

Activities and Accomplishments of the Massachusetts Toxics Use Reduction Program

*Report to the Governor of the Commonwealth of
Massachusetts*

Fiscal Year 2012

By:

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Executive Summary

Enacted in 1989, The Toxics Use Reduction Act (TURA) is designed to reduce the use of toxics, energy, water, and materials while simultaneously saving companies money. The TURA program activities are implemented by three agencies: Massachusetts Department of Environmental Protection (MassDEP), the Office of Technical Assistance and Technology (OTA), and the Toxics Use Reduction Institute (TURI). These agencies work in conjunction with an Administrative Council, composed of the heads of six state agencies or their designees; an Advisory Committee, composed of citizen stakeholders; and a Science Advisory Board (SAB).

Twenty-three years later the law continues to produce benefits for the Commonwealth. Companies reporting to MassDEP show a 58 percent reduction in toxics use since 1990. Companies working with OTA continue to find substantial savings in changes that improve processes and reduce environmental impact, and the Toxics Use Reduction Institute continues to support Massachusetts companies and communities through grants, training, research and other programs.

FY 12 Accomplishments:

- In FY 12, MassDEP collected and analyzed 1,484 individual chemical reports from 486 facilities. In addition, after comparing year to year reports, conducting 70 inspections of TURA filers and 190 screening inspections to determine if facilities were subject to the act, the department issued 36 Notices of Non-compliance and three higher level enforcement actions that included monetary penalties. The Toxics Use Reduction Institute funded research on safer substitutes, demonstrations of successful initiatives, and community projects. Its conferences and reports on nanotechnology, identifying safer alternatives, chemicals policy and the “wet cleaning” alternative to dry cleaning have been widely received, and Institute staff has begun a major collaborative initiative with industry to test alternatives to hexavalent chromium in defense and aerospace applications.
- OTA’s visits to 56 companies brought many into compliance with environmental, health and safety requirements, and resulted in company-reported savings of more than a million gallons of water, hundreds of thousands of dollars worth of waste reduction, hundreds of thousands of kilowatt hours of electricity, and more than 358 million Btu of fuel. Companies publishing case studies with OTA reported energy savings of more than 11 million kilowatt hours in electricity use, 55,000 pounds of toxics use reduction, and savings of more than \$1.5 million.



In FY2012 the Toxics Use Reduction Administrative Council acted to bring about further reductions in the use of trichloroethylene, formaldehyde and hexavalent chromium by manufacturers, and reductions in the use of perchloroethylene by dry cleaners. Through the Council, member agencies increased collaboration on toxics, focusing on revising requirements to use toxic chemicals in facilities covered by the Board of Cosmetology; opportunities to reduce the use of asthma-related chemicals; and incorporating preventive strategies into emergency preparedness efforts prompted by new hazardous materials processing regulations

of the Board of Fire Prevention Regulations in collaboration with the Division of Fire Safety at the Department of Fire Services.

The program's plans include:

- Continuing efforts to improve the Toxics or Hazardous Substances List that determines chemical coverage under the Act, by identifying chemicals to be added or removed from the list and designations of Higher and Lower Hazard Substances, in furtherance of the 2006 Amendments to TURA;
- Continuing to use the Administrative Council as a forum for coordinating work by member agencies relating to toxics;
- Continuing to identify priority areas and TUR opportunities through enhanced data analysis and communication; and
- Continuing to rely on the contributions of its Advisory Committee, Science Advisory Board, the member agencies of the Administrative Council, and interested members of the public, to find new ways to apply the common sense methods of toxics use reduction to reduce threats to health and the environment and to contribute to the development of a cleaner, greener Commonwealth.

Introduction

This report is submitted by the Administrative Council of the Toxics Use Reduction Act to the Governor of Massachusetts pursuant to Chapter 21I, Section 4(D). It summarizes program activities and results during fiscal year 2012.

From its inception by unanimous vote in 1989, the Toxics Use Reduction Act (TURA) has developed innovative policies and worked cooperatively with businesses to prevent pollution, minimize workplace and consumer exposures to toxic chemicals, and to reduce the risks associated with the storage, transportation, and disposal of toxic chemicals. The strategy of the Act is to address these problems at the source; it does not set limits on toxics use but requires reporting and planning to draw attention to opportunities to use safer materials, or to use less of these chemicals by using them more efficiently. The Act's regulations and education and assistance services are designed to prompt businesses to implement toxics use reduction (TUR) voluntarily. TURA is based on the concept that businesses will implement options to reduce environmental and health impacts if they see how they will lead to cost savings or product or process design improvements.



Data from manufacturers in the Commonwealth show that they now use hundreds of millions of pounds less toxics to achieve the same levels of production. Since 1990, companies covered by TURA have reduced their use of toxics by an estimated 58 percent, even though TURA does not require any reductions. This has been achieved through actions freely and individually chosen by businesses after first becoming aware of the quantities and costs of toxic chemicals they use, and the waste in their production processes. They then perform TUR planning, which is designed to identify cost effective ways to reduce chemical use and waste, and with many companies taking advantage of TURA's educational opportunities and technical assistance. Because of this documented success, in 2006 the legislature amended the Act to expand its focus to include the reduction of water, energy use, and the generation of materials commonly found in solid waste. TURA now promotes many aspects of business sustainability, helping to preserve jobs and economic health by efficiently stimulating production innovation and manufacturing efficiency.

