

TOXIC CHEMICAL MANAGEMENT IN MASSACHUSETTS:

AN ANALYSIS OF FURTHER CHEMICAL RESTRICTION POLICIES

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The Toxics Use Reduction Institute is a multi-disciplinary research, education, and policy center established by the Massachusetts Toxics Use Reduction Act of 1989. The Institute sponsors and conducts research, organizes education and training programs, and provides technical support to governments to promote the reduction in the use of toxic chemicals or the generation of toxic chemical byproducts in industry and commerce. Further information can be obtained by writing the Toxics Use Reduction Institute, University of Massachusetts Lowell, One University Avenue, Lowell, Massachusetts 01854.

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During the study we met on occasion with representatives of the industrial and public interest communities. At the conclusion of the study we prepared a draft of this report and sent it out for review. We wish to acknowledge and thank all of those who provided advice during the study and reviewed the draft report. These included John Bulko, Janet Clark, Patrick Demers, Michael Ellenbecker, Hillel Gray, Tim Hawes, Ed Jamro, George Lemos, Ray Lizotte, Jack Luskin, Keith McCoy, Susan Peck, Rick Reibstein, Rob Sargent, Susan Shepherd, Susan Swedis, Ardis Vaughan, representatives from the Department of Environmental Protection, Department of Public Health, and Executive Office of Environmental Affairs. We appreciate all who shared their time discussing the crude and fine points of chemical restriction policies.

There were significant differences among those who reviewed the draft report. We have tried to add many of the ideas and clarifications that were suggested by reviewers. Yet, we recognize that this final document will not satisfy all of those who reviewed the drafts. We acknowledge and respect these differences. Of course, we take full responsibility for the conclusions and opinions that are presented in this final version.

EXECUTIVE SUMMARY

1. Introduction

The growing awareness of the intractable linkage between environment and development is reflected in the emergence and implementation of the principles of toxics use reduction and sustainable development. These two concepts emphasize and promote a collaborative relationship between government and industry to attain the goals of a cleaner, safer, and more productive society.

In Massachusetts, the Toxics Use Reduction Act of 1989 (TURA) focuses on the reduction in use of toxic substances or generation of hazardous wastes through state funded research, education, and technical assistance and industry planning and voluntary reductions. Those who drafted TURA also recognized that other policies, beyond the scope of the Act, may be necessary to reduce the risks of toxic chemicals in the Commonwealth. With this in mind the legislature required that the Toxics Use Reduction Institute "... conduct a detailed study on potential restrictions on the use of chemicals in the commonwealth."

This report meets that mandate by providing a detailed analysis of the problems toxic chemicals pose in Massachusetts, the wide array of policy options the state could affect to respond, the ambiguous and fragmented approach that currently exists, the social, economic and environmental effects that may come from a restriction on some priority chemicals, a review of more systematic and comprehensive policy models and a proposal for a state Toxic Chemical Transition Process that could be effectively implemented today.

2. Toxic Chemicals in Massachusetts

Toxic chemicals are in the drinking water, the environment (air, water, and wildlife), and the workplaces of Massachusetts. Polychlorinated biphenyls (PCBs) have caused the closure of New Bedford Harbor to fishing and shellfishing, chlorinated hydrocarbons have caused the closure of drinking water supplies, and one quarter of all surveyed rivers in Massachusetts contain toxic chemicals. While toxic chemicals continue to be used and released into the workplaces and environment of Massachusetts the long term effects of these chemicals on the environment and on humans is little understood. Often times evidence of the effects of toxic chemical exposure in humans is difficult to identify because the adverse effects appear in offspring, there are a multitude of chemical exposures to sort out, and the connection between an observed adverse effect and a specific toxic chemical is difficult to establish.

More research into the hazards associated with toxic chemicals in Massachusetts is needed. However, public commitment to a safer environment requires that exposure prevention policies move forward where the weight of evidence is compelling and the technical and economic costs make precaution prudent.

