

A Progress Report to the Governor from
the Administrative Council on Toxics Use Reduction

Toxics Use Reduction in Massachusetts





The Commonwealth of Massachusetts
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November 25, 2008

Dear Governor Patrick:

We are pleased to present a Progress Report on the Massachusetts Toxics Use Reduction Program (Program) and to summarize ongoing efforts to meet the mandates of the Toxics Use Reduction Act (TURA) and the Amendments of 2006.

For nearly two decades, the Commonwealth has been a national leader in toxics use reduction. Since TURA's passage in 1989, the Program has helped the state's largest toxics users reduce use by 40 percent, waste by 71 percent and on-site releases of toxic chemicals by 91 percent.

The Amendments of 2006 provided new opportunities for companies regulated by TURA to include energy efficiency and resource conservation in their TURA planning. As a result, Massachusetts businesses now are using less toxic materials, employing more efficient production processes, and conserving energy, water and other resources as never before. Businesses have demonstrated that they can enhance their competitiveness by implementing sound environmental practices.

TURA Program progress has been built on unprecedented collaboration among environmental groups, industry, government agencies, lawmakers and Program Partners — all of whom share the credit for ensuring a healthier environment and economic future for Massachusetts. That spirit of cooperation fueled early Program success and continues to drive Program momentum.

Today, the Commonwealth can be proud of its role as an environmental steward. On behalf of the Council and all of the stakeholders of the Toxics Use Reduction Program, thank you for your continued interest and support.

Sincerely,

Philip Griffiths
Chairman, the Administrative Council on Toxics Use Reduction

Toxics Use Reduction in Massachusetts

A Progress Report to the Governor from the
Administrative Council on Toxics Use Reduction

Today, Massachusetts is significantly cleaner and safer because of the environmental initiatives of the Toxics Use Reduction Act (TURA).

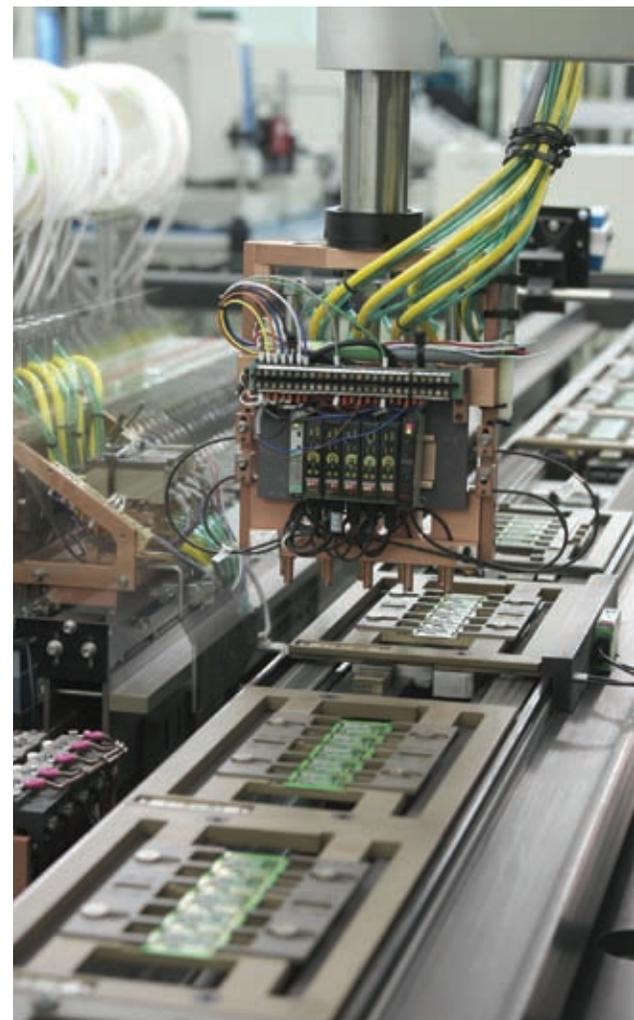
The 1989 legislation and the Toxics Use Reduction Program it brought about have won awards from Harvard University's John F. Kennedy School of Government and the National Pollution Prevention Roundtable, have been recognized by independent research organizations such as the Worldwatch Institute, and have become a national model for toxics use reduction. The Program has been saluted both for what it has accomplished and for its innovative approach and strategies.

