the LOUISVILLE CHARTER

BACKGROUND PAPER FOR REFORM NO. 2 OF THE LOUISVILLE CHARTER FOR SAFER CHEMICALS

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Reform No. 2 of the Louisville Charter for Safer Chemicals reads:

PHASE OUT PERSISTENT BIOACCUMULATIVE OR HIGHLY TOXIC CHEMICALS

Phase Out Persistent, Bioaccumulative, or Highly Toxic Chemicals—Prioritize for elimination chemicals that are slow to degrade, accumulate in our bodies or living organisms, or are highly hazardous to humans or the environment. Ensure that chemicals eliminated in the United States are not exported to other countries.

ABSTRACT

Chemicals such as lindane, lead compounds, and some brominated flame retardants and organophosphate pesticides are examples of persistent, bioaccumulative, and/or highly toxic chemicals that continue to be used in commerce, although strong evidence exists that they pose threats to human and ecosystem health.

These and other chemicals, by virtue of their characteristics, are very difficult to manage without unacceptable threats to workers, the environment or ecosystems. Chemicals that cannot be safely managed should be prioritized for phase out. A transparent process to further identify and prioritize the list of chemicals for phase out is needed.

With few exceptions, the U.S. government lacks the authority or an efficient policy instrument to prevent these high priority chemicals from being used in products and processes or released to the environment. It has also been very difficult for state and local governments to restrict these chemicals. Policy instruments to efficiently and effectively phase out problematic chemicals are needed at all levels of government.

Problem Statement

Chemicals such as lindane, lead compounds, and some brominated flame retardants and organophosphate pesticides are examples of persistent, bioaccumulative, and/or highly toxic chemicals that continue to be used in commerce, although strong evidence exists that they pose threats to human and ecosystem health.

With few exceptions, the U.S. government lacks the authority or an efficient policy instrument to prevent these high priority chemicals from being used in products and processes or released to the environment. It has also been very difficult for state and local governments to restrict these chemicals. According to a July 2005 General Accounting Office report *Chemical Regulation: Options Exist to Improve EPA's Ability to Assess Health Risks and Manage Its Chemical Review Program*, the Environmental Protection Agency (EPA) lacks sufficient data to ensure that potential health and environmental risks of new chemicals are identified. Models used to predict toxicity were found to be inadequate, and only about 15 percent of new chemicals are accompanied by health or safety test data.

The report further estimated the EPA has exercised its authority to require testing for only 200 of the 62,000 chemicals in commerce, although the Agency has extremely limited data with which to review existing chemicals currently on the market. For chemicals produced in volumes greater than one million pounds, in 1998, only about 7 percent had information on the six endpoints deemed to constitute minimal testing. The report further notes that EPA has had difficulty proving that chemicals pose unreasonable risks and has regulated few existing chemicals under the Toxic Substances Control Act (TSCA) — only 5 chemical groups out of 62,000 have been restricted in 29 years. The report notes the failure to regulate asbestos as an example: *"EPA concluded that asbestos was a potential carcinogen at all levels of exposure . . . the court concluded that EPA did not present sufficient evidence to justify the ban on asbestos . . . because it failed to show the control action it chose was the least burdensome regulation . . ."*[1]

Persistent, bioaccumulative, toxic chemicals (PBTs) provide some of the most glaring examples of the failure of the current regulatory approach, given that chemicals with these properties are difficult or impossible to control once released. Therefore PBT elimination is in the vanguard of the chemical reform movement. Increasingly, environmental and health groups are pursuing a regulatory approach that sunsets their use, production, and release over time, with exemptions only in limited and special circumstances. Market campaigns are recommending manufacturers eliminate these chemicals entirely from products and production processes.

There are a variety of policy instruments to manage, reduce, restrict or phase out chemicals. This paper outlines some of the issues surrounding the phase out of chemicals of concern. It also very briefly reviews the effectiveness of existing policy phase out instruments.

Phasing out the worst toxic chemicals is only one step in chemicals policy reform. A phase out strategy will be most effective when paired with policies that also address the management and substitution of other high priority chemicals. Policy incentives and disincentives must be aligned with society's overall goal of safe and effective products that don't cause harm to workers, the community or the environment. Rewarding the use of, and eventually requiring the adoption of safer alternatives will be a key part of chemical reform [see Louisville background paper on substitution].