3. Definition of Chemical Restrictions

Chemical restrictions are one family of exposure prevention policies that encourages or directs a company to reduce or eliminate production, uses, or distribution of a chemical (or class of chemicals) or product which contains the chemical. Chemical restriction policies differ from toxics use reduction and pollution prevention programs because their goal is to eliminate the use of a chemical or product. Chemical restriction policies differ from chemical bans and phase-outs by allowing companies the opportunity to meet the goal of elimination through means other than mandatory action (see Table 3.1 for definition of chemical restriction).

TABLE 3.1 DEFINITIONS OF CHEMICAL RESTRICTION TERMS

Absolute or Outright Ban	Prohibits the production, all uses, and distribution of a chemical or class of chemicals.
Chemical Restrictions	Any policy that encourages or directs a company to reduce or eliminate production, uses, or distribution of a chemical (or class of chemicals) or product which contains the chemical.
Conditional or Use Ban	Prohibits a specific use or uses of a chemical or product.
Phase-Out (Sunset)	Bans the use and/or production of a chemical or product over a period of time. A phase-out can be either conditional or absolute.
Severe Restriction	A regulatory policy so stringent that most uses of the chemical or product are rendered technically infeasible or economically undesirable.

4. Chemical Restriction Policies

A variety of policy options are available to the state if it should decide to implement a chemical restrictions program. Voluntary programs that seem relevant to a chemical restrictions program are those that help industry make a transition to safer substitutes. The "help" side of voluntary policies provide technical support, technical information, research, product development, and product evaluation to assist firms in voluntarily ceasing the use of a toxic chemical.

Economic incentive programs that would be appropriate for promoting chemical restrictions are grants, loan assistance, and tax credits. The advantage of grants over loan assistance and tax credits is that they can be used to promote the research on new technologies. Loan assistance and tax credits are useful for promoting chemical restrictions after firms have identified technologies they want to use.

Mandatory informational policies that would be appropriate for chemical restrictions are reporting and planning requirements. The current Massachusetts planning requirements under TURA could be expanded in a chemical restriction program to require companies to plan for a chemical transition process. Ultimately, mandatory regulatory policies -- e.g., conditional and absolute bans, enforcement orders, chemical registration, and regulations -- would be needed to provide the legal mandate for chemical restrictions.

5. Chemical Ban Case Studies

This study has completed case reports on six chemical/product bans that reveal a "natural history" of bans that unfolds over time. These histories revolve around the identification of the perceived problem chemical/product, the will to respond to the problem on both the public and private sector levels, the struggle for an effective solution, and the development of alternative processes and chemicals.

Currently bans are implemented in reaction to crisis situations. Such crises result in advocates arguing for a ban, manufacturers arguing against a ban, and government officials arguing for a compromise solution. The outcome is conditional bans that solve only part of the problem.

To overcome the shortfalls of the current process, a systematic process needs to be developed that encourages all concerned parties to be involved. In exchange for corporate participation, the state needs to assist in the development of alternatives and provide an infrastructure helpful to companies interested in moving towards safer production.

6. Effects of Toxic Chemical Restrictions

The macroeconomic and microeconomic effects of a chemical restriction vary widely, depending on the target chemical and how the policy is implemented.

Environmental and occupational health and safety regulations play only a marginal role in industrial development decisions. However, since chemical restrictions are more stringent than regulations, they may cause greater negative economic impacts than environmental regulations. Therefore, if the state is to pursue an industrial development oriented chemical restriction policy it must enact measures to alleviate the costs of the transition to a safer substitute.

Of the chemical manufacturers, distributors and users in Massachusetts the users of toxic chemicals would be the largest segment of the market affected by a chemical restriction policy. Potential effects of a chemical transition process on users include:

- pushing Massachusetts companies ahead on the technological transition curve,
- imposing high one-time costs for cost-competitive industries,
- increasing operating costs, and
- requiring one-time capital costs.

Two feasibility analyses completed for this study reveal that often substitutes are available, are being used by Massachusetts companies, are "effective", and are being developed by competitive and innovative firms.