The TURA offices are comprised of specialists at the Massachusetts Department of Environmental Protection, who ensure that large quantity users of toxic chemicals comply with planning and reporting requirements; the Office of Technical Assistance and Technology, which provides one-on-one direct and confidential assistance to toxics users; and the Toxics Use Reduction Institute, which trains professionals, educates the public, and stimulates research on TUR. Certified toxics use reduction planners, private professionals who play a vital role in maintaining the success of the program, help manufacturing companies understand their TUR options by preparing plans that examine ways to reduce toxics at the facilities.

TURA Program FY12 Revenues

Facilities	481
Chemical Fees	\$2,712,931
<u>Late Fees</u>	<u>\$30,000</u>
Total Revenues	\$2,742,931

TURA Program FY12 Expenditures

MassDEP	\$731,219
OTA	\$631,611
<u>TURI</u>	<u>\$1,397,331</u>
Total Expenditures	\$2,760,161



TURA employs a rich mix of strategies that includes education and training, manufacturing operations evaluation, and a flexible method of toxics regulation. Its recognition of the public's right to know about toxics use in their community makes toxics use patterns visible to all, especially to those who can take direct action within the manufacturing facility. Businesses have reported that they have saved more than the regulations have cost, and that they find TUR opportunities on a continuing basis.

The TURA program is overseen by an Administrative Council chaired by the Secretary of Energy and Environmental Affairs. The Council includes officials from the Departments of Public Health, Environmental Protection, and Labor Standards, and from the Executive Office of Housing and Economic Development and the Executive Office of Public Safety. An Advisory Committee made up of representatives from business, environmental, health and labor organizations, advocacy, and the general public provides perspective to the program offices and the Council. A Science Advisory Board provides the program with expertise for assessing the toxicity and hazards of chemicals and for prioritizing chemicals.

One of the stated purposes of the TURA legislation is to enhance the competitiveness of Massachusetts businesses. Enhancing the prospects for Massachusetts manufacturers is increasingly recognized as a key part of the state's economic policy. Increasing workforce skills, supporting innovation and entrepreneurship, increasing regulatory efficiency and reducing the costs of doing business are key steps recommended by the Economic Development Planning Council (established by the legislature in 2010). In furtherance of those goals, in November, 2011, the Commonwealth released *Building Bridges to Growth: A Roadmap for Advanced Manufacturing in Massachusetts*. For more than two decades, the TURA program has played a leading role in demonstrating how government can assist manufacturers; reduce their costs, prompt innovation, improve the efficiency of materials use in manufacturing, and comply with regulations in an efficient and cost effective manner. The many case studies and public demonstration events as well as the data from the companies themselves, illustrate how manufacturing can develop without unsustainable costs to health, safety and the environment. At the end of Fiscal Year 2012, as Massachusetts is poised to continue economic growth in the manufacturing sector¹, the Toxics Use Reduction program can continue to enhance the chances that this development will be both environmentally and economically sustainable.

This report is divided into two sections: ***Program Highlights***, summarizing the work of the Office of Technical Assistance and Technology, the Toxics Use Reduction Institute, and MassDEP; and ***Program-Wide Actions***, describing the work of the Toxic Use Reduction Administrative Council together with the Advisory Committee and Science Advisory Board.

¹ Staying Power II: A Report Card on Manufacturing in Massachusetts 2012, http://www.northeastern.edu/dukakiscenter/wp-content/uploads/Manufacturing-2012_138pp.pdf.

Program Highlights

The Massachusetts Office of Technical Assistance and Technology

OTA provides free assistance in reducing toxics use, energy or water use, and in complying with environmental, health and safety regulations. In order to ensure that companies and others will make use of OTA's services without fear of penalty, TURA mandates that OTA maintain confidentiality concerning sensitive information acquired in the course of providing assistance, unless it pertains to imminent danger, is otherwise required by law, or if it has permission to release the information. Although much of OTA's achievements are not shared with the public, the office publishes case studies with the permission of its clients, fact sheets, guidance and other reports, and presents generic information at public events and meetings.

Highlights of Assistance Provided

Special Initiatives

In FY 12, OTA called nearly 100 companies to make sure they were aware of recent regulatory changes involving trichloroethylene (TCE) and methylene chloride, and to offer assistance with reducing or eliminating the use of all hazardous solvents. OTA also conducted significant outreach with and through the Office of the State Fire Marshal - Division of Fire Safety to fire departments and the regulated community throughout the Commonwealth, to help them understand the value of preventive emergency planning and its relevance to new hazardous materials processing regulations. OTA also co-organized, with MassDEP and the U.S. Environmental Protection Agency, four workshops in Spring 2012 for companies filing under TURA and the federal Emergency Planning and Community Right to Know Act.

