in 2009, requires that the Minnesota Department of Health (MDH), after consultation with the Minnesota Pollution Control Agency (MPCA), generate a list of Chemicals of High Concern according to criteria identified in Minn. Stat. 2009 116.9401. This list has been generated and is available for download on the Minnesota Department of Health website.[20] The statute also states that MDH, in consultation with MPCA, may designate a Chemical of High Concern as a Priority Chemical if the chemical meets additional criteria identified in Minn. Stat. 2009 116.9403.[21] The list of Priority Chemicals must be published by February 1, 2011, but MDH can update the list whenever a new priority chemical is designated. In spite of this important list building activity, many stakeholders still believe Minnesota lacks a broad framework to assess and prioritize chemicals. Many different prioritization schemes are currently in use in the state and are tied to different federal rules. Some stakeholders believe these schemes should be synchronized for improved effectiveness, but standard criteria for prioritization are needed, as well as consistency regarding definitions.

In the stakeholders' view, there is room for improvement in Minnesota's biomonitoring, data collection, and environmental health tracking efforts. Prioritization in research, data gathering and reporting is lacking. Policy recommendations need to be informed by greater clarity regarding how states make use of national data, such as the National Health and Nutrition Examination Survey (NHANES), to make research decisions that are relevant for Minnesota. Stakeholders also need a better understanding of whether there are unique exposure pathways in Minnesota that should influence policy decisions. In addition, a science gap must be overcome in order to increase understanding of what biomonitoring means for public health. Finally, pharmaceuticals as environmental contaminants are not regulated at the state level and this may warrant further evaluation in Phase II.

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[20] Minnesota Department of Health, Toxic Free Kids Act, Chemicals of High Concern, July 2010: http://www.health.state.mn.us/divs/eh/hazardous/topics/toxfreekids/highconcern.html

[21] 2009 Minnesota Statutes, Identification of Priority Chemicals: https://www.revisor.mn.gov/statutes/?id=116.9403

Conclusion and Next Steps

At the conclusion of Phase I, the Work Group recommended by consensus that the stakeholder dialogue proceed to a Phase II through which the group will develop recommendations regarding the state's system of regulating and managing chemicals.

MEI is currently seeking funding to support the continuation of the Minnesota Chemical Regulation Project into Phase II. If adequate funding is secured, the charge to the Work Group for Phase II will be to:

- Identify and analyze the effectiveness of regulations and policies currently in place at the state and federal levels, and determine if they do (or could) adequately address the opportunities the group highlighted in Phase I
- Where needed, recommend improvements to Minnesota's system of regulating and managing chemicals
- Evaluate opportunities to integrate promotion of and incentives for product design that incorporates principles of green chemistry and life-cycle analysis into a recommended policy framework

At the outset of Phase II MEI will reconvene key stakeholders, including representatives from state agencies, industry, nonprofit advocacy organizations and academic institutions, to accomplish the project goals stated above. Anticipated interim activities and outcomes include:

1) Further evaluation of the role for state policy in the context of evolving federal and international chemicals policy;
2) Deepening stakeholder understanding of mechanisms and approaches that have been applied or considered in other jurisdictions and utilizing lessons learned to inform recommendations for Minnesota;
3) Developing a set of consensus principles for state chemicals policy reform;
4) Evaluating opportunities to incentivize and promote the incorporation of green chemistry and design practices into Minnesota-based production and industrial processes; and
5) Performing outreach to the governor, state agencies, legislature and other interested citizens around the group's recommendations.

A Planning Team made up of a sub-set of the Work Group will continue to provide input and advice to MEI throughout Phase II of the project. The Center for Science, Technology, and Public Policy at the University of Minnesota's Humphrey Institute of Public Affairs will conduct research and provide information to support the Work Group as needed. The Work Group is anticipated to meet eight times in Phase II, and a larger circle of stakeholders ("Partners Group") will be convened twice to solicit broader input.

Phase II is anticipated to begin in fall 2010 with all activities concluding by July 2011. Outreach on the Work Group's recommendations will occur in late 2011.

Appendix A: Work Group Roster

Work Group Members for the Minnesota Chemical Regulation Project
(Alternates listed in italics)

Paul Aasen, Minnesota Center for Environmental Advocacy
Samuel Yamin, Minnesota Center for Environmental Advocacy

Bob Cattanach, Dorsey & Whitney LLP
Andy Brown, Dorsey & Whitney LLP

Snehal Desai, Segetis
Brian Tockman, Segetis

Tom DiPasquale, 3M
Bob Skoglund, 3M

Julia Earl, Preventing Harm Minnesota
Cathi Lyman-Onkka, Preventing Harm Minnesota

Lloyd Grooms, Winthrop & Weinstine
John Easter, American Chemistry Council

Rosemary Lavin, Hennepin County Environmental Services
Amy Roering, Hennepin County Environmental Services

Cindy McComas, University of Minnesota – Minnesota Technical Assistance Program
Alister Innes, Minnesota Pollution Control Agency

Melissa McLean, Target Corporation
Alayne Kantor, Target Corporation

Mike Robertson, Minnesota Chamber of Commerce
Tony Kwilas, Minnesota Chamber of Commerce

Mike Sandusky, Minnesota Pollution Control Agency
Todd Biewen, Minnesota Pollution Control Agency

Kathleen Schuler, Healthy Legacy Coalition/Institute for Agriculture and Trade Policy
Jim Kleinschmit, Institute for Agriculture and Trade Policy

John Linc Stine, Minnesota Department of Health
Linda Bruemmer, Minnesota Department of Health

Deborah Swackhamer, University of Minnesota, Humphrey Institute of Public Affairs – Center for Science Technology and Public Policy
Steve Kelley, University of Minnesota, Humphrey Institute of Public Affairs – Center for Science Technology and Public Policy