TURA targets toxics use and waste generation at the source—the industrial and manufacturing processes that generate it. This strategy affords better protection for the public and workers because it can prevent waste from being generated in the first place. To help businesses, the Program has pioneered new methods of assistance, making it easier for companies to comply with regulations and to find new opportunities for improvement. For instance, the Program offers affected companies free, confidential on-site support and training. In turn, businesses report their toxics use annually, develop toxics use reduction plans, and pay a fee for use of toxics.

TURA has been a win-win for industry and the environment. By working together, advocacy groups, Program agencies and industry have made Massachusetts a safer place to live and work—and companies are better positioned to compete in global markets that increasingly favor safer materials and processes.



In September 2008, the Administrative Council on Toxics Use Reduction voted to designate perchloroethylene (PCE), a solvent widely used by drycleaners, as a higher hazard substance. Over the next 18 months, the TURA Program will support drycleaners and other industries in switching to less toxic alternatives to PCE.



Vicor Corporation in Andover eliminated toxic chemical use in its electronics manufacturing line to comply with European Union regulations. TURI awarded Vicor a demonstration matching grant to showcase its accomplishments to other Massachusetts companies.



Sika Sarnafil in Canton reduces use of virgin materials, one of the new goals of the 2006 TURA Amendments, by recycling vinyl into plastic roof membrane. The Company's recycled roofing materials solved water infiltration problems at the Marriott Long Wharf Hotel in Boston. At least 95 percent, by weight, of the old roofing material was recycled.

A Wider Range of Advocacy, Regulatory and Industry Voices Represented in Decision-making

The TURA Administrative Council gained new appointees from its member state agencies and established a new Advisory Committee with a wide range of environmental advocacy, public health, labor and industry voices to provide advice and serve as a sounding board for the Council. For instance, organized labor

has become a key Program stakeholder that provides unique worker and industry perspectives. Labor representatives on the Advisory Committee identify potential impacts of Program decisions on workers, their environment and their industries. They help shape strategies to overcome barriers that impede the reduction in use of hazardous substances. For example, the Committee has reviewed:

- ✦ Procedures that drive Program decisions concerning the designation of higher and lower hazard substances
- ✦ The evaluation for retention or delisting of chemicals on the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) list
- ✦ The TURA fee structure

A Fast Start in Addressing TURA Amendments: New Opportunities and Additional Flexibility

The Program has made rapid strides in implementing the TURA Amendments. The Program developed new rules for Resource Conservation Plans and Environmental Management Systems, so that companies now can develop plans for conserving energy, water, and other resources (on an every other planning cycle basis), or implement an Environmental Management System that integrates toxics use reduction (so that no further toxics use reduction plans are needed).

The 2006 TURA Amendments

After 15 years of successful implementation, Amendments to the Toxics Use Reduction Act were signed into law July 28, 2006. Representing the first major TURA overhaul, the Amendments called for:

- ✦ Categorizing substances based on hazard
- ✦ Focusing Program resources and facilities on reducing the use of higher hazard substances
- ✦ Encouraging businesses to improve environmental performance by adopting resource conservation plans or environmental management systems once toxic use reduction issues have been addressed
- ✦ Reducing reporting and planning requirements to be consistent with federal requirements
- ✦ Evaluating fees paid to the TURA Program for chemicals used

To implement the 2006 Amendments, the three TURA Program Partners—the Massachusetts Department of Environmental Protection (MassDEP), the Office of Technical Assistance and Technology (OTA), and the Toxics Use Reduction Institute (TURI)—relied on their collaborative working relationship to develop new regulations, guidance documents, reporting forms and data systems, and training and outreach materials.