The process of phasing out chemicals, particularly chemicals that are used in multiple industries, that serve as building blocks or allow common activities, or are crucial to a particular sector, etc, will require careful planning. The goal is to transition to safer materials and processes with the least disruption to industry sectors, to jobs, and to the economy. If well planned, transitions to green chemistry, bio-based materials and sustainable agricultural production systems, and safer material selection offer enormous advantages: potential job growth in emerging and high growth sectors; real public health benefits in avoided costs associated with disease caused by environmental and occupational toxicants; avoided costs in cleanup and remediation of contamination; increased property values around cleaner industrial facilities, and many other benefits. Planning for a transition, and providing some certainty, transparency, and predictability in the phase out will be key in assuring the least disruption while achieving the goal of eliminating the use of chemicals that pose the greatest risks to human and ecosystem health.

Persistent, Bioaccumulative, Toxic Compounds

There is now broad international agreement that chemicals that are persistent, bioaccumulative, and toxic (PBT) should be prioritized for eventual phase out. While this view is not unanimous, it is widely articulated in state, national, and international policy. This consensus largely rests on the observation that chemicals with these characteristics cannot be effectively managed. This is not necessarily due to the failure of particular management systems, but because of the characteristics of the chemicals themselves. If the manufacture, use or disposal of a material allows a PBT to enter the environment, the PBT will not readily break down, rather it can cycle through the environment in complex and sometimes unpredictable ways, building up in wildlife, the food chain, and people. PBT's can deposit in reservoirs, both in the environment, and in living organisms, that can pose risks in the future. Once dispersed, many of these chemicals can travel great distances from the source, and reside there for years. Capture and containment of these chemicals has proven very difficult, costly, and ultimately not entirely successful. In some cases, it is simply impossible. For PBTs that have been banned, recirculation remains a major pathway of exposure for humans and wildlife. In order to reduce or slow down continual recirculation, PBTs must then be landfilled or destroyed, both of which pose risks in current practice.

Of course, without adequate information on a chemical, it is more difficult to accurately classify a chemical as a PBT. Defining and identifying PBTs is closely tied with the challenge of ensuring adequate information on chemical properties (see Louisville background papers on "Comprehensive Safety Data" and "Right-to-Know").

A chemical's tendency to persist, and to bioaccumulate is often used as a measure of exposure. This is because the chemical can no longer be managed, and cycles through the ecosystem with potentially numerous opportunities for widespread exposure of the entire population, including vulnerable subpopulations such as children and/ or the developing fetus.

Given this array of concerns, international treaties, and some federal, regional, state and local initiatives have prioritized PBTs and set a goal of eventual elimination of discharges. No two PBT elimination lists are identical, however, and debate remains as to the appropriate definition of persistence, bioaccumulation and toxicity.

A review of the issues associated with designating a chemical persistent, bioaccumulative, and toxic appears below.

Bioaccumulation

Bioaccumulation refers to the accumulation of substances in an organism or part of an organism. Chemicals can accumulate that enter the organism through respiration, food intake, skin contact, and/or other means. Through this process, an organism has a higher concentration of contaminants than the surrounding environment.[2] Bioaccumulation is dependent on many factors including the rate of uptake, the mode of uptake, how quickly the substance is eliminated from the organism, metabolic transformation, fat content of the organism, and other environmental, biological and physical factors. As a general rule the less water soluble a substance is, the more likely it is to bioaccumulate.[3] Therefore, bioaccumulation can be estimated using a measure related to solubility – the octanol water partition coefficient (Kow) or partition coefficient (P). The higher the Kow, the greater the likelihood of bioaccumulation in the food chain, and the greater the potential for sorption (or chemical attachment) in soil. Some substances do not conform to this relationship; methylmercury, for example, accumulates in fish to a much greater degree than methylmercury's Kow would indicate. A comparison of Kows and directly measured bioaccumulation show a general tendency of Kows to underestimate bioaccumulation.

Bioconcentration differs from bioaccumulation; it refers to the uptake of substances into the organism from water alone. Bioconcentration in fish can be readily measured in the lab or estimated and can be used to predict bioaccumulation.[4] The potential for bioconcentration is called the *Bioconcentration Factor (BCF)* and is the ratio of the concentration of a substance in an organism to the concentration in water, based only on uptake directly from the surrounding medium (excludes uptake from food).