James Tracy, Ver-Tech Laboratories

Elizabeth Wattenberg, University of Minnesota – School of Public Health
William Toscano, University of Minnesota – School of Public Health

Deanna White, Healthy Legacy Coalition/Clean Water Action
Dan Endreson, Clean Water Action

Karen Yeadon, Emerson Process Management
Marcy Tweedie, Emerson Process Management

Appendix B: Planning Team Roster

Planning Team Members for the Minnesota Chemical Regulation Project

Paul Aasen
Minnesota Center for Environmental Advocacy

Bob Cattanach
Dorsey & Whitney LLP

Tom DiPasquale
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Lloyd Grooms
Winthrop & Weinstine

Mike Robertson
Minnesota Chamber of Commerce

Mike Sandusky
Minnesota Pollution Control Agency

John Linc Stine
Minnesota Department of Health

Deborah Swackhamer
University of Minnesota
Humphrey Institute of Public Affairs – Center for Science Technology and Public Policy

Appendix C: Charge to the Work Group

Background

The Minnesota Chemical Regulation Project is a stakeholder process involving public and private sector leaders convened to recommend improvements to Minnesota's approach to chemical regulation and ways to promote product design using the principles of green chemistry. Ultimately, the project will aim to develop a consensus set of recommendations regarding mitigation of chemical risk and the promotion of green chemistry for the governor, state agencies and state legislature. The project is designed to take place in two phases. In Phase I, a stakeholder Work Group (consisting of diverse representation from state agencies, representatives of industry, environmental advocates and members of the scientific community) will be convened to assess the issues and opportunities facing Minnesota with respect to improving the state's approach to chemical regulation and the promotion of green chemistry.

Charge for Phase I

In Phase I of the Minnesota Chemical Regulation Project, the Work Group is responsible for developing the elements of a Needs Assessment that will:

- Refine the issues and opportunities that are relevant for consideration in Minnesota;
- Assess mechanisms used by other states, the federal government and other countries to evaluate and regulate chemicals and identify approaches that may be applicable in Minnesota;
- Determine the viability of moving to Phase II and recommend whether or not the project should proceed to Phase II, contingent upon the availability of funding.

Phase I Process and Outcomes

To complete this task the Work Group will examine recent approaches to chemicals policy taken in other states, as well as activities at the national and international scales, to assess policy options and opportunities. Through a series of facilitated discussions, the Work Group will look to identify approaches that could be successfully applied in Minnesota. In addition, the Work Group will review and refine a list of issues and opportunities that could serve to inform ongoing policy discussions in Minnesota.

The work product of Phase I will serve to educate the larger community of stakeholders and decision makers and may also inform the continuing stakeholder process if at the conclusion of Phase I, MEI determines that moving to Phase II of the project is a viable approach, based both on the results of Phase I and on the availability of funding.

The intent is for Phase I to focus first and foremost on the overarching system used in Minnesota to regulate chemicals in commercial use without overlooking opportunities to integrate the promotion of greener chemistry practices into product design. If the project proceeds to Phase II, the Work Group will look for ways to integrate promotion of and incentives for green chemistry and life-cycle analysis into the group's recommended regulatory framework.

The Center for Science, Technology and Public Policy in the Humphrey Institute of Public Affairs at the University of Minnesota will provide research and technical support to the Work Group as needed through the duration of the project.

Charge for Phase II
If, based on the results of Phase I and the availability of funding, MEI determines that the project will proceed to Phase II, the charge for the Work Group in Phase II will be to:

- Recommend improvements to Minnesota's system of regulating chemicals;
- Evaluate opportunities to integrate promotion of and incentives for product design that incorporates principles of green chemistry and life-cycle analysis into a recommended policy framework.

Timeline
Phase I began in January 2010 and the Work Group is expected to complete its charge over the course of four to five half-day meetings (four hours each), which will take place over spring 2010, concluding by July 2010.

If the project proceeds to Phase II, MEI would anticipate a seamless transition between phases with an additional six to eight meetings of the Work Group taking place in the second half of 2010. The completed recommendations would be made available by January 2011. Additional outreach on the project outcomes would take place through February 2011.

Appendix D: Issues with Example Needs and Barriers

The six numbered issues were identified, refined and agreed upon by consensus of the Work Group during Phase I of the Minnesota Chemical Regulation Project. To provide additional context and detail, the Work Group brainstormed a list of various examples of needs and barriers that may be associated with each issue statement.

Of note, the example needs and barriers simply reflect a compilation of brainstormed ideas offered by individual members of the Work Group, and specific *example needs and barriers have not been agreed upon by the full Work Group*. It is the intention of the Work Group to further develop broad-based understanding and agreement around the needs and barriers associated with each of these significant issues during Phase II.

1) There is a lack of shared vision for improved chemical management in Minnesota, resulting in chemical-specific initiatives unrelated to a comprehensive approach.

Example Needs and Barriers:

- *Need*: For a paradigm shift to a systems-based, holistic approach to chemicals management that is grounded in economic, environmental, and social sustainability (at the policy level)
    - *Barrier*: Current approach and current scientific understanding are not keeping pace with the challenges; few incentives to move away from status quo; concerns over impacts on chemical manufacturing and retail industries; any changes need adequate timelines to be implemented
    - *Barrier*: Agency responsibilities are fragmented and siloed, which prevents holistic approach and allows things to fall through cracks (e.g., no state agency has authority over pharmaceuticals in water)
    - *Barrier*: Any change in approach that is product-oriented also involves entire supply chain; any change in approach must consider globalization of trade and economy, which we lack control over
    - *Barrier*: There is a lack of informed cross-sector dialogue among interested parties
    - *Barrier*: There are closely held positions on both sides that may impede progress on a large-scale shift in thinking
    - *Barrier*: Special interests tend to respond to immediate threats and may be less focused on the big picture

- *Need*: To look beyond current chemical-by-chemical risk assessment approaches to those that can accommodate cumulative risk, effects of chemical mixtures, are proactive, address sensitive populations, maybe new risk paradigm altogether
    - *Barrier*: Data gaps; institutionalization of risk assessment paradigm

- *Need*: For policies to be dynamic to match the dynamic character of industry, science, and economy
    - *Barrier*: Creating policy that is dynamic is extremely difficult, if not impossible; agency charters (federal and state) are outdated or incomplete, focused on pollution control or just one aspect of issue

2) The status quo of chemical regulation, management, and policy is not sustainable given outdated federal policy and the chaotic approach to chemicals management that is occurring at state and local levels.