Toxics Use Reduction (TUR) is a specific form of pollution prevention that focuses on reducing the use of toxic chemicals or the generation of hazardous wastes. Companies accomplish this by finding safer alternatives or redesigning products and processes.

The Program also reduced reporting and planning requirements by making the reporting thresholds more consistent with federal reporting requirements, and improved the electronic reporting system so that today more than 90 percent of filers do so electronically. Due to the streamlining effort prompted by the Amendments, the number of reports filed with MassDEP since 2006 decreased by 398 or 18 percent. As a result, Massachusetts manufacturers saved over \$438,000 in reporting fees.

TURA requires that each toxics use reduction plan be reviewed and approved by a certified Toxics Use Reduction Planner (TUR Planner). This requirement led to the creation of a group of professionals, who are not only experts in toxics use reduction but who are currently being trained to prepare Resource Conservation and Environmental Management Systems. The TUR Planners help ensure plan accuracy and provide pollution prevention expertise, a critical Program underpinning.

Key Program accomplishments since 2006 include:

Massachusetts Department of Environmental Protection

- Developed new reporting regulations, guidance documents and forms.
- Developed new regulations and guidance documents for the Resource Conservation and Environmental Management System options.
- Conducted over 100 multi-media inspections per year at TURA facilities to check for compliance with regulations for air, industrial wastewater, hazardous waste and toxics use reduction.
- Provided extensive training to TURA facility planners on new reporting requirements and planning options.
- Increased the number of electronic submissions by TURA filers to more than 90 percent for calendar year 2007.

Office of Technical Assistance and Technology

- Conducted approximately 240 site visits to identify potential process improvements, pollution prevention, energy efficiency and water conservation opportunities.
- Conducted conferences and events and published fact sheets, case studies and papers to promote toxics use reduction and resource conservation.
- Supported development of free software to track materials and energy use by facilities.
- Conducted four energy efficiency and water conservation workshops attended by representatives of 100 companies.

Throughout Massachusetts, companies are demonstrating that adopting sustainable practices that reduce the use of toxics, energy and water, makes good environmental and business sense.

Sweet Metal Finishing, Attleboro, MA

- New owners of Sweet Metal Finishing, a long-established jewelry and decorative products electroplating company, enlisted OTA and TURI to help improve its environmental compliance and safety program and to minimize use of hazardous materials.
- The facility reduced use of toxic solvents by substituting aqueous cleaning and water-based paint processes, substantially increased hazardous material recycling and recovery of precious metals from the wastewater stream, and installed a state-of-the-art plating room. The company has increased business volume by 33 percent and added staff.



Rohm and Haas Electronic Materials installed solar panels at the company's Advanced Technology Center in Marlborough, which is home to a new \$60 million immersion lithography facility.

Rohm and Haas Electronic Materials, Marlborough, MA

- Reducing toxic chemical use leads to energy savings. Rohm and Haas Electronic Materials, for instance, estimates its expected annual savings from reduced chemical use to be 16,000 MMBTU of natural gas, and almost 1,000 metric tons of CO₂ equivalents in greenhouse gases.
- The company received a demonstration site matching grant from TURI to showcase to other Massachusetts companies innovative ways the company significantly reduced its energy consumption. For two days, the company hosted nearly 100 people who learned how the company used green chemistry-based process modifications, thereby reducing the need for thermal oxidation of air emissions in its pilot plant.