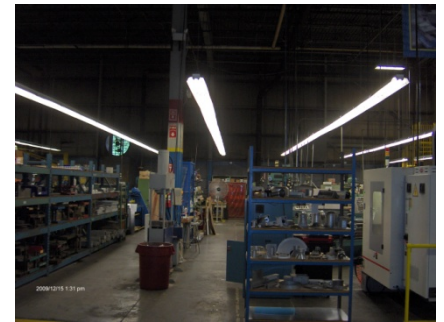
Onsite Visit Service

In addition to the assistance provided by OTA over the phone and through public events, OTA specialists were invited onsite to 56 companies in a variety of industrial and business sectors, half of which were companies OTA had never worked with before. Forty-three percent of the companies were TURA filers. Of the more than 100 recommendations made, about half have been implemented; while others remain under consideration. More than half of the implemented recommendations concerned regulatory compliance. The following are examples of the assistance OTA provided (results included when provided by company):



- Helped company switch from trichloroethylene (TCE) to an aqueous cleaner (hardware supplier).
- Helped company eliminate 547,500 pounds of food waste, saving hundreds of thousands of dollars annually in lost finished product (food manufacturer).
- Found a recycler who would take plastic trim the company previously disposed of as a waste (laminator).
- Recommended that a company install an automated energy management system for HVAC units and occupancy sensors which reduced electricity consumption by 195,000 kwh per year (medical device manufacturer).

- Recommended energy audit that lead to companies implementing projects that reduced energy consumption by 140,000 kwh (instruments and organic polymers).
- Recommended steam leak repairs that saved the company 358,000,000 Btu (textile).
- Recommended reuse of process water, reducing consumption by 164,000 gallons per year at one company and 1,000,000 gallons per year at another (paper and instrument manufacturer), saving tens of thousands of dollars.
- Designed a protocol to reduce spills from filling containers (fabric coater).
- Helped company reduce electric demand charges, saving \$2,277 the first year (plating company).
- Recommended coolant recycling, leading to reduction of 18,000 pounds of hazardous waste (machine shop).
- Recommended routine leak detection and repairs to air compressor systems at several companies, reducing energy losses and saving thousands of dollars in electricity costs.
- Informed several companies of utility incentives for lighting upgrades, installation of energy management software, and other energy efficiency projects.
- Helped companies adopt efficient spray-coating techniques and comply with relevant regulations (spray-coater, electroplater, plastics manufacturer).
- Helped companies understand hazardous waste, worker safety, and toxic reporting requirements (manufacturing and chemicals).
- Eliminated odors that were causing complaints from neighbors (auto body shop).
- Convinced several companies to initiate proper disposal of mercury-containing fluorescent lamps.



OTA also helped companies understand current regulatory requirements for occupational exposure and safety, new requirements pertaining to chemical reporting, and opportunities to capture new incentives for energy efficient equipment.

Advanced Technology

Working with the Massachusetts Technology Collaborative, OTA continued to provide technical support to a company seeking to develop new printing technology that would scale up existing digital print methods for high-output, replacing conventional screen printing with a low energy, less toxic process that would greatly speed production and possibly provide a competitive edge to textile firms in the Northeast. The idea for the technology originated at OTA and the company and the Collaborative are claiming that it can help bring



back jobs to an industry sector that was once much more important to the state's economy. OTA also arranged for a presentation by UMass Lowell researcher Dr. Sanjeev Manohar on recent work with carbon nanotubes, for companies positioned to make use of Dr. Manohar's findings to produce conductive screens more efficiently. OTA also presented to the Environmental Business Council and at an international conference on the Safe Development of Nanotechnology.

Sharing Information

Although those receiving assistance from OTA enjoy confidentiality, some are willing to share information with the public so that others may learn about the benefits of efforts to reduce toxics, energy, water, waste, or liability risks. In FY 12 OTA published a case study of its success in helping the biotech company ChemGenes to reduce its toxics use. ChemGenes, located in Wilmington, MA, requested a visit in connection with their use of volatile organic chemicals. OTA's recommendations led to the company replacing most of their chloroform use in the process of extracting genetic material with a blend of hexane and ethyl acetate. The company also invested in a new chromatography system that significantly improved the efficiency of their process. From 2007-2010 ChemGenes reduced their use of chloroform by 45,600 pounds and hexane by 9,403 pounds annually. The company has realized net savings of at least \$215,000 due to reduced chemical purchases, regulatory fees, disposal costs, and increased productivity, which has allowed the company to hire four new employees. See: <http://www.mass.gov/eea/docs/eea/ota/case-studies/chemgenes-corp.pdf>.

OTA also arranged for Gentex Optics of Dudley, MA, to share with other companies their successful energy conservation efforts at a training co-sponsored by OTA and TURI. Since 2005, the company has saved more than 11 Million kWh in electricity use, saving the company \$1.4 million dollars. The company also received \$900,000 in energy efficiency incentives from utilities, to replace three process chillers with two high energy efficiency models, and implemented heat recovery from electric curing oven exhaust to preheat the fresh air to the oven. OTA has helped dozens of companies to access utility incentive programs.

Energy Fact Sheet

OTA also published a fact sheet to assist companies in understanding their electricity bills, and learned during the process, that many do not use their bills as sources of information on how to reduce energy costs. The fact sheet reflects advice OTA has been providing on obtaining daily load profiles, and understanding "power factor" to reduce peak demand charges and to use electricity more effectively. See: <http://www.mass.gov/eea/docs/eea/ota/fact-sheets/elec-bill-fact-sheet-final.pdf>.