Example Needs and Barriers:

- *Need*: To develop incentives and other non-regulatory policy options to shift the paradigm to green chemistry and manufacturing and Design for the Environment
    - *Barrier*: Lack of incentives, lack of rewards to balance regulation

- *Need*: For manufacturers to have responsibility and play a role in product's end of life
    - *Barrier*: Lack of policy regulations or incentives to make this happen

- *Need*: To harmonize the regulatory environment with existing market incentives toward safer alternatives
    - *Barrier*: Lack of harmonization

- *Need*: To think outside the box, consider public-private partnerships, market-based programs, voluntary programs with accountability (clear rewards and negative consequences)

3) There are significant data gaps in our knowledge of occurrence, exposure, risk, and impacts of chemicals on ecosystems and human health.

Example Needs and Barriers:

- *Need*: More data on sources, exposures, effects (both human and ecosystem), long-term impacts, safety of alternatives, toxicity, etc.
    - *Barrier*: There is a large amount of unavailable data; will need to prioritize and be strategic

4) Decision making in the face of scientific uncertainty will continue to be a challenge in effective chemical regulation and management.

- *Need*: Mechanisms or approaches to enable decision making in the face of uncertainty (policy-related)
    - *Barrier*: Current policy approach regulates chemicals only after they are proven to be unacceptable

- *Need*: Determination or decision regarding how much data are needed to make decisions (policy-related)
    - *Barrier*: Traditional risk assessment approach is very data intensive

5) There is inconsistency in regulatory requirements, lack of clarity in "standard" definitions, and an inadequate process to evaluate the effectiveness of policy tools.

Example Needs and Barriers:

- *Need*: Consistency in regulations across all relevant layers of government (state, federal, international)
    - *Barrier*: Consistency will come from federal government, not states

- *Need*: Consistency in definitions, including "safe," "chemicals of emerging concern," "adverse," "green," "sustainable," etc.
    - *Barrier*: Legal definitions lacking or different from public perception or common use

- *Need*: Consistency in requirements, such as chemical profiles and what data get reported
    - *Barrier*: Inconsistent laws among local units of government, states, federal, and international scales; also inconsistent laws for different chemicals among federal laws and agencies (e.g., Food and Drug Administration vs. Environmental Protection Agency)

- *Need*: Consistency in "burden of proof" and responsibility for establishing chemicals/products safety, both conceptually (precautionary vs. reactionary approach) and specifically in practice (e.g., Food and Drug Administration vs. Environmental Protection Agency vs. Consumer Product Safety Act)
    - *Barrier*: Precautionary principle is a hot button issue; international regulations are not consistent either
    - *Barrier*: There are closely held positions on both sides regarding where the "burden of proof" should reside
    - *Barrier*: Special interests tend to respond to immediate threats and may be less focused on the big picture

- *Need*: To reform who and how regulates and manages "active" vs. "inactive" ingredients
    - *Barrier*: This is not currently done

- *Need*: Standardized prioritization process for which groups of chemicals get addressed first
    - *Barrier*: Several approaches being used, such High Production Volume (HPV), Persistent, Bioaccumulative and Toxic (PBT) chemicals; no consensus on approach

- *Need:* To regulate and manage chemicals introduced in imported goods
    - *Barrier*: U.S. law (TSCA) does not currently address this issue, unsure about REACH

- *Need*: To consider environmental fate and effects when approving pharmaceuticals for use – crosstalk between Environmental Protection Agency and Food and Drug Administration
    - *Barrier*: No current regulation for the impacts of pharmaceuticals ingested by humans or animals

6) There is insufficient education and a gap in perception surrounding chemical exposures and risk, government's role and degree of protection, methods for communicating accurately to the public and elected representatives, and restrictions on access to certain information.

Example Needs and Barriers:

- *Need*: To have better government protections that match reality
    - *Barrier*: Commerce protections in United States Constitution

- *Need*: More education of our decision-makers, engaged public, average citizens around these highly emotional issues
    - *Barrier*: No mechanism to educate legislators; lots of conflicting information in media; emotionally charged issue

- *Need*: Improved access to information on what is in products and what is safe
    - *Barrier*: Proprietary information protected in TSCA; industrial users obtain materials from distributors not manufacturers making it harder to track what is in materials