Toxics Use Reduction Institute

- ✦ Delivered more than 50 hours of new curriculum on Resource Conservation and Environmental Management Systems (EMS) for Massachusetts Toxics Use Reduction Planners.
- ✦ Managed, collected data and supported the Science Advisory Board's (SAB) recommendations for designating chemicals as higher or lower hazard substances and for retaining or delisting CERCLA chemicals, and developed policy analysis of the SAB's recommendations.
- ✦ Conducted policy analyses for cadmium, cadmium compounds, trichloroethylene (TCE), and perchloroethylene (PCE) as candidates for designation as higher hazard chemicals.
- ✦ Developed Web site and other resources to help companies complete Resource Conservation Plans for "toxics in products" and "non-reportable toxics," as specified by the 2006 TURA Amendments.
- ✦ Facilitated the eleventh TURI EMS Peer Mentoring Workgroup that included three companies that submitted an EMS alternative plan to the Commonwealth.

Evaluating Chemical Lists and Designating Higher and Lower Hazard Substances

The TURA Amendments require the Science Advisory Board (SAB) and the Toxics Use Reduction Institute (TURI) to review the 496 substances on the TURA Toxic or Hazardous Substances List that originate from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) list. The SAB has reviewed and made recommendations to either retain or remove the chemicals based on its scientific assessment of hazard. TURI has conducted policy analyses and made a recommendation to the Council to retain the chemicals or drop them from reporting requirements. In September 2008, the Administrative Council voted to retain all of the chemicals but deferred a final decision on 56 substances pending further studies that will be completed in 2009.

Substantial progress has been made in designating higher and lower hazard chemicals. The Amendments required that

the SAB and TURI review substances on the TURA Toxic or Hazardous Substances List and recommend to the Administrative Council substances that should be designated as higher or lower hazard substances. *Massachusetts is one of the first states to establish a methodology for categorizing substances based on hazard.*

➤ Higher Hazard Designations

In October 2007, following recommendations from the SAB and TURI, the Administrative Council designated three chemicals as higher hazard substances:

- ✦ trichloroethylene
- ✦ cadmium
- ✦ cadmium compounds.

This lowered the reporting threshold for these substances to 1,000 pounds per year, effective January 1, 2008. In September 2008, the Council voted to designate perchloroethylene as a higher hazard substance. The designation of trichloroethylene, cadmium, cadmium compounds and perchloroethylene as higher hazard substances will result in an estimated 50 additional TURA Program reports over the next two years. New reports will be submitted by companies that perform metal cleaning, plastics processing, adhesives and sealant compounding, and dry cleaning.



Toxics use reduction planners are environmental health and safety or process engineering professionals who are qualified to prepare, write and certify toxics use reduction plans for companies.

► Lower Hazard Designations

The Council has voted to designate three chemicals as lower hazard substances and regulations will be promulgated by the end of 2008:

- isobutyl alcohol
- sec-butyl alcohol
- n-butyl alcohol

To date, the SAB has recommended that 11 substances be considered for designation as higher hazard substances and another 11 as lower hazard substances.