Environmentally Preferable Products

Since launching the state's program to identify environmentally preferable products in the mid-1990's, OTA has worked closely with the Operational Services Division (OSD), the state's purchasing arm, to develop contracts for greener products that agencies may purchase. In 2009, Governor Patrick issued Executive Order (E.O.) 515, which requires all Commonwealth Executive Departments to procure Environmentally Preferable Products (EPPs) and services whenever such products and services are readily available, perform satisfactorily, and represent the best value to the Commonwealth. OTA and OSD's EPP staff, charged with overseeing implementation of E.O. 515, formed a task force of representatives from the Departments of Public Health and Environmental Protection, the state's Occupational Safety and Health program, and the Toxics Use Reduction Institute. To assess progress in EPP purchasing, the Task Force has compiled and analyzed data and contacted agencies making significant purchases. As a result, Task Force members are working with the Department of Corrections on whether the cleaners it makes in-house can be designated as EPP, with the Department of Conservation and Recreation to examine how public restrooms in state

parks are and should be cleaned, and to develop guidance on safe disinfection practices that achieve public health and safety objectives without overuse of toxic disinfectants.

Reducing the Use of Chemicals Related to Asthma

In fulfillment of TURA's mandate to OTA to examine and report on barriers to toxics use reduction, the office has worked with representatives of the Department of Public Health, the state's Occupational Safety and Health program, TURI and the Lowell Center for Sustainable Production on what needs to be addressed to help bring about greater reductions in the use of chemicals that cause or exacerbate asthma. The focus of the work has been on formaldehyde, chlorine, and isocyanates, all widely used in a variety of settings, and on identifying opportunities for reduction and overcoming obstacles to greater understanding and implementation of those options. OTA is currently meeting with potential partners to plan training and outreach to reduce use and exposures from spray operations using isocyanates, and is working with several organizations to develop approaches to cleaning that avoid the overuse of disinfectants.

Educational Institutions

In 2010, with the Sustainability Coordinator of Suffolk University, OTA created the Massachusetts School Sustainability Coordinators Roundtable (MSSCOR), which currently has over 100 members on its mailing list. On April 4, 2012 MSSCOR, with the co-sponsorship of Second Nature (the organization that coordinates the American College and University Presidents' Climate Commitment) and the new President of Hampshire College, Jonathan Lash, held the first annual *Convocation of Students Working With Sustainability Coordinators*, to recognize and encourage the student contribution to staff efforts. Presidents of Massachusetts colleges were invited to review and select from student contributions, and eight colleges were represented at the event. (See: <http://campusgreenbuilder.org/MSSCOR>).

The Toxics Use Reduction Institute

The Toxics Use Reduction Institute (TURI) at the University of Massachusetts Lowell (UML) provides research, training, information, laboratory services and grant programs to reduce the use of toxic chemicals while enhancing the economic competitiveness of local businesses. Its training builds the skills and capacity of managers, technicians and consultants. Its grants support technology purchases, demonstrations, research and projects that reduce toxic chemical use in Massachusetts. Its information resources promote innovative green and sustainable production tools and methods. Its performance testing and on-line database of testing results help those selecting greener cleaners. TURI helps organizations raise awareness of the hazards of toxic chemical use and introduce safer alternatives in neighborhoods through support for education and training; and with industry and university researchers identifies and promotes innovation in science and technology (green chemistry, toxicity and exposure, nanotechnology, materials engineering, discussion groups, networks and demonstration). TURI is also a resource for policy considerations relevant to sustainable chemicals management.

TURI Highlights

FY12 University Research Grants

TURI provided funding to four UMass Lowell faculty members to conduct research into the development of safer methods and materials that are of particular interest to Massachusetts companies. The funding supported graduate students who worked on the following topics:

- Prof. Nancy Goodyear: Disinfection in homes and hospitals.

- Prof. Daniel Schmidt: Safer formulations for adhesives based on plant oils and other less hazardous ingredients.
- Prof. Ramaswamy Nagarajan: Safer surfactants for laundry detergents.
- Prof. Sanjeev Manohar: Safer conductive, transparent, flexible coatings for electronic applications.



FY12 Community Grants

TURI provided funding to four community organizations, allowing them to conduct projects on a regional or state-wide level to reduce the use of toxic chemicals in household cleaners, lawn care, and nail salons.

- Norfolk County 7 Public Health Coalition towns of Canton, Dedham, Milton, Needham, Norwood and Westwood: “Greening Nail Salons for Employees and Communities”.
- Brazilian Women’s Group, Allston: “Wiping out Toxics Use in Housecleaning”.
- Pioneer Valley Planning Commission, Springfield (hosting projects in Agawam, Northampton, Longmeadow, Ludlow and Holyoke): “Creating Safeground: Transitioning Western Massachusetts Parks to an Organic Land Care Management Plan”.
- Montachusett Opportunity Council, Fitchburg (serving North Central Massachusetts): “Green and Clean in North Central Mass”.



Professional Wet Cleaning

For about 30 Massachusetts cleaners, TURI provided demonstrations of professional wet cleaning technology – the safest alternative – and completed a study of alternatives to the use of perchloroethylene in dry cleaning. TURI also disseminated case studies of the costs and benefits of implementing wet cleaning systems at previous grantees: Best Neighborhood Care Cleaners in Medford, MA, and Ace Cleaners in Andover, MA.² FY12 Grants were provided to two cleaners, **King and Queen Cleaners** (Milford) and **Art’s Cleaners** (Westborough) to convert to professional cleaning, and demonstrations were held at their facilities for other cleaners and the public.