Policy Category	Definition	Regulation/Statute Reference and Description
1) Pollution Prevention/Toxics Use Reduction	Multi-pollutant, multi-media strategies that shift the focus from end-of-pipe regulation to reduction of pollution at the source and/or encourage changes in production processes, product, or raw materials to reduce, avoid or eliminate the use of toxic or hazardous substances or the generation of hazardous byproducts.	**STATE POLICY** Minnesota Toxic Pollution Prevention Act: Minn. Stat. §§ 115D.01-115D.15 (2008). Enacted—Adopted: 1990; Amended: 1991, 1992, 1993, 1994, 1995, 1996, 2002, 2005 • Encourages pollution prevention throughout state. • Requires a pollution prevention assistance program (e.g. MnTAP) to be established. • Requires specific facilities to prepare and maintain a toxic pollution prevention plan. Providing for the Implementation of Pollution Prevention and Resource Conservation by State Government: Exec. Order No. 99-4 (Apr. 2, 1999). Enacted: 1999 • Requires state agencies to encourage pollution prevention through purchasing policies and specifications. • Requires state agencies that generate significant quantities of hazardous waste or use significant quantities of toxic chemicals to develop or revise policy statements to indicate that pollution prevention is a priority and to reduce their generation of solid and hazardous waste and use of toxic chemicals and resources. **LOCAL POLICY** No known local policy for this category.
2) Single Chemical Restrictions	Policies that ban or severely restrict specific chemicals or uses of chemicals.	**STATE POLICY** A Bill for an Act Relating to Public Health; Protecting the Health of Children; Prohibiting Bisphenol-A in Products for Young Children; Proposing Coding for New Law in Minnesota Statutes, Chapter 325F: S.F. 247, 86th Leg., Reg. Sess. (Minn. 2009). Enacted: 2009 • Prohibits the sale of an empty bottle or cup to be filled with food or liquid designed or intended to be used a child under three years of age that contains bisphenol A. Cadmium in Children's Jewelry: S.F. 2510, 86th Leg., Reg. Sess. (Minn. 2010). Enacted: 2010 • Prohibits the use of cadmium on any surface coating or accessible substrate material of children's jewelry. Certain Mercury Use in Schools Prohibited: Minn. Stat. § 121A.33 (2008). Enacted: 2007 • Prohibits a school from purchasing or using elemental mercury for any purpose, purchasing or using an instrument of measurement that contains mercury, storing elemental mercury for any purpose, or storing an instrument of measurement that contains mercury.

Policy Category	Definition	Regulation/Statute Reference and Description
		Items Containing Lead Prohibited: Minn. Stat. § 325E.389 (2008). Enacted: 2007 • Restricts the sale or manufacturing of any jewelry that is offered for sale in Minnesota unless the jewelry is made entirely from a Class 1, Class 2, or Class 3 material. • Prohibits the sale of any jewelry as children's jewelry or body piercing jewelry represented to contain safe levels of lead, unless the jewelry meets certain requirements. Mercury Emissions Reduction: Minn. Stat. §§ 116.92-116.921 (2008). Enacted/Adopted: 1992 Amended: 1993, 1994, 1995, 1997, 2000, 2001, 2006, 2007) • Restricts the sale of mercury without providing a material safety data sheet. • Requires purchaser to sign a statement that the purchaser will use the mercury only for a medical, dental, instructional, research, or manufacturing purpose and understands the toxicity of mercury and will not place, or allow anyone under the purchaser's control, to place the mercury in the solid waste stream or in a wastewater disposal system. • Requires labels on a thermostat or thermometer, electric switch, appliance, medical or scientific instrument, electric relay or any other electronic device, fluorescent or high-intensity discharge lamp, laboratory chemicals, reagents, fixatives, and electrodes that clearly inform a purchaser or consumer that mercury is present in the item and that item may not be placed in the garbage until the mercury is removed and reused, recycled, or otherwise managed to ensure that it does not become part of solid waste or wastewater. • Requires manufacturer of a displacement relay that contains mercury to be responsible for the costs of collecting and managing its displacement relays. • Prohibits the sale of mercury thermometers, a toy or game that contains mercury, sphygmomanometer containing mercury, mercury containing thermostats, mercury switches, mercury relays, mercury-containing barometers, manometers, pyrometers, mercury diostats, cosmetics and mercury in over-the-counter pharmaceuticals. • Requires a person who sells fluorescent or high intensity discharge lamps that contain mercury to inform the purchaser in writing that the lamps contain mercury. • Prohibits mercury manometers for use on dairy farms. • Authorizes the Minnesota Pollution Control Agency (MPCA) to participate in the Interstate Mercury Education and Reduction Clearinghouse to assist in carrying out the requirements and coordinating any other activities related to the administration of statutes governing the purchase, sale, use, labeling, disposal, and management of mercury and mercury-containing products. **LOCAL POLICY** An Ordinance Pertaining to Mercury and Mercury-Containing Items, City of Duluth, Ordinance No. 02-040 (Aug. 27, 2002) Enacted—2002 • Prohibits a public or private school from purchasing bulk elemental mercury or mercury compounds for use in classrooms.

Policy Category	Definition	Regulation/Statute Reference and Description
		• Prohibits the sale, purchase, installation or re-installation of a mercury sphygmomanometer. • Prohibits the sale or purchase of gastrointestinal devices containing mercury. • Prohibits the sale or installation of any thermostat containing mercury. • Prohibits the sale or purchase of a barometer containing mercury. Prohibits the sale or purchase of a psychrometer containing mercury. Mercury, City of Duluth, Ordinance No. 00-007 (Feb. 23, 2000). Enacted: 2000. • Prohibits the sale or offer for sale of any fever thermometer or basal thermometer containing mercury. Retail Sale of Fever and Basal Thermometers Containing Mercury, City of Fergus Falls, Ordinance No. 61 (Dec. 4, 2000). Enacted—2000 • Prohibits the sale at retail of any fever thermometer or basal thermometer containing mercury. Mercury Reduction, Minneapolis Code of Ordinances §§ 57.10-57.30 (2006). • Restricts the sale and other use of any sphygmomanometer device used to measure blood pressure that contains mercury or a gastrointestinal device containing mercury. • Restricts the sale or installation of any thermostat that contains mercury. • Restricts the sale of any barometer device used to measure atmospheric pressure that contains mercury or a psychrometer device used to measure relative humidity that contains mercury. • Prohibits public or private schools offering kindergarten, elementary, junior high school or high school from purchasing any restricted mercury-added product or any bulk elemental mercury or mercury compounds. • Requires signs for the sale of fluorescent bulbs or other bulbs or lamps containing mercury stating that the bulbs or lamps contain mercury, that they may not be put in the waste stream, and which references available lamp and bulb recycling programs. See also **4) Regulation of Product Categories** (Calling for a State-wide Phase-Out of Bisphenol-A and Phthalates in Children's Products, Minneapolis City Council, Resolution No. 2008R-076 (Feb. 29, 2008) Enacted—2008)
3) Multiple Chemical Policies	Policies that regulate groups/classes of chemicals, rather than just one chemical.	**STATE POLICY** Minnesota Toxic Free Kids Act: Minn. Stat. §§ 116.9401-116.9407 (2009). Enacted: 2009 • Requires the Minnesota Department of Health (MDH), in consultation with the MPCA, to generate a list of chemicals of high concern by July 1, 2010. • Requires the MDH, in consultation with MPCA, to designate and publish a list of priority chemicals in children's products by February 1, 2011.