Bioaccumulation is the more general term because it includes all means of uptake into the organism.[5] The

Bioaccumulation Factor (BAF) is the ratio of a substance's concentration in an organism's tissue to its concentration in the water where the organism lives. BAFs measure a chemical's potential to accumulate in tissue through exposure to both food and water.[6]

In determining hazard, Bioaccumulation Factors (BAF) are preferable to the Bioconcentration Factors (BCF). In the absence of BAF or BCF data, the octanol-water partition coefficient (log Kow) is often used, although this method of estimation has limitations.

Determining what cut off point to use to assess bioaccumulation is based on judgment and political considerations and varies depending on the agency or standard setting body. Values range from BAF's of 5,000 designated as high, to 1,000 designated as low. For more information, see Annex: "Criteria & Lists for Identifying Priority Chemicals for Elimination & Reduction," Compiled by: Tracey Easthope & Laurie Valeriano, November 18, 2004.

Persistence and Half Life

Persistence is the ability of a chemical to remain in the environment in an unchanged form.[7] Chemicals with greater persistence pose greater possibilities for exposure because they can continue to cycle through the environment. A chemical's persistence can be directly measured. The persistence of a single chemical can vary depending on the environmental media. A chemical's *half life*—or the length of time it takes for the concentration of a substance to be reduced by one-half relative to its initial level[8]—is the unit often used to express persistence.Estimates of persistence are often given for air, water, soil, and sediment.

Chemicals can also degrade to PBT's. The degradation byproducts of most chemicals are simply not known, although they can have equal or greater hazardous properties compared with the parent chemical.

Cut off points to determine persistence are also based on judgment and political considerations and vary depending on the agency or standard setting body. Values range from a half-life of 2 all the way to 50 days in air, for instance. For more information on the range of values associated with different lists, see the above referenced Annex.

Toxicity

Toxicity determinations generally fall into broad categories including acute and chronic impacts, and impacts on humans, biota and the environment. Toxicological endpoints include: carcinogen, mutagen/genotoxin, teratogen, endocrine disruptor, neurotoxicant, reproductive system toxicant, liver toxicant, cardiovascular or blood toxicant, irritant, and many others. Environmental effects can include various measures of terrestrial and aquatic impacts on biota. There are no standard definitions for any of these endpoints, although conventions in some areas have developed over time.

Toxicity can be determined directly, by various animal and human testing, through the use of in vitro tests, or by estimation. The use of human testing is controversial and has just recently been allowed by the federal government in some circumstances. Various estimating regimes have been developed to predict a chemical's toxicity, including methods that estimate the toxicity of a compound by evaluating a chemical's structure and comparing it to the hazards of similarly structured compounds. Each of these methods has limitations, and an entire discipline has emerged around interpreting results of these tests.

Government agencies and standard-setting bodies have created numerous PBT lists, all with differing criteria for toxicity. Most PBT lists use existing toxicity lists to determine whether a chemical qualifies as toxic. Often, the criteria for PBT lists will also consider volume of use, and evidence of the contaminant in the environment as a surrogate for direct measures of exposure.

It is the recommendation of the authors of this paper that environmental non-governmental organizations (ENGOs) initiate the development of consensus criteria for persistence, bioaccumulation and toxicity leading to an agreed target list of chemicals. The authors also recommend that ENGOs adopt, in the interim, appropriate existing lists of PBTs to prioritize for phase out in policy initiatives and in market campaigns.

Other Candidates for Phase-Out

In addition to persistent, bioaccumulative and toxic compounds, what compounds should be considered for phase-out? This question has been tackled by a number of independent panels, agencies, and jurisdictions. Each has developed a unique set of priorities, algorithms or ranking systems to prioritize chemicals for phase out. Each has developed a rationale to argue that these chemicals cannot be managed. The rationales include, for instance, consideration of inherent properties that pose unacceptable hazards or risks; or the ubiquity of use resulting in persistent exposure. Below is a brief review of some of these chemical categories, with recommendations for action.

Very Persistent, Very Bioaccumulative Compounds

The European Union has proposed prioritizing chemicals that are very persistent and bioaccumulative, even in the absence of data on toxicity. The proposed REACH legislation has forwarded a definition of very persistent, very bioaccumulative (vPvB) chemicals with a bioconcentration factor greater than 5,000, and a half life (persistence) of greater than 60 days in marine or freshwater and greater than 180 days in marine or freshwater sediment. The rationale for the inclusion of these compounds on priority lists is the likelihood of widespread contamination of the environment and the foodchain based on their inherent characteristics. This position is based on several observations: only a handful of chemicals have a complete set of toxicity screens; we do not have these screens for most vPvBs; chemical toxicities are often revealed over time as we learn about new endpoints of concern and as our tools for discernment of problems improve; and a mistake with vPvBs can result in irreversible contamination of the biosphere.