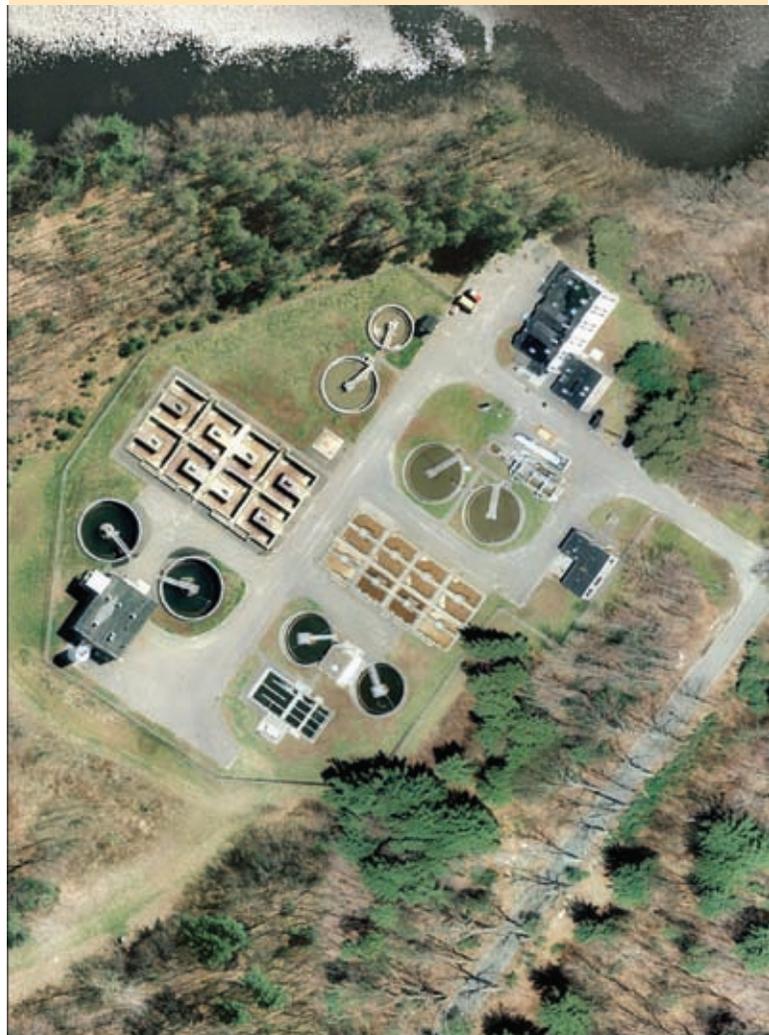
Looking Ahead: Program Priorities for 2009 and Beyond

The Program has successfully achieved many of the mandates of the 2006 Amendments and is moving forward to identify priorities for 2009 and beyond, including:

- Evaluate existing industry segments to focus Program resources and assistance on new opportunities to reduce toxics use and waste, to increase energy efficiency and to reduce consumption of water and other resources.
- Continue to categorize substances based on hazard, so that Program resources can be directed toward reducing the use of the most hazardous chemicals.
- Continue to work with the regulated community to increase understanding of its emerging needs and to offer responsive services.
- Work with businesses to identify and promote opportunities to improve regulatory compliance, reduce production costs, enhance workplace health and safety and overcome barriers to sustainable practices through toxics use reduction.
- Promote safe development of new technologies that offer the promise of green innovation, such as nanotechnology, green chemistry, smart controls, and the use of environmentally friendly materials.
- Continue to work collaboratively to ensure the Administrative Council receives policy recommendations that effectively promote sustainable business practices and reduce the use of the most toxic chemicals.
- Increase awareness and use of Program services through effective outreach and networking.

The Administrative Council on Toxics Use Reduction

The six-member Administrative Council is the governing body of the TURA program and is responsible for program oversight. The Council coordinates state enforcement of laws and regulations on chemical use and toxic waste generation



Marlborough's Westerly Wastewater Treatment Works is at full capacity, prompting the city to launch a water conservation and wastewater reduction program. The Office of Technical Assistance and Technology will direct a water conservation effort.

Marlborough, MA

- Marlborough, one of Boston's fast-growing Metrowest suburbs, is launching an aggressive water conservation and wastewater reduction program because its wastewater treatment plant is at maximum capacity. The city is concerned it will be unable to accommodate future residential and commercial development.
- Under a federal grant managed by MassDEP, OTA is directing water audits at 10 large industrial and commercial facilities.
- Water balance analyses will identify equipment processes that generate the most wastewater and define water conservation opportunities.
- OTA also will conduct a workshop for the hospitality industry to promote water conservation and sustainable practices.



The Administrative Council

and implements policies that promote worker health and safety, and safeguard public health. The Council designates higher hazard and lower hazard chemicals and makes other listing and delisting decisions, and is responsible for toxics use fee requirements.