Policy Category	Definition	Regulation/Statute Reference and Description
		• Permits participation in an interstate chemicals clearinghouse. • Requires MPCA to report by December 15, 2010 recommendations about mechanisms to reduce and phase out the use of priority chemicals in children's products, moving to safer alternatives, and incentives for product design that use green chemistry. **LOCAL POLICY** No known local policy for this category.
4) Regulation of Product Categories	Policies that regulate categories of consumer products. These types of policies include regulating chemical use in products, encouraging the purchase/use of less toxic products, and labeling/ disclosing chemicals in products.	**STATE POLICY** Prohibitions on Selected Toxics in Packaging: Minn. Stat. § 115A.965 (2008). Enacted—Adopted: 1991; Amended: 1993, 1994, 1995, 1996, 1997, 2000, 2005 • Prohibits a manufacturer or distributor from selling packaging if it contains any inks, dyes, pigments, adhesives, stabilizers, or any other additives containing any lead, cadmium, mercury, or hexavalent chromium that has been intentionally introduced as an element during manufacture or distribution of the packaging. • Places a restriction on the total concentration level of lead, cadmium, mercury, and hexavalent chromium that can be present in any packaging. Listed Metals in Specified Products; Enforcement: Minn.Stat. § 115A.9651 (1991) • Specifies reduction of lead, mercury, hexavalent chromium and cadmium in products. See also **2) Single Chemical Restrictions** (A Bill for an Act Relating to Public Health; Protecting the Health of Children; Prohibiting Bisphenol-A in Products for Young Children, Cadmium in Children's Jewelry, Items Containing Lead Prohibited) and **3) Multiple Chemicals Policies** (Toxic Free Kids Act) **LOCAL POLICY** Minneapolis City Council, Resolution No. 2008R-076 (Feb. 29, 2008) Enacted—2008. • Resolution calling for a State-wide Phase-Out of Bisphenol-A and Phthalates in Children's Products • Urges the Minnesota State Legislature to vote to enact HF 2100 and SF 1858, to phase out bisphenol-A and phthalates in products intended for use by young children, including but not limited to, toys, pacifiers, baby bottles, and teethers. See also **2) Single Chemical Restrictions** (Mercury Reduction ,Minneapolis Code of Ordinances §§ 57.10-57.30, 2006) and **12) Environmentally Preferable Purchasing** (A Resolution Adopting Low Environmental Impact Cleaning Policy, City of Minneapolis Low Environmental Impact Cleaning Policy (Oct. 6, 2006). Enacted—2006)

Policy Category	Definition	Regulation/Statute Reference and Description
5) Biomonitoring/ Environmental Health Tracking and Surveillance Systems	Policies that support assessment of human biologic specimens (blood, urine, breast milk, fat tissue) to characterize the levels of human chemical exposure. Policies that require tracking and monitoring of the links between exposures to chemical/environmental hazards and adverse human health effects.	**STATE POLICY** Environmental Health Tracking and Biomonitoring: Minn. Stat. §§ 144.995-144.998 (2008). Enacted: 2007 • Establishes an environmental health tracking program. • Requires the Commissioner of the MDH, in cooperation with the MPCA commissioner, to conduct biomonitoring of communities, pregnant women, and minors on a voluntary basis. • Establishes a biomonitoring pilot program. **LOCAL POLICY** No known local policy for this category.
6) Data Collection	Policies that encourage the gathering and dissemination of information about the presence, toxicity, and/or use of chemicals in products and processes. These types of policies may require further research and testing of specific chemicals to assess potential health and environmental impacts, the establishment of monitoring programs to detect the presence of contaminants in the environment, or the manufacturer's or distributor's submission of chemical production and use information.	**STATE POLICY** Endocrine-Disruptor Monitoring: H.F. 1231, 86th Leg., Reg. Sess. (Minn. 2009). Enacted—2009 • Requires the Commissioner of the Pollution Control Agency to establish a network of water monitoring sites in public waters adjacent to wastewater treatment facilities across the state to assess levels of endocrine disrupting compounds, antibiotic compounds, and pharmaceuticals. See also **2) Single Chemical Restrictions** (Products Containing Polybrominated Diphenyl Ether) **LOCAL POLICY** No known local policy for this category.
7) Right to Know	Policies that require or encourage the provision of information or disclosures about exposures and health risks associated with chemicals to the general public.	**STATE POLICY** Notice for Fluorescent Lamps Containing Mercury: Minn. Stat. § 325E.127 (2008). Enacted: 2007 • Requires a person who sells fluorescent lamps at retail to post a notice visible to consumers stating that the light bulbs contain mercury and must be recycled at the end of use. See also **2) Single Chemical Restrictions** (Mercury Emissions Reduction) **LOCAL POLICY** See **2) Single Chemical Restrictions** (Mercury Reduction, Minneapolis Code of Ordinances §§ 57.10-57.30 Enacted: 2006)