The environmental and social (public and occupational health) effects of a chemical restriction policy would depend on the chemical restricted. In general, however, chemical restrictions are effective in removing the chemical from the environment, thereby improving environmental and public health in relationship to the amount of chemical in the environment and in humans. For example, the levels of DDT and PCBs in humans and animals of prey have declined dramatically after uses of these chemicals were banned. But how effective restrictions are overall depends on the toxicity of the substitute. Table 6.1 summarizes the effectiveness of the chemical bans studied as background cases for this report based on exposures to the target substance.

TABLE 6.1 CASE STUDY BANS: ASSESSMENT OF EFFECTS

Effect of Ban	DDT	EDB	Ozone Depleting Chemicals	PCBs	UFFI
Reduced Public Exposures to the Substance	Yes	Yes	Not yet -- yes in the future	Yes	Yes
Reduced the Substance's Presence in the Environment	Yes, but toxaphene caused new problems. Most uses of toxaphene were banned in 1983.	Yes	Not yet -- yes in the future	Yes	Not Applicable
Reduced Occupational Exposure to the Chemical	Yes, but new problems with toxaphene	Yes	Yes	Yes	Yes

7. Existing State Policies for Chemical Restrictions

A review of existing chemical restriction authorities in Massachusetts reveals a fragmented and inconsistent array of government programs with no clear, well-focused, or comprehensive authority for the restriction of toxic chemicals. Specifically:

- The authorities to ban, phase-out, or restrict chemical usage, production or distribution are either limited in scope or ambiguous in the extent of their authorization of decisive regulatory action.
- The state Toxics Use Reduction Act provides indirect opportunities for restricting toxic chemical use, but nowhere does it offer a clear state mandate for chemical restrictions.
- There is no formal, systematic process for guiding state action in restricting toxic chemicals.
- With the exception of the limited research program of the Toxics Use Reduction Institute, no state authority is seeking out and promoting substitutes for toxic chemicals that may be considered for restrictions.

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The Commonwealth could continue on without a more rational process for managing toxic chemical risks. The specific laws and authorities currently in place provide an ad hoc collection of medium specific and problem focused functions that serve to address some of the most publicly recognized health and environmental exposures to toxic chemicals.

Yet, this study finds that the actual costs and potential risks of continuing on with the status quo make a compelling case for state action. These costs and risks of maintaining the status quo include the following:

- there is no systematic state process for determining whether the Commonwealth is focusing on high risk chemicals,
- there is no overall, comprehensive process for assuring that current state programs involved with toxic chemicals are well coordinated and effectively designed to yield the maximum benefit for the available resources,
- the state relies heavily on regulatory instruments for managing toxic chemicals and seldom considers the potentials offered by non-regulatory approaches,
- there is no means to assure that firms are receiving clear and non-conflicting messages from the various public agencies involved in toxic chemical management,
- there remains a large volume of toxic chemical releases in Massachusetts that could be accumulating in ecological niches or human tissue that is not attended to because such accumulation is incremental and not presently noted as a "public problem", and
- there remains a significant amount of toxic chemical use in the Massachusetts economy that has not been adequately reviewed for safer or more sustainable substitutes.

For these reasons it appears desirable for the Commonwealth to consider the benefits of a more formal, comprehensive, and systematic approach to managing toxic chemicals.

8. Existing Toxic Chemical Restriction Models

There are three basic toxic chemical restriction models: chemical registration, chemical ban, and phase-out process models. Chemical registration programs are exemplified by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), chemical ban programs are exemplified by the federal Toxic Substances Control Act (TSCA), and phase-out process programs are exemplified by the Swedish proposal to the Organization for Economic Cooperation and Development. Of the three models, the phase-out process model would be attractive because it avoids many of the bureaucratic encumbrances of the chemical registration model and the lengthy analysis and legalistic proof of the chemical ban model.