► **Members of the Administrative Council on Toxics Use Reduction:**

- Philip Griffiths, Chair, Massachusetts Executive Office of Energy and Environmental Affairs
- April Anderson Lamoureux, Massachusetts Executive Office of Housing and Economic Development

- James C. Colman, Massachusetts Department of Environmental Protection
- Suzanne Condon, Massachusetts Department of Public Health
- Laura Marlin, Massachusetts Executive Office of Labor and Workforce Development
- Kevin Partridge, Massachusetts Executive Office of Public Safety
- **EXECUTIVE DIRECTOR:**
Rich Bizzozero, Massachusetts Executive Office of Energy and Environmental Affairs, Office of Technical Assistance and Technology

Advisory Committee

The Advisory Committee to the Administrative Council is composed of fifteen stakeholders who provide advice to the Administrative Council.

► **Members of the Advisory Committee to the Administrative Council on Toxics Use Reduction:**

- Andy Goldberg, Attorney General’s Office
- Lee Ketelsen, Clean Water Action & Clean Water Fund/Alliance for a Healthy Tomorrow
- Peggy Middaugh, Regional Environmental Council of Central Massachusetts
- Stephen Gauthier, IUE/CWA Local 201, General Electric

ABOVE: Some of the members of the Administrative Council, from left: Meg Blanchet (for Suzanne Condon), Phil Griffiths, Rich Bizzozero, James Colman, Laura Marlin and April Anderson Lamoureux

RIGHT: Some of the members of the Advisory Committee, from left: Tolle Graham, William Judd, Gary Nedelman, Robert Pliskin, Stephen Gauthier, Andy Goldberg, Lucy Servidio, Mark Rossi, Samuel Lipson, Ed Gomes



The Advisory Committee

**By working together, advocacy groups, regulatory agencies and industry
have made Massachusetts a safer place to live and work.**

- Tolle Graham, Massachusetts Coalition for Occupational Safety & Health
- Edward Gomes, Vicor Corporation
- Robert Pliskin, Bradford Industries
- Robert Napolitano, Astro Chemicals, Inc.
- Gary Nedelman, AlphaGary Corporation
- Lucy Servidio, Capaccio Environmental Engineering, Inc.
- Carolyn Fiore, Massachusetts Water Resources Authority
- Samuel Lipson, City of Cambridge/Mass Public Health Association
- Mark Rossi, Clean Production Action/Health Care Without Harm
- William Judd, Industrial Compliance Group
- Sarah Little, Northeast Organic Farming Association

The Science Advisory Board

The Science Advisory Board (SAB) works closely with the Toxics Use Reduction Institute (TURI) to provide scientific advice, especially related to the hazard of substances and recommendations for listing and delisting.

► Members of the TURA Science Advisory Board

- David Williams, Department of Public Health
- Lawrence Boise, TUR Planner, Consultant
- Lorraine Braunsdorf, Teknor Apex Company
- Chris Swartz, Stockholm Environmental Institute
- Igor Linkov, Army Corps of Engineers



The Science Advisory Board

Some of the members of the Science Advisory Board and Program Liaisons, from left, back row: Michael Ellenbecker, John Raschko, Lawrence Boise, Hilary Eustace, Joann Lindenmayer, Lorraine Braunsdorf; front row, Heather Tenney, Carol Rowan West, David Williams, Chris Swartz

John Adams Innovation Institute, Massachusetts Technology Collaborative

- Supported by a \$150,000 grant from the Massachusetts Technology Collaborative's John Adams Innovation Institute, OTA evaluated the feasibility of a promising new printing technology it conceptualized for the textile industry.
- Studies of high-speed, digital printing using wide-format printers and radiation-curable materials have been encouraging, raising the possibility that the technology could offer textile finishing and other types of printing companies a more economical, more environmentally friendly and less-energy intensive alternative to conventional rotary screen printing.



Boston-based John Nagle Company, a wholesale fish distributor, is reducing operating costs by cutting energy expenses.

John Nagle Company, Boston, MA

- John Nagle, a wholesale fish distributor, has sought ways to reduce energy costs associated with refrigeration.
- The company implemented OTA's recommendation to purge trapped air from the refrigeration system, which will save an estimated \$15,000 in electric power or 74,333 kilowatt hours yearly. The company plans to install an automatic refrigeration control system, another OTA recommendation.
- In addition, the company will install a solar photovoltaic and/or wind-turbine-based system and will add more energy efficient lighting.