To address these concerns, the European Union has proposed a list of chemicals for consideration as vPvB, although no agreed upon list has yet been developed by any authoritative body.

It is the recommendation of the authors of this paper that ENGOs initiate the development of criteria for vPvBs to prioritize for phase-out in policy initiatives and in market campaigns.

Pervasive Due to Continuous Release

A joint United Nations Environment Programme/Global Environment Facility (UNEP/GEF) project broadened the definition of persistence to include chemicals that are "pervasive due to continuous release." This effectively extends the concept of persistence to include some hazardous chemicals that do not meet the technical criteria of lasting in the environment for 2 or 6 months, but which result in chronic exposures, for example, the pesticides chlorpyrifos and atrazine because of their widespread and continuous use.

The concept of persistence due to continuous release is just emerging; there are no accepted lists of chemicals and no defined criteria as yet. This designation has been suggested for chemicals based on direct measurement in human body burden testing, in product or household dust testing, or because of data on their ubiquitous use. Concerns center on chemicals with hazardous or toxic properties. The rationale for inclusion on a phase out list is based on the observation that some chemicals, because of the ubiquity of their use, will necessarily result in widespread exposure to the general population, including vulnerable subpopulations. Reduced use typically isn't an option because the chemicals are used in products that by definition are widely distributed, or because they are used as part of widespread practices. Still, much work remains to be done to further develop criteria for this category of chemicals.

It is the recommendation of the authors that environmental nonprofits initiate a process to further understand the issues of chemicals that are pervasive due to continuous release, and to propose a set of criteria for prioritization, as well as recommendations for phase out candidates.

Highly Hazardous Chemicals (not Persistent or Bioaccumulative or Pervasive)

Researchers, authoritative bodies, and government entities have prioritized chemicals for elimination based on their hazardous or toxic properties. Some lists explicitly recommend phase out, while others recommend prioritizing action to reduce releases and/or exposure.

Every government has developed priority lists. For instance, in Europe, the REACH initiative has prioritized carcinogens, mutagens, reproductive

toxins, and endocrine disrupters, PBT's, vPvB's, and other highly toxic chemicals. These lists, however, are often not explicit about which compounds merit phase out and which chemicals should simply be managed, registered and reduced.

A number of attempts have been made to address the question of phase out candidates. One such attempt, *"Criteria to Identify Chemical Candidates for Sunsetting in the Great Lakes*[9]*"* by Foran and Glen, provides one example of a methodology for creating such a list.

Foran's and Glen's methodology assessed chemical hazard by evaluating toxicity data, and surrogates for exposure. Bioaccumulation, persistence, and volume of use determined exposure. Categories that address adverse impacts to aquatic biota, terrestrial and avian organisms, non-mammalian species; and mammalian species determined toxicity. Each toxicity and exposure category received a high, moderate, or low concern score. Chemicals scoring high in any toxicity category, and high in release or production, or chemicals scoring high in any acute or chronic toxicity category and high in persistence or bioaccumulation were considered candidates for sunsetting.

The triggers used to determine whether a chemical merited a high, moderate or low designation would require many additional pages to fully describe. Generally, methods determining severity and potency of a chemical influenced toxicity scoring.

The authors of this paper recommend adoption of a transparent methodology for the prioritization of highly hazardous chemicals to set for phase out in policy and market campaigns.

NOTE: *There are currently no lists that tackle the concern that chemicals can act antagonistically, synergistically, or otherwise in ways difficult to predict, resulting in largely non-quantifiable toxities and risks.*

How Could PBT or other Highly Toxic Chemical Elimination Work?

There are also different ways to interpret what it means to "eliminate" PBTs and other highly toxic chemicals. Some regulations ban the manufacture or importation of specific chemicals, while others focus on specific uses, and still others try to prevent releases. While the meaning of eliminate may seem obvious, we may need to translate this concept into specific language of legislation or corporate policies.