²http://www.turi.org/About/Library/TURI_Publications/Toxics_Use_Reduction_Case_Studies/Best_Neighborhood_Care_Dry_Cleaner_-_Eliminating_the_use_of_toxic_chemicals_in_dry_cleaning.

http://www.turi.org/About/Library/TURI_Publications/Toxics_Use_Reduction_Case_Studies/Ace_Cleaners_in_North_Andover_Mass._-_Eliminating_the_use_of_toxic_chemicals_in_dry_cleaning.

Industry Research

- Independent Plating, a small Massachusetts business, received a grant from TURI to help the facility purchase new equipment for shifting from plating based on hexavalent chromium, a carcinogen, to trivalent chromium, a less hazardous alternative. The facility has been able to expand its customer base as a result of adopting this safer alternative.
- With major defense contractors Raytheon and Northrup Grumman, TURI also began a project for the aerospace and defense sector to research safer alternatives to hexavalent chromium in selected applications.
- TURI continues to investigate the worker health and safety issues of nanomaterials. TURI Director Michael Ellenbecker co-authored a report for the National Institute for Occupational Safety and Health (NIOSH) which formed the basis for the March 2012 NIOSH manual, “General Safe Practices for Working with Engineered Nanomaterials in Research Laboratories.” In addition, with OTA, TURI visited a company considering using nanomaterials to review options for preventing exposures.



Special Events

In addition to its annual Toxics Use Reduction Planner (TURP) education course, TURI organized, hosted, or sponsored the following special events:

- Two day-long continuing education conferences in November 2011 and April 2012, which attracted 98 and 91 attendees respectively. Featured speakers at the April conference included Paul Anastas, former Assistant Administrator and Science Advisor of the US EPA, and Roger McFadden, Chief Scientist at Staples, Inc.
- The fifth International Symposium on Nanotechnology, Occupational and Environmental Health, together with UMass Lowell and the Center for High-rate Nanomanufacturing in August 2011.
- A demonstration and tour at Mr. John’s Cleaners in Everett, highlighting energy conservation and efficiency measures undertaken by a small business. (April 2012).
- Healthy Cleaning Products Training: Event sponsored by TURI and the Brazilian Women’s Group. Participants learned how to formulate safer and more affordable products for household cleaning. (April 2012).
- Picnic in the Park: An Introduction to Organic Land Care: Event sponsored by TURI and the Pioneer Valley Planning Commission. Participants learned about pesticide hazards and techniques for maintaining organic turf. (May 2012).
- A Night Out with Toxic-Free Nails: Event sponsored by TURI and the Norfolk County 7 Public Health Coalition. Attendees learned what can be done to protect the health of employees and customers from adverse effects of toxic chemicals used in nail salons. (March 2012).



(Additional events are listed in the Appendix).

Other FY12 Highlights

- Together with colleagues at the Lowell Center for Sustainable Production, TURI completed a major report funded by the United Nations Environment Programme, providing an analysis of trends in the global chemicals industry as well as health and environmental impacts of these trends. TURI completed this project in collaboration with an international steering committee composed of government, industry, and non-governmental representatives from Europe, Africa, Asia, and the Americas.
- The TURI laboratory continues to work with the UMass Lowell Clinical Lab and Nutritional Sciences Department to research the efficacy of less-toxic disinfection solutions. The laboratory also provided testing and implementation assistance to several Massachusetts companies in their search for safer and more effective cleaning operations.

Publications

In addition to publishing reports, policy analyses and technical fact sheets under its own name, TURI staff served as special editors of Volume 19, Issue 5 of the international *Journal of Cleaner Production's* special issue on Toxics Use Reduction, including articles from TURI, OTA, the UMass Lowell Work Environment Department, and TUR specialists from Canada, New Zealand, Japan, Spain, and other states.³ TURI also presented at two international conferences on chemicals policy, and on TUR to conferences for the automotive and surface finishing industries. (A complete list of publications is in the Appendix).

The Massachusetts Department of Environmental Protection

The Massachusetts Department of Environmental Protection (MassDEP) is responsible for implementing the regulatory aspects of the Toxics Use Reduction Act. The Act applies to facilities in certain industrial codes that employ 10 or more full-time equivalents and annually use more than a specified quantity of some 1400 listed toxic chemicals. These toxics users are required to submit annual reports on the quantities of chemicals they use, waste, and release to the environment from their production processes, and pay toxics use reduction fees based on their number of employees and the number of listed chemicals they use. In addition, every other year, toxics users are required to undertake a planning process in which they quantify the total cost of using the chemical, including the cost of waste disposal and fees, and then identify if there are any changes they can make to their production processes that would both save them money and reduce toxic chemical use and waste. Facilities that have done toxic use reduction planning for two cycles may use an Environmental Management System to fulfill the planning requirement or substitute a similar Resource Conservation planning process for water or energy use, solid waste, or for chemicals not regulated under the Toxics Use Reduction Act. These plans are not submitted to MassDEP for approval. Instead they are approved by a MassDEP certified "Toxics Use Reduction Planner" (TURP) and a summary of the results is sent to the agency. MassDEP is responsible for establishing and enforcing the annual reporting and biennial planning requirements, collecting the reports and fees, conducting data quality assurance and analysis, preparing the data for publication, and certifying the toxics use reduction planners.