Policy Category	Definition	Regulation/Statute Reference and Description
8) Prioritization	Policies that establish a framework for assessing and prioritizing chemicals.	**STATE POLICY** See **3) Multiple Chemicals Policies** (Toxic Free Kids Act) **LOCAL POLICY** No known local policy for this category.
9) Alternatives Assessment	Policies that encourage research to support or establish requirements to replace the use of toxic chemicals with the use of alternatives that have been carefully and methodically evaluated for safety (i.e. substitution)	**STATE POLICY** See **2) Single Chemical Restrictions** (Products Containing Polybrominated Diphenyl Ether) and **3) Multiple Chemicals Policies** (Toxic Free Kids Act) **LOCAL POLICY** No known local policy for this category.
10) Green Chemistry/Design for the Environment	Policies that encourage the redesign of chemicals, products and processes from the outset to reduce or eliminate the use and generation of hazardous substances.	**STATE POLICY** A Bill for an Act Relating to Economic Development; Amending the Definition of Green Economy to Include the Concept of Green Chemistry: S.F. 2510, 86th Leg., Reg. Sess. (Minn. 2010). Enacted: 2010 • Amends the definition of "green economy" to include products, processes, methods, technologies, or services intended to increase the use of green chemistry. Small Business Investment Tax Credit: H.F. 2695, 86th Leg., Reg. Sess. (Minn. 2010). Enacted: 2010 • Provides a 25% tax credit to investors in certain high-technology fields, including chemistry (with express legislative intent that it means "green chemistry"). See also **3) Multiple Chemicals Policies** (Toxic Free Kids Act) **LOCAL POLICY** No known local policy for this category.
11) Product Stewardship	Policies that establish an environmental management strategy for minimizing a product's environmental impact throughout all stages of a product's life cycle.	**STATE POLICY** Cathode-Ray Tube Prohibition: Minn. Stat. § 115A.9565 (2008). Enacted: 2003; Amended: 2005) • Prohibits dumping of an electronic device containing a cathode-ray tube in mixed municipal solid waste. Development of Recommendations for Establishing a Comprehensive Product Stewardship: H.F. 1812, Minn. Session Law, Chapter 363, Article 5, Sec. 3 Enacted—Adopted: 2008) • Required the MPCA to develop recommendations for reducing environmental and health risks

Policy Category	Definition	Regulation/Statute Reference and Description
		posed by the use or disposal or products using a comprehensive product stewardship approach. • Required report due to the Legislature on January 15, 2009. • Recommendations must be consistent with existing North American product stewardship programs and developed in consultation with stakeholders. Electronic Waste Recycling: Minn. Stat. §§ 115A.1310-115A.1330 (2008). Enacted: 2007 • Requires a video display device to be labeled with the manufacturer's brand before sale. • Requires the manufacturer to file a registration before sale. • Restricts recycling of a video display device without registration. • Requires registration before a person can operate as a collector of covered electronic devices. • Requires participation in the establishment of a regional multistate organization. Collection for Recycling: Minn. Stat. §§ 325E.115-325E.1151 (2009). Enacted—Adopted: 1987; Amended: 1989, 1991, 1993, 2001 • Requires a retailer of lead acid batteries to accept used lead acid batteries for recycling. Mercury Prohibition: Minn. Stat. § 115A.932 (2008). Enacted—Adopted: 1992; Amended: 1993, 1997, 2007 • Restricts the placement of mercury or a thermostat, thermometer, electric switch, appliance, gauge, medical or scientific instrument, fluorescent or high-intensity discharge lamp, electric relay, or other electrical device from which the mercury has not been removed for reuse or recycling in solid waste or waste water disposal system. • Requires a fluorescent or high-intensity discharge lamp to be recycled by delivery of the lamp to a lamp recycling facility. See also **7) Right to Know** (Notice for Fluorescent Lamps Containing Mercury) **LOCAL POLICY** See **2) Single Chemical Restrictions** (Mercury Reduction, Minneapolis Code of Ordinances §§ 57.10-57.30 Enacted: 2006)
12) Environmentally Preferable Purchasing	Policies that require or encourage the purchase of products based on particular environmentally sensitive attributes (i.e., less toxic chemicals, recycled material content, energy efficiency, etc.)	**STATE POLICY** Public Entity Purchasing: Minn. Stat. § 16B.122 (2008). Enacted—Adopted: 1989; Amended: 1991, 1992, 1993, 1994, 1995 • Requires a public entity, when purchasing commodities and services, to apply and promote the State's preferred waste management practices (Minn. Stat. § 115A.02), especially the reduction of the quantity and toxicity of materials in waste.

Policy Category	Definition	Regulation/Statute Reference and Description
		See also **1) Pollution Prevention/Toxics Use Reduction** (Providing for the Implementation of Pollution Prevention and Resource Conservation by State Government) **LOCAL POLICY** Environmental Purchasing Policy, Minneapolis City Council, Resolution No. 2008R-432 (October 10, 2008) • Requires the City to follow an Environmental Purchasing Policy. Requires the Purchasing Department to disseminate to all City departments information on these guidelines, product specifications, and available resources. Environmentally Preferable Purchasing and Waste Reduction Resolution, Hennepin County, Hennepin County Board of Commissioners, Res. No. 01-4-263 (Apr. 17, 2001). Enacted—2001 • Requires the development of procedures to continuously evaluate product purchases for environmentally preferable alternatives. A Resolution Adopting Low Environmental Impact Cleaning Policy, City of Minneapolis Low Environmental Impact Cleaning Policy (Oct. 6, 2006). Enacted—2006 • Requires the City Purchasing Department to establish and regularly update guidelines and specifications for purchase of environmentally sensitive cleaning products and cleaning procedures regarding City facilities. • Requires the Department to disseminate to all City departments information on these guidelines, low environmental impact product specifications, and sample lists for standard cleaning products that are commonly purchased by departments.
13) Precautionary Principle	Policies that define and develop approaches for applying the precautionary principle in practice for chemicals.	**STATE POLICY** None at this time. **LOCAL POLICY** No known local policy for this category.