Beyond concluding that we want policies to eliminate PBTs and other dangerous chemicals, we must decide *how* the policies will work and how we'll get them adopted. Since coherent chemical policy should avoid banning one dangerous chemical only to replace it with another, the mechanism to enforce elimination is intimately connected to whether or not the alternatives are safer (see Papers on "Substitution" and No Data, No Market").

While no single law or policy has succeeded in eliminating PBTs as a class, several existing and proposed initiatives provide examples of how this might be achieved in comprehensive national reform. Some existing federal laws deserve attention, in part because they illustrate approaches that have <u>not</u> worked. State laws and local programs help to fill the federal policy vacuum. But even the most ambitious state approaches have very limited scopes, often targeting a small list of specific PBTs. International developments, including the Stockholm POPs Convention and Europe's proposed REACH regulation, may provide policy ideas and practical opportunities for creating effective national approaches for eliminating PBTs and other highly toxic chemicals. Other approaches that have made progress but have fallen short of the goal of real phase out include a host of voluntary initiatives. The voluntary initiatives may provide some transition for industries to adopt new policies, but ultimately fall short if they are not followed up with an eventual mandate. (Additionally, there has been progress outside the public policy arena in winning commitments from business to phase out their use of selected PBTs). Finally, effective monitoring can be an important tool for advocacy and compliance under all of these approaches.

Federal Approaches

U.S. federal law on chemicals provides more examples of failure to eliminate PBTs than successes. The Toxic Substances Control Act (TSCA), which was intended to regulate both existing

and new chemicals, has proved essentially powerless to force the phase-out of PBTs that are among the 60,000 - 80,000 "existing" chemicals in EPA's database. When companies develop "new" chemicals they are not obligated to test for environmental or health impacts. However, they must present EPA with the chemical structure, with which EPA uses predictive models to estimate the persistence, bioaccumulation, and toxicity. These models are not foolproof. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requires substantial data, although this statute too, due to various loopholes, has proven inadequate to remove many dangerous agricultural chemicals from the market.[10]

Even when a chemical meets PBT criteria, the government rarely takes action to eliminate public or occupational exposure to it. Yet a crucial difference between FIFRA and TSCA is that agricultural chemicals must be registered before they can be sold, while industrial chemicals require no affirmative action by EPA. This is an important distinction. TSCA Section 6 allows EPA to regulate existing chemicals that pose "an unreasonable risk to health or to the environment." But in reality, the vast majority of industrial chemicals, including PBTs, are free to be manufactured, sold, and used without serious scrutiny because the courts have interpreted Section 6 so that it is effectively impossible to regulate. By contrast, EPA forced the phase-out of some pesticides under FIFRA, and significantly reduced others under the "reasonable certainty of no harm" standard found in the Food Quality Protection Act (FQPA) (which applies to pesticide residues on food). Moreover, pesticide manufacturers have sometimes withdrawn their chemicals voluntarily rather than face an outright U.S. ban, in order to avoid "prior informed consent" requirements that could harm their overseas sales. However, this allows the continued use and marketing of chemicals in other countries where laws are even more lax. While the FQPA has reduced certain uses of hazardous chemicals, the risk-assessment (versus a safer substitution) approach to the evaluation of pesticides allows the continued and unnecessary use of many hazardous chemicals. The process also has proven to be extraordinarily slow.

A few other positive federal examples exist. For example, the Clean Air Act has been relatively effective at forcing the phase out of ozone-depleting substances (ODS), such as chlorofluorocarbons. Section 604 defines lists of ozone depleting chemicals and defines a schedule for phase-out, unless specifically exempted. The Bush Administration is currently fighting with the international community to allow increased U.S. use/production of the ODS pesticide, methyl bromide. This is widely viewed as a U.S. attempt to undermine the Montreal Protocol on Ozone Depleting Substances.

State and Local Initiatives

Some of the most promising advances on PBT elimination are being made at the state and local levels. Bans on polybrominated diphenyl ethers (PBDEs) in California, New York, Michigan, Washington, Illinois, Maine and Hawaii represent an approach to target a few specific compounds and fix a date after which they can no longer be produced or sold in the state. These efforts were aided by comparable action taken first by the European Union on the penta- and octa-brominated formulations and by the growing evidence of human and environmental contamination demonstrated through biomonitoring. The initiatives were in part successful because they were not strongly opposed by industry. Industry may have hoped to stop momentum for broader phase outs by supporting limited bans. They also may have already largely achieved the desired outcome by voluntary action.