During Fiscal Year 2012 MassDEP:

³ [http://www.turi.org/About/Library/TURI_Publications/Journal_of_Cleaner_Production -- Special Issue](http://www.turi.org/About/Library/TURI_Publications/Journal_of_Cleaner_Production_-_Special_Issue).

- Collected and analyzed 1484 individual chemical reports from 486 facilities covering toxic use in calendar year 2011 and \$2.6 million in fees;
- Drafted the annual data release report with the assistance of OTA and TURI;
- Issued 32 Notices of Non compliance (NON) for failure to submit a required toxics use report by the reporting deadline, and two Administrative Consent Orders with Penalties (ACOPs) to facilities that had repeatedly failed submit the required reports;
- Conducted 70 inspections of TURA filers and issued four NONs and one ACOP for violations of the TURA statute found through the inspections;
- Conducted 190 screening inspections at facilities to determine if they were subject to the Act;
- Reviewed and approved applications demonstrating their qualifications from 16 new TURPs and reviewed and approved applications demonstrating that they had completed the required continuing education requirements from 123 TURPs seeking recertification. Of these, 29 were also certified to approve Resource Conservation (RC) Plans and 26 were also certified to approve Environmental Management System (EMS) plans. Eleven of these RC and EMS planners were certified to approve both types of plan;
- Approved over 30 continuing education courses;
- Administered two Toxics Use Reduction Planner Exams, that TURPS seeking certification to approve TUR Plans at companies other than their current employer are required to pass;
- Substantially revised and updated the Toxics Use Reduction, Environmental Management System and Resource Conservation Planning guidance documents;
- Revised and updated the list of chemicals to provide more information about the historical reporting requirements and to facilitate data analysis;
- Revised the electronic reporting forms to eliminate confusion about reporting requirements.
- Conducted four Reporting and Planning training sessions with the assistance of OTA and the Environmental Protection Agency;
- Corrected some problems with the MassDEP electronic reporting system. Automated the data review process to speed up data collection and analysis and to expand the information on plan summaries that would be available to the public; and
- Worked with OTA and TURI to integrate the information and incentives for reductions in perchloroethylene use into the “Dry Cleaner Environmental Results Program”, MassDEP’s regulatory oversight program for Dry Cleaners.

Program-Wide Actions

Background

TURA is governed by an Administrative Council, chaired by the Executive Office of Energy and Environmental Affairs and includes delegates from the Departments of Public Health, Public Safety, Environmental Protection, and Labor Standards, and from the Executive Office of Housing and Economic Development. The offices also meet several times a year with a multi-stakeholder Advisory Committee of representatives from business, environmental and labor organizations, and the public to report on its progress and receive input on its plans. TURI convenes a Science Advisory Board that helps the program base its decisions on the best available science concerning the toxicity of materials considered for listing, delisting, or hazard designation. All meetings are open to the public.

Overview of Fiscal Year 2012 Actions

In FY12 the program offices, the Council, the Advisory Committee and other interested parties engaged in extensive deliberations concerning the option of designating a Priority User Segment (PrUS) for users of trichloroethylene (TCE) in parts cleaning, and users of perchloroethylene (perc) in dry cleaning. (Designation of a PrUS extends the requirements of TURA automatically to facilities with less than 10 employees where threshold amounts of the chemical are used.). The Council voted against PrUS designation for TCE, and directed the programs to investigate the prospects for developing an alternative approach to reducing the use of perchloroethylene by dry cleaners using the existing Environmental Results Program. The Council and the Advisory Committee also engaged in discussion with the program offices concerning next steps in listing chemicals and increased coordination between the TURA program offices and member agencies of the TURA Council.



Increased Coordination

In furtherance of one of the central purposes of TURA, in FY12 the Council focused on increasing coordination between member agencies and TURA program offices. In FY 2011, the practice of sharing updates on toxics activities among council members was instituted, and in FY 2012, it became a regular feature of Council meetings. Resulting coordination included: initiatives to increase awareness by representatives of the Department of Fire Service of the Board of Fire Prevention Regulations pertaining to hazardous materials processing; joint work on asthma-related chemicals (also involving the Lowell Center for Sustainable Production); communication with Housing and Economic Development's Board of Cosmetology on the use of formaldehyde for disinfection; and promotion of TUR in cleaning processes in government procurement and operations. Each of these efforts benefited from the increased coordination provided by the Council and Advisory Committee.



Higher Hazard Designations

Based on a recommendation from TURI, and supported by input from the Science Advisory Board, MassDEP, and the Advisory Committee, the Council voted to classify hexavalent chromium compounds

and formaldehyde as Higher Hazard Substances, after first voting to list hexavalent chromium compounds separately from trivalent chromium compounds. In December 2011, the Executive Office of Energy and Environmental Affairs promulgated regulations to accomplish these actions, thus lowering the applicable threshold for coverage under TURA to 1,000 pounds per year. Beginning January 1, 2012, companies in covered industrial categories using these chemicals are required to track their quantities of use to determine if they exceed this threshold, and to conduct TURA reporting and planning (and pay the applicable fee) if they do. The identification of these chemicals as Higher Hazard Substances also begins a four-year period during which the Council may designate Priority User Segments.