Appendix F:

Summary of Policy Categories Identified by Lowell Center for Sustainable Production,

State Leadership in Formulating and Reforming Chemicals Policy, July 2009

POLICY CATEGORIES IDENTIFIED AT THE STATE AND LOCAL LEVEL

Policy Category	Definition	Policy Landscape at State/Local Levels	Examples[1]
Pollution Prevention/ Toxics Use Reduction	Multi-pollutant, multi-media strategies that shift the focus from end-of-pipe regulation to reduction of pollution at the source and/or encourage changes in production processes, product, or raw materials to reduce, avoid, or eliminate the use of toxic or hazardous substances or the generation of hazardous byproducts.	Following federal pollution prevention legislation in 1990, many states enacted similar pollution prevention laws. Although the majority of states have set pollution prevention goals, there is a wide variety of programs and policies set up to achieve these goals at the state level. Some states simply have aspirational goals for pollution prevention, while others have voluntary pollution prevention programs that provide technical assistance to businesses. Only a small number of these regulations/programs actively require, facilitate, or encourage the use of least toxic alternative chemicals. Additionally, most of these programs focus exclusively on reducing toxics in industrial settings, but some states are trying to extend these policies and programs to small businesses and households. Further, elements of pollution prevention and toxics use reduction are incorporated into other state policies, especially policies that focus on procurement and policies that focus on greening government management and operations.	• Enacted—Massachusetts Toxic Use Reduction Act (TURA); Oregon Toxics Use Reduction and Hazardous Waste Reduction Act; New Jersey Pollution Prevention Act • Proposed—New York (A348, S2256); California (AB558)
Single Chemical Restrictions	Policies that ban or severely restrict specific chemicals or uses of chemicals.	This type of policy is most prominent at the state and local levels. A number of chemicals have been banned or restricted in some states and localities. In addition, there is proposed legislation in a number of states and localities to ban or restrict single chemicals. The chemicals targeted by these policies include: PBDEs, lead, mercury, chromated copper arsenate, chlorinated solvents, dioxin, formaldehyde, perchloroethylene, phthalates, bisphenol A, and diacetyl.	• Enacted—Washington PBDE Ban (Wash. Rev. Code Ann. § 70.76.005); Maine PBDE Ban (Me. Rev. Stat. Ann. tit. 38, § 1609); Rhode Island Mercury Reduction and Education Act • Proposed—Illinois Bisphenol A Products Act (HB4744); New York (various bills on restriction of lead-A1745, S782)

[1] Although instructive examples are listed for each policy category, it is important to note that in many cases, the policies listed span multiple policy categories. More than one policy category is denoted in the State Chemicals Policy Database for policies that contain elements of more than one policy category. More information about the policies listed as examples can be found in the State Chemicals Policy Database, accessible at http://www.chemicalspolicy.org/uslegislationsearch.php.

Policy Category	Definition	Policy Landscape at State/Local Levels	Examples
Multiple Chemical Policies	Policies that regulate groups/classes of chemicals, rather than just one chemical.	Most of the legislation that has been enacted at the state and local levels to regulate groups of chemicals focuses on persistent, bioaccumulative, and toxic chemicals (PBTs). Enacted and proposed legislation in a number of states focuses on "chemicals of concern" or "priority chemicals."	• Enacted—Executive Orders to reduce PBTs (WA, OR); Local resolutions to reduce PBTs (Seattle, WA; Buffalo, NY; Erie County, NY); Priority Chemicals (CA, CT, ME, WA) • Proposed—An Act Providing for Safer Alternatives to Toxic Chemicals (MA S2481); Toxic Chemicals in Children's Products (RI H7098)
Regulation of Product Categories	Policies that regulate categories of consumer products. These types of policies include regulating chemical use in products, encouraging the purchase/use of less toxic products, and labeling/disclosing chemicals in products.	Instead of regulating single chemicals, some states and localities are beginning to regulate and propose legislation that would place restrictions on chemicals in categories of products, encourage the purchase and use of less toxic products, and require the labeling/disclosure of chemicals in products. To date, states and localities have enacted or proposed legislation for a number of product categories, including cosmetics/personal care products, cleaning products, children's toys/child care products, and product packaging.	• Enacted—California Safe Cosmetics Act; New York School Green Cleaning Law; Connecticut Toxics in Packaging Law; California Phthalates in Products for Young Children (AB1108); An Act Concerning Child Product Safety (CT HB5650) • Proposed—Illinois Safe Cosmetics Act; Massachusetts Safer Cleaning Products Act (H2246); Children's Product Safety Act (IL HB4351); Maryland Phthalates and Bisphenol A Prohibitions-Toys, Child Care Articles and Cosmetics (HB833)
Biomonitoring/ Environmental Health Tracking and Surveillance Systems	Policies that support assessment of human biologic specimens (blood, urine, breast milk, fat tissue) to characterize the levels of human chemical exposure. Policies that require tracking and monitoring of the links between exposures to chemical/environmental hazards and adverse human health effects.	The establishment of biomonitoring programs and environmental health tracking systems is increasingly seen as a way to understand the general population's exposure to chemicals as well as a powerful advocacy tool. Since the exposure and disease profile varies geographically, state and local biomonitoring programs are needed to collect this type of information. California, a leader in this area, enacted a state-wide biomonitoring program in 2006. Other states have enacted and proposed these types of initiatives, but lack the necessary resources to implement this type of legislation.	• Enacted—California Environmental Contaminant and Biomonitoring Program; Illinois Biomonitoring Feasibility Study Act • Proposed—New York Environmental Health Tracking System (A5343, S5298); Tennessee Environmental Contaminant Biomonitoring Program (HB757, SB878)