City and county-wide municipal purchasing policies to phase out PBTs are widespread and new efforts are emerging regularly. For example, Seattle passed a PBT-free resolution, Boston passed a dioxin elimination purchasing resolution, Buffalo recently adopted a PBT-free purchasing resolution, and San Francisco and Erie County, New York each have PBT-free purchasing initiatives.

A set of integrated approaches has proved effective in phasing out several PBTs in consumer products. Originally informed by Toxics in Packaging laws more than 10 years ago, this framework has been adopted into law in Maine and other states to address mercury products, arsenic-treated wood and, most recently, brominated flame retardants. These approaches generally focus on single chemicals, followed by a process of identifying product-specific uses, public notification, and restrictions on sale, use and disposal.[11] The State of Washington launched a PBT initiative in 2000 that is now a funded program of the state's environmental agency. The

program prioritizes elimination of mercury, PBDEs and other PBTs using voluntary and regulatory approaches.

There are also many voluntary state and regional initiatives by the industry sector to reduce or eliminate PBTs.

Finally, the role of grassroots activism in eliminating PBT sources has been dramatic. For example, the decrease in dioxin air emissions from 1987 to 1995 reported by the USEPA is largely due to the closure of the worst sources of dioxin emissions - Municipal Solid Waste Incinerators (MSWI) with Hot-side Electrostatic Precipitators (ESPs) and Medical Waste Incinerators (MWI). The reduction in dioxin emissions from these two sources alone accounted for over 90% of the total reduction in dioxin emissions during this time period.[12]

International Developments

POPs. The Stockholm Convention on Persistent Organic Pollutants (POPs) entered into force in May 2004. The treaty requires action by national governments on an initial list of twelve POPs chemicals,[13] and it establishes a process for identifying, evaluating, and adding other chemicals with POPs characteristics. Any country that is party to the treaty can nominate a chemical for listing. An international expert review committee will then determine whether the chemical meets the POPs criteria. After an in-depth risk assessment and risk management evaluation, the chemical may be banned or severely restricted under the treaty.

With the exception of the by-product chemicals (dioxins and furans), the U.S. has already taken action on the Stockholm Convention's "dirty dozen," particularly in regard to manufacture and distribution of manufactured chemicals. The extent to which the treaty may trigger further U.S. regulation of these chemicals or the regulation of additional POPs will depend on how closely the required implementing amendments to TSCA and FIFRA are tied to the international processes under the treaty. The U.S. has not yet ratified the Stockholm Convention, pending congressional action on implementing legislation.

REACH. The European Union's proposed REACH regulation provides another model for forcing the elimination of PBTs and other dangerous chemicals. REACH requires "registration" (a data reporting requirement that will be phased in over an 11-year period) of chemicals that are manufactured, used, or imported in the EU in quantities over 10 metric tons per year. REACH would require data on persistence, bioaccumulation, some kinds of toxicity, and other information. Of the estimated 30,000 chemicals that will be registered over the next dozen years, approximately 1,400 are expected to require explicit approval, known as "authorization." The actual phase-out could be accomplished if governments refuse to authorize chemicals for some or all uses. In effect, REACH will effectively create a list of accepted chemicals/uses, rather than a list of banned ones.

SAICM. Another emerging international process with some relevance to PBT elimination is the Strategic Approach to International Chemicals Management (SAICM). The SAICM is intended to give substance to the goal adopted at the World Summit on Sustainable Development (WSSD), to "achieve by 2020 that chemicals are used and produced in ways that lead to the minimization of significant adverse effects on human health and the environment." While this goal is aspirational (i.e., not legally binding or enforceable), it is one that the Bush Administration agreed to, and is something we could use to support our arguments for chemicals reform in the United States. International negotiations are ongoing to define the scope and impact of SAICM, with finalization of the negotiation process set for February 2006.

Corporate Action

Governments have sponsored industry and sector-based voluntary pollution prevention initiatives for years, often in place of regulation and often as a result of NGO pressure. Typically multi-stakeholder, with jointly identified lists of priority chemicals, these efforts almost always include PBTs. Examples include the Great Printer's Project, the Automotive Pollution Prevention Project, the American Hospital Association/Environmental Protection Agency's Memorandum of Understanding, and numerous other initiatives. Governments have also launched or hosted (after NGO pressure) cross-sector initiatives at the federal, state and city levels, again with identified lists of priority chemicals and multi-stakeholder processes. Examples of those efforts include the Binational Toxics Strategy, Washington State's PBT program, and San Francisco's PBT initiative, among many examples.