Priority User Segment Designations

Trichloroethylene: In FY 2012, the Council voted against designating a PrUS for trichloroethylene (TCE) used for parts cleaning. The Chair of the Council noted the support of members of the Advisory Committee for designation, and concerns of Council members that designation would create regulatory burdens on small businesses during an economic downturn, and that designation would also create a burden for the state during a time of scarce program resources. The small number of facilities estimated to be automatically brought under TURA by designation was also a consideration. Council members expressed regret that designation could only occur, as the law is currently written, within the four-year period after Higher Hazard Substance designation, as it might make sense to designate at some time in the future. Subsequent to this decision, OTA conducted extensive outreach, reaching 65 facilities and offering its assistance in achieving reductions. Twenty-eight reported that they had already stopped using the chemical.

Perchloroethylene: In FY12, the Council deliberated on whether to designate a PrUS for dry cleaners using perc, and instructed the program offices to actively investigate alternative approaches to reducing the use of perc by dry cleaners, in particular, MassDEP's existing Environmental Results Program (ERP) for dry cleaners. After extensive discussion involving relevant experts and the Advisory Committee, the program began developing a set of proposed modifications to the state's



Environmental Results Program, which already covers all dry cleaners using perc, and which was created in order (sorry!) to simplify compliance by small companies. This approach, consistent with TURA's mandate to "streamline, coordinate and consolidate" toxics reporting, will be supplemented by a MassDEP plan to use its authority to require TUR in appropriate enforcement actions, and to apply Clean Air Act permitting requirements to the installation of perc-based dry cleaning equipment if the ERP modifications do not result in significant reductions in the installation of perc equipment. During the summer of 2012, the program offices held a series of open meetings to craft this approach in detail and in early Fiscal '13, the Council voted to forego designation, judging that the alternative approach would be both less burdensome and more effective than PrUS designation.

TURA Listings

Following EPA's addition of 16 chemicals to its list of chemicals reportable under the federal Emergency Planning and Community Right to Know Act's Toxics Release Inventory (TRI), the Council took action to add these chemicals to the TURA List of Toxic and Hazardous Substances, pursuant to the Act's mandate to adjust the list to reflect EPA's changes to TRI.

SAB discussions

The Science Advisory Board has continued a project to evaluate the alternatives to existing TURA Higher Hazard Substances trichloroethylene and perchloroethylene. This project is intended to assess common alternatives to these chemicals in order to better inform facilities switching away from these HHSs and to add the alternatives to the TURA chemical list if necessary. During FY12, the SAB was in the process of evaluating volatile methyl siloxanes and hydrofluorinated ethers.

In FY12, the Science Advisory Board recommended listing a group of chemicals referred to as 'Certain Halogenated Compounds'. This group of chemicals was of interest to the Board due to the similarities to n-propyl bromide, a chemical the SAB recommended listing (and the Council then listed) in 2009.

Finally, the Science Advisory Board began evaluating a CERCLA category – phthalate esters – in order to assist DEP in updating its policy for reporting this category.

Future Directions

In FY12, and for the foreseeable future, the program will continue to focus on modernization of the TURA list of Toxic or Hazardous Substances (at 301 CMR 41.00), which determines what chemical uses are covered by the act. What chemicals, or groups of chemicals, should be selected for listing or delisting, or identification as Higher and Lower Hazard Substances? Many years have gone into the development of an open and science-based process for making these decisions, and articulation of intelligible principles to guide decision-making. Yet determination of the relative safety of chemicals, considering all of their uses, remains exceedingly complex.

It is also expected that the members of the Administrative Council will continue to increase their coordination of efforts concerning toxics. The Council agencies worked together to inform the public of the Fire Marshal's new rules pertaining to hazardous chemicals, strengthening the preventive aspects of the rule, and the opportunity for education the rules present. Council agencies have been working together to develop information on reducing the use of asthma-related chemicals, and in identifying areas for collaborative outreach to small users of chemicals. One result of this cooperation has been a change in the regulations of the Board of Cosmetology which will likely result in decreased chemical exposures in beauty and barber shops. The increased coordination has provided the TURA program with access to special expertise concerning occupational safety and public health, while generally enhancing awareness of opportunities for TUR, as intended by the Toxics Use Reduction Act.

All TURA programs have been cooperating to advance understanding of TURA and related chemical use data. New methods of analysis used in assessing Priority User Segments and trends in overall toxics use will continue to be applied, for targeting enforcement, outreach and education.

Finally, the program will continue to rely on the contributions of its Advisory Committee, its Science Advisory Board, and the member agencies of the Administrative Council, as well as any other interested members of the public, to find new ways to apply the common sense methods of toxics use reduction, to reduce threats to health and the environment, and to contribute to the development of a cleaner, greener, Commonwealth.