9. Proposed Chemical Transition Process

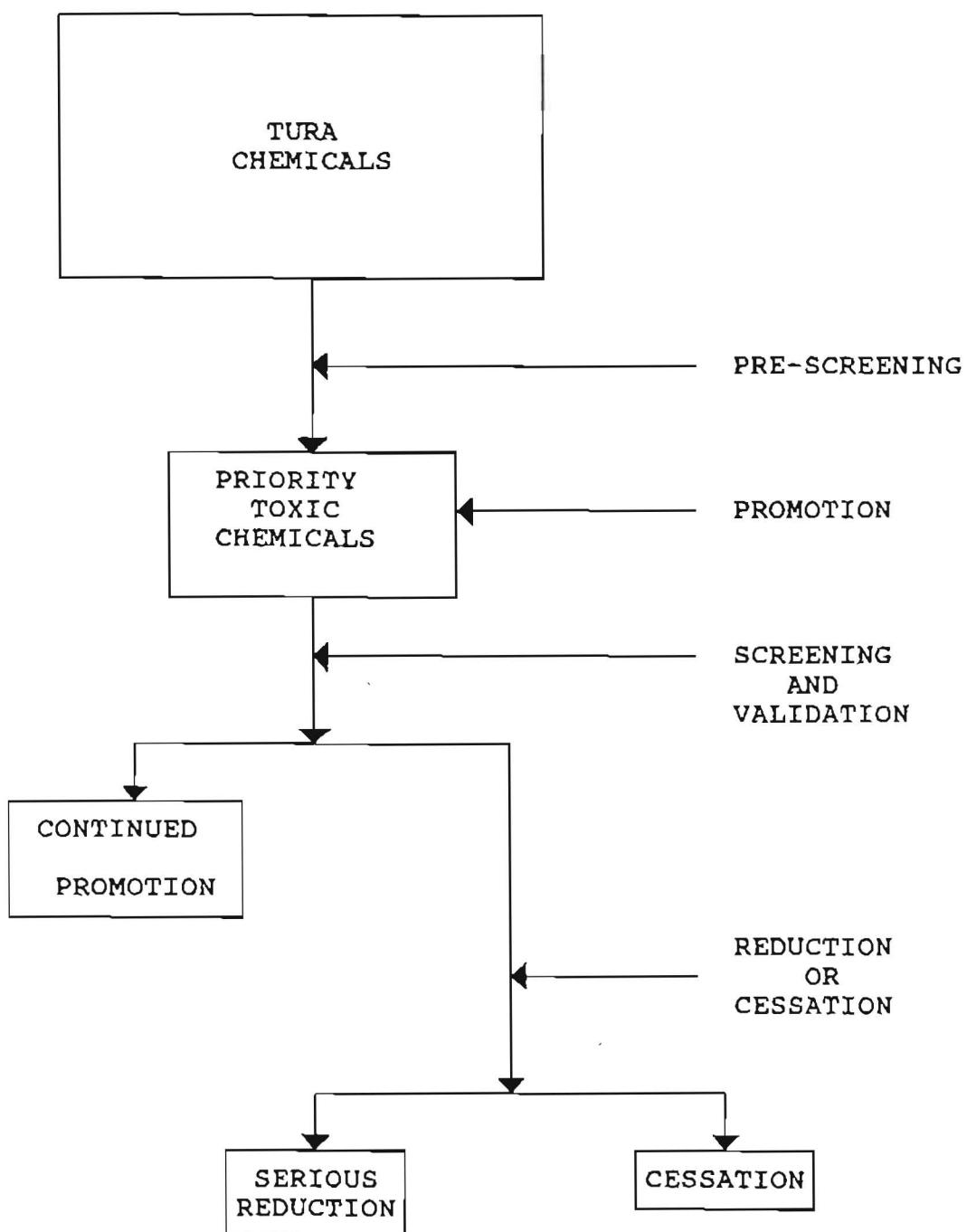
Because the phase-out process model respects the time necessary to move from chemicals of high concern to safer substitutes and because it would include policy options that promote the development and diffusion of the substitutes, the model is better characterized as a toxic chemical transition model than a chemical restriction model. The elements of a rational, collaborative, and staged program are reflected in the four stages of a Toxic Chemical Transition Process (see Figure 9.1):

- 1) pre-screening,
- 2) promotion,
- 3) screening and validation, and
- 4) reduction and cessation.