Valentine Tool and Stamping, Norton, MA

- Valentine Tool and Stamping, a metal finishing facility, had used TURA-reportable quantities of cleaning solvents and had faced more stringent, costly wastewater regulation.
- OTA and TURI assisted the company in choosing alternative substances and in modifying processes to completely eliminate use of the trichloroethylene (TCE) for vapor degreasing. The Commonwealth subsequently designated TCE as a higher hazard substance.
- By implementing OTA suggestions for modifying wastewater and reuse systems, the facility achieved a zero discharge level for wastewater.

- ✦ Anne Marie Desmarais,
Tufts University Department
of Civil and Environmental
Engineering
- ✦ Veronica Vieira, B.U. School
of Public Health
- ✦ Hilary Eustace, Occupational
Hygiene Program
- ✦ Joann Lindenmayer, Tufts
University School of
Veterinary Medicine

- ✦ PROGRAM PARTNER
LIAISONS:
Michael Ellenbecker, TURI
John Raschko, OTA
Carol Rowan West, MassDEP

- ✦ SAB MANAGER:
Heather Tenney, TURI



Massachusetts Department of Environmental Protection

The Massachusetts Department of Environmental Protection (MassDEP) is responsible for implementing the regulatory components of the TURA program, including ensuring that facilities comply with their TURA obligations. This includes developing and implementing regulations governing toxics use reporting and planning; developing reporting and planning forms and guidance documents; promoting compliance with reporting and planning requirements; and taking enforcement action when necessary. In addition, MassDEP is responsible for maintaining the TURA information management system and reporting toxics use results to the public; coordinating with the U.S. Environmental Protection Agency (EPA) on federal Toxics Release Inventory reporting; and implementing multi-media compliance and enforcement programs that promote pollution prevention.

➤ 2006 and 2007 Toxics Use Reporting

To implement the new TURA program, MassDEP revised its toxics use reporting regulations, guidance, reporting forms, and data systems for calendar year 2006 reports. Working with

OTA and TURI, MassDEP conducted extensive outreach and training to TURA facilities and Toxics Use Reduction (TUR) planners on the new reporting requirements. MassDEP received toxics use reports from 560 facilities with more than 90 percent filing electronically. For calendar year 2007 reports, MassDEP received toxics use reports from 560 facilities with more than 80 percent filing electronically.

➤ Toxics Use Reduction Planning

During the 2008 planning cycle, for the first time facilities could choose to develop a Resource Conservation Plan or implement an Environmental Management System (EMS), instead of updating their toxics use reduction plan. MassDEP developed new regulations for the Resource Conservation and EMS options, developed guidance documents and forms, and conducted extensive outreach and training. Taking advantage of these new opportunities, 26 facilities developed Resource Conservation plans and 15 facilities implemented an EMS, while the remainder of facilities developed toxics use reduction plans.

Due to the reduced reporting requirements under the Amendments, the number of reports filed with MassDEP since 2006 decreased by 398 or 18 percent. As a result, Massachusetts manufacturers saved over \$438,000 in reporting fees.

► TUR Planner Certification Program

The 2006 TURA Amendments established new requirements for TUR planners and EMS professionals who want to certify Resource Conservation plans and Environmental Management Systems. MassDEP revised the planner regulations to establish criteria for these new planner disciplines and revised the planner application forms. Based on the new criteria, MassDEP certified 33 planners as eligible to certify Resource Conservation plans and 23 planners as eligible to certify EMSs.

MassDEP also certified 25 new toxics use reduction planners and re-certified 201 planners. The agency collected \$46,400 in certification fees. MassDEP worked closely with TURI to revise the TUR planner course in 2006 to account for the modified reporting requirements and in 2007 to incorporate the new Resource Conservation and EMS planning options