APPENDIX

TURI Publications (Books and Peer Reviewed Journals)

As part of the TURA program 20th Anniversary, TURI edited a special issue of the Journal of Cleaner Production (*Journal of Cleaner Production*, 19(5), March 2011.) focused on toxics use reduction. In FY12, TURI arranged for the issue to be available on our website; it includes the following articles by TURI staff:

- Clark, J., Hutchins, J. Ellenbecker, M.J., eds. (2011.) "Improving the Health of the Public, Workers and the Environment: Twenty Years of Toxics Use Reduction."
- Ellenbecker, M.J., Geiser, K. (2011.) "At the Source: the Origins of the Massachusetts Toxics Use Reduction Program and an Overview of this Special Issue."
- Ellenbecker, M.J., Tsai, S. (2011.) "Engineered Nanoparticles: Safer Substitutes for Toxic Materials, or a New Hazard?."
- Eliason, P., Morose, G. (2011). "Safer Alternatives Assessment: the Massachusetts Process as a Model for State Governments."
- Hutchins, J.G. (Ed.). (2011). Book reviews for special issue).
- Marshall, J. (2011). "Hands-on assistance improves pollution prevention services of TURI's lab."
- Massey, R. (2011). "Program assessment at the 20 year mark: Experiences with TURA."
- Morose, G., Shina, S., & Farrell, R. (2011). "Supply chain collaboration to achieve toxics use reduction."
- Onasch, J. (2011). "A feasibility and cost comparison of perchloroethylene dry cleaning to professional wet cleaning: Case study of Silver Hanger Cleaners, Bellingham, Massachusetts."
- Onasch, J., Shoemaker, P., Nguyen, H. M., & Roelofs, C. (2011). "Helping small businesses implement toxics use reduction techniques: dry cleaners, auto shops, and floor finishers assisted in creating safer and healthier work places."

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- Jacobs, M., Massey, R., and Clapp, R. "The Burden of Cancer from Organic Chemicals." Forthcoming in David Carpenter, ed., *Effects of Persistent and Bioactive Organic Pollutants on Human Health*.
- Marshall, J. (2011). "Road Map for Cleaning Product Selection for Pollution Prevention." Chapter in B. Kanegsberg and E. Kanegsberg (Eds.), *The Handbook for Critical Cleaning*, Second Edition.
- Massey, R., Tenney, H., and Harriman, E. (2012). "Higher Hazard Substances under the Massachusetts Toxics Use Reduction Act: Lessons from the First Four Years," *New Solutions* 21:3, 457-476.
- Trasande, L., Massey, R., DiGangi, J., Geiser, K., Olanipekun, A., and Gallagher, L. (2011) "How Developing Nations Can Protect Children from Hazardous Chemical Exposures While Sustaining Economic Growth." *Health Affairs*, 30:12:2400-2409.

Publications: Technical Reports (selected)

- Massey, R. and Jacobs, M. (2012). "Global Chemicals Outlook: Trends and Indicators." United Nations Environment Program, forthcoming (funded by UNEP).
- Morose, Gregory and John Lindberg (2011). Economics of Conversion to Mercury-Free Products. Report prepared for the UNEP DTIE Chemicals Branch (funded by UNEP).
- Toxics Use Reduction Institute (2012). Alternatives Assessment: Alternatives to Perchloroethylene in Professional Garment Cleaning.
- Toxics Use Reduction Institute (2011). Massachusetts Chemical Fact Sheet: n-Propyl Bromide.

- Toxics Use Reduction Institute (2011). Policy analysis: Higher hazard substance designation recommendation: Formaldehyde.
- Toxics Use Reduction Institute (2011). Policy analysis: Recommendation to separate hexavalent chromium compounds from the chromium compounds category, and recommendation to designate hexavalent chromium compounds as a higher hazard substance. 2011.
- Toxics Use Reduction Institute (2012). Toxics Use Reduction and Disease Prevention Fact Sheet: Asthma.

Professional Conference Presentations, Workshops, and Training Presentations (Selected):

- Massey, R. “The Massachusetts Toxics Use Reduction Act: Goals, Results, and Lessons Learned.” Alberta Occupational and Environmental Health Symposium, Calgary, Alberta, March 7, 2012 (non-TURA funding).
- Massey, R. “Trends in the Global Chemicals Industry, and Health and Environmental Impacts.” United Nations Environment Programme Chemicals Branch, Meeting of the Global Chemicals Outlook Steering Committee, Geneva, Switzerland, December 8, 2011 (UNEP funding).
- Myles, M. “Safer Alternatives to Solvent-based Painting and Cleaning in Automotive Repair.” Three presentations to the Alliance of Automotive Service Providers.
- Wilcox, H. “Laboratory and Research Services Available at TURI for Metal Finishing Industry.” New England Surface Finishing Annual Conference.

Training Events (Selected)

- Toxics Use Reduction Planner Training: 45th session of the TURA 48-hour training course (8 participants). September and October 2011.
- Resource Conservation Training: Training on the Resource Conservation option for TUR Planning (20 participants). October and December 2011.
- Toxics Use Reduction Planners’ Continuing Education Conference: Semi-annual day-long conference. Featured Don Huisingsh, Editor-in-Chief of the *Journal of Cleaner Production*, as keynote speaker and six breakout sessions on a variety of toxics use reduction topics (98 participants). November 2011.
- Toxics Use Reduction Planners’ Continuing Education Conference: semi-annual day-long conference. Featured Paul Anastas, former Assistant Administrator and Science Advisor of the US EPA, and Roger McFadden, Chief Scientist at Staples, Inc. as keynote speakers. There were 6 breakout sessions plus a poster session on new TUR-related research featuring TURI-sponsored UML researchers (91 participants). April 2012.
- Alternatives Assessments 101: Training for California Department of Toxic Substance Control: training performed by Liz Harriman and Pam Eliason of TURI, plus Ken Geiser and Cathy Crumbley of Lowell Center for Sustainable Production on determining safer alternative chemicals and substances (44 participants, non-TURA funding). June 2012.