Similarly, NGOs such as Health Care Without Harm, the Healthy Building Network and others have launched sector-based campaigns, typically with long-standing NGO priority chemicals or materials as the focus. In addition, corporate campaigns directed at a single or several companies have targeted priority chemicals. NGOs have also launched multi-sectoral and retailer efforts, like those in the UK with Boots and Marks & Spencer on a range of priority chemicals. Marks & Spencer has sought to phase out pesticides, PVC, phthalates, alkyl tins, azo dyes, and other priority chemicals.

Regulation, or the threat of regulation has also played a role in market transformation. A recent example is the European Restriction on Hazardous Substances (RoHS) Directive, which was a major catalyst for research and adoption of lead free solutions in electronic equipment by Dell, Sony, NEC, Fujitsu, Hitachi Matsushita and Panasonic.

Industries have also adopted on their own initiative strategies to move away from hazardous materials. Recently for example, several health care institutions announced plans to adopt a comprehensive chemicals policy. These policies are meant to go beyond the chemical-by-chemical approach to adopting safer alternatives for classes of chemicals. These policies advance key principles like shifting the burden of safety testing to the manufacturer, substituting safer materials as available, and preferring competitive products that are manufactured without target chemicals. Nearly every industry sector has market leaders that have developed their own internal policies to identify priority or restricted chemicals. These policies provide a model for transitions to safer materials, and help build momentum and experience for national chemicals policy reform.

Monitoring

Monitoring international, national, or state regulatory measures to phase out PBTs and highly toxic chemicals will be important to ensure compliance and to assess the effectiveness of such measures. National assessments of human exposures through the Center for Disease Prevention and Control's (CDC) NHANES biomonitoring studies has been useful in identifying chemical exposure trends, new chemicals of concern, highly exposed or especially vulnerable populations, and has established a reference range for exposure for the average US citizen. Using CDC data, or data from their own biomonitoring projects, NGOs and community-based organizations have been able to raise public awareness about inadequacies of regulations. They have shown that some levels of exposure are well above what would be predicted from published release and usage data, and have leveraged campaigns designed to phase out toxic chemical production and use. Human biomonitoring can be a strong tool, if strategically used in ways that indicate source or pathway, in PBT phaseout. Biomonitoring can also be resource intensive, may not produce useful data, or may produce data that can stigmatize or harm those communities undertaking such studies.

Monitoring of environmental media, biota, household dust and products also play a role in assessing exposure, and evaluating progress toward goals to reduce hazardous chemical use.

[See Annex: "Criteria & Lists for Identifying Priority Chemicals for Elimination & Reduction," Compiled by: Tracey Easthope & Laurie Valeriano, November 18, 2004.]

ENDNOTES

1 *Chemical Regulation: Options Exist to Improve EPA's Ability to Assess Health Risks and Manage Its Chemical Review Program* (GAO, June 2005), p.28–29.

2 USGS Toxic Substances Hydrology Program, definitions. *http://toxics.usgs.gov/definitions/bioaccumulation.html*

3 Ibid.

4 Ibid.

5 PBT Profiler, definition. *http://toxics.usgs.gov/definitions/bioaccumulation.html*

6 LAMP definitions, US EPA, *http://www.great-lakes.net/humanhealth/about/words_b.html*

7 Ibid.

8 Ibid

9 "Criteria to Identify Chemical Candidates for Sunsetting in the Great Lakes, Jeffrey Foran, PhD and Barbara Glenn, MPH, Environmental Health and Policy Program, 1993

10 See for example: *Chemical Trespass, Pesticides in Our Bodies and Corporate Accountability* by Kristin S. Schafer, Margaret Reeves, Skip Spitzer, Susan E. Kegley, Pesticide Action Network North America, May 2004

11 See Maine's mercury product policy framework *http://janus.state.me.us/legis/statutes/38/title38ch16-Bsec0.html*

12 See Center for Health Environment and Justice evaluation of the role of grassroots activism in PBT reduction.

13 The initial twelve POPs are: aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene, polychlorinated biphenyls, dioxins and furans. With the exception of DDT, countries are required to "eliminate" production and use of the intentionally produced POPs. However, there are a number of exceptions to that requirement, e.g., laboratory-scale research or reference standard; closed-system, site-limited intermediates; and unintentional trace contamination.