The goals of the Pre-Screening Stage would be to identify "priority toxic chemicals" from the list of TURA chemicals and to create a List of Priority Toxic Chemicals that would serve as the basis for prioritizing toxic chemical management resources in the state. "Priority toxic chemicals" would be chemicals identified as particularly problematic to human or environmental health. Once identified as a priority toxic chemical, a chemical would receive priority attention for voluntary reduction assistance (the Promotion Stage). Elements of the pre-screening process would be:

- data collection,
- public input,
- data analysis, and
- development of a list of toxic priority chemicals.

FIGURE 9.1 SCHEMATIC OF THE TOXIC CHEMICAL TRANSITION PROCESS



The Promotion Stage would involve: 1) continued data gathering to define the functional characteristics of the priority chemicals and to determine the availability of substitutes for each process a chemical is used in (preliminary impact analysis); and 2) efforts to motivate voluntary shifts to chemicals or processes that are believed to offer significantly improved environmental performance. This stage would rely on a mix of possible policy instruments with an emphasis on voluntary and economic instruments such as sponsoring research and development, providing targeted technical and financial assistance, and providing regulatory flexibility.

The Screening and Validation Stage would involve culling the List of Priority Toxic Chemicals down to a few "target chemicals" for phase-outs, validating that decision with a final impact analysis and creating a Target Chemical Transition Plan for those target chemicals that, after screening and validation, still appear as candidates for phase-outs. The final impact analysis would consist of three parts: economic, environmental and social analyses. The economic analysis would focus on the economic costs and benefits of complying with the restriction. The environmental analysis would focus on the restriction's effects on air, water, and land resources, wildlife, plants, and ecosystems. The social analysis would focus on the restriction's effects on employment and public and worker health.

In the Reduction and Cessation Stage, policies would be implemented for moving chemicals beyond the voluntary reductions of promotion to a legally authorized phase-out of target chemicals. The Reduction and Cessation Stage would involve three steps: 1) planning, 2) other regulatory reduction policies, and 3) a scheduled and legally mandated cessation of the target chemical. In some cases regulatory reduction policies may meet the goals of the Target Chemical Transition Plan and there will be no further need for legal action. In other cases, the last step, cessation, will be necessary. The scheduling of the phase-out will depend on the availability of substitutes and the costs of implementing the phase-out as determined in the Screening and Validation Stage.

The Toxic Chemical Transition Process would encourage and support the elimination of priority chemicals, and ultimately eliminate the majority of uses of a few target chemicals through a staged phase-out, after thorough economic, environmental, and social impact analyses. The staged phase-out would include the use of a variety of policies, from technical support to prohibitions on specific uses.

10. Conclusion

We are persuaded by information presented here that the legacy of toxic chemical emission in Massachusetts has created significant costs to the government, business community, and general public. We recognize the progress that has been made in controlling and preventing pollution, yet, we are still persuaded that some highly toxic

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substances are used and released where a more precautionous approach could reduce that use to the point of cessation without dire economic consequences.

We are persuaded by the case studies prepared as background documents for this report that simple government bans on toxic chemicals are hard to achieve, too limited in scope, and seldom effective without many other business and government initiatives. We have found that Massachusetts state laws and authorities have left the state with a fragmented mix of programs lacking in foresight and ill prepared for assessing the overall risks of toxic chemicals, identifying priorities among chemicals, and creating well focused toxic chemical management programs.

We propose here a fairly ambitious program. Our proposal would establish a new governmental focus for better accounting for and managing toxic chemicals in Massachusetts. It would create a staged process that would identify priority chemicals and where economically feasible would offer industry time and resources to phase-out the use of those chemicals. Only where voluntary efforts do not appear effective and the substance is of significant concern, would the state move forward on a regulatory driven phase-out. The legal authority to prohibit the use of a chemical would then be used only in the final phases of a well planned conversion process. Recognizing that there are many interests at stake in this process, the program is designed to be open and participatory, actively engaging industry and the public and evolving as the state and industry learn more about the safety of substitutes and the complexities of conversion.

While we recognize that there are differences on this point, we believe that there is a compelling argument for state action. We demonstrate that the state could take such action with or without new legislation. With this proposal we argue that the Commonwealth could take a more anticipatory, planned, and integrated approach to toxic chemical management that would better protect public health and the environment and, at the same time, promote a cleaner, safer, and more sustainable industrial economy.