Policy Category	Definition	Policy Landscape at State/Local Levels	Examples
Data Collection	Policies that encourage the gathering and dissemination of information about the presence, toxicity, and/or use of chemicals in products and processes. These types of policies may require further research and testing of specific chemicals to assess potential health and environmental impacts, the establishment of monitoring programs to detect the presence of contaminants in the environment, or the manufacturer's or distributor's submission of chemical production and use information.	There is increasing recognition of the data gaps that exist with respect to the properties of chemicals as well as chemical use and exposure data. California is a leader on enacting and proposing these types of policies. Other states recognize the importance of gathering this information, but lack the necessary resources to enact legislation that establishes data collection programs at the state level. However, some recently enacted and pending legislation in a number of states contains provisions that permit the state to collect chemical use and production information about priority chemicals.	• Enacted—California Chemical Testing Methods (AB289); Maine Act to Protect Children's Health and the Environment from Toxic Chemicals in Toys and Children's Products (Me. Rev. Stat. Ann. tit. 38, § 1691) • Proposed—California High Production Volume Chemical Data Collection (AB578); Illinois Child Safe Chemical Act (HB5705, SB2868)
Right-to-Know	Policies that require or encourage the provision of information or disclosures about exposures and health risks associated with chemicals to the general public.	Some right-to-know policies at the state and local level build on existing federal legislation (Emergency Planning and Community Right-to-Know Act) and require users of hazardous substances to publicly report those uses. Other state right-to-know legislation focuses on the labeling of consumer products to inform the general public of the chemical content of these products. Some of the enacted and proposed mercury products and cosmetics legislation has included provisions that require labeling of these products. Some of this legislation also includes public education programs.	• Enacted—California Safe Drinking Water and Toxic Enforcement Act (Prop. 65); California Toxics Information Clearinghouse (SB509); City of Eugene Oregon Toxics Right-to-Know Charter Amendment; New Jersey Worker and Community Right-to-Know Act • Proposed—An Act Concerning Toxic Substances in the Workplace (CT SB1022)

Policy Category	Definition	Policy Landscape at State/Local Levels	Examples
Prioritization	Policies that establish a framework for assessing and prioritizing chemicals.	Although prioritization of chemicals is widely seen as a necessary step for chemicals policy, states are just beginning to develop and implement frameworks to achieve this goal.	• Enacted—California AB1879; Maine Act to Protect Children's Health and the Environment from Toxic Chemicals in Toys and Children's Products (Me. Rev. Stat. Ann. tit. 38, § 1691); An Act Concerning Child Product Safety (CT HB5650); Washington Children's Safe Products Act (HB2647) • Proposed—Establishing the Toxic Substances Identification Program (VT S292); Chemicals in Children's Products (WI AB968)
Alternatives Assessment	Policies that encourage research to support or establish requirements to replace the use of toxic chemicals with the use of alternatives that have been carefully and methodically evaluated for safety (i.e. substitution).	Some states have enacted or proposed policies to establish research institutions solely to conduct alternatives assessment and encourage the substitution of toxic chemicals with safer alternatives. In addition, other policies enacted at the state and local level encourage alternatives assessment. For example, some policies that ban or restrict single chemicals also contain provisions that require the assessment of alternative chemicals to choose an appropriate substitute for the banned/restricted chemical.	• Enacted—Massachusetts Toxic Use Reduction Institute; New York Pollution Prevention Institute; Maine Executive Order Promoting Safer Chemicals in Consumer Products and Services • Proposed—Connecticut Innovation Institute (HB7020)
Green Chemistry/ Design for the Environment	Policies that encourage the redesign of chemicals, products, and processes from the outset to reduce or eliminate the use and generation of hazardous substances.	There has been executive branch action to encourage research and investment in green chemistry in a few states. In addition, these principles are beginning to be incorporated into legislative initiatives.	• Enacted—Michigan Green Chemistry Executive Directive; California Green Chemistry Initiative • Proposed—California Design for the Environment (SB291)

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Product Stewardship	Policies that establish an environmental management strategy for minimizing a product's environmental impact throughout all stages of a product's life cycle.	Managing a product from cradle to grave has become an increasing concern at the state and local levels, especially as more chemicals are banned. There are a number of product stewardship schemes that are being proposed, although many of the policies focus on producer responsibility for managing products throughout their life cycle. Most of the legislative action (enacted and proposed) to date on product stewardship has focused on electronics equipment. Additionally, some of the mercury laws include collection and recycling provisions for products containing mercury.	• Enacted—Oregon Producer Responsibility System for the Management of Obsolete Electronics • Proposed—North Carolina Manufacturer Responsibility and Consumer Convenience Information Technology Equipment Collection and Recovery Act (SB1525); Pennsylvania Used Electronic Device Recycling Act (HB7)
Environmentally Preferable Purchasing	Policies that require or encourage the purchase of products based on particular environmentally sensitive attributes (i.e. less toxic chemicals, recycled material content, energy efficiency, etc.).	There are myriad environmentally preferable purchasing policies at the state, and especially local level. Both legislative and executive branch initiatives at the state and local level require or encourage more environmentally preferable state and local government purchasing decisions for a wide range of products. Some of these policies are more aspirational, while others lay out a decision-making process for choosing products.	• Enacted—San Francisco, CA Precautionary Purchasing Law; California State Agency Environmentally Preferable Purchasing; Vermont Clean State Program • Proposed—Colorado Act Concerning a Preference for the Purchase of Environmentally Preferable Products by Government Entities (HB1220); New York State Safe and Green Procurement Act (A7038, S1158)
Precautionary Principle	Policies that define and develop approaches for applying the precautionary principle in practice for chemicals.	One state has enacted a senate resolution that incorporates the precautionary principle into state department and agency decision-making processes. A number of localities have also enacted precautionary principle resolutions that incorporate the principle into decision-making processes.	• Enacted—Hawaii Precautionary Resolutions (HCR49, SR86); Local Precautionary Principle Resolutions (Seattle, WA; San Francisco, CA; Berkeley, CA; Marin County, CA; Multnomah County, OR) • Proposed—New York State Public Health Protection Act (A3420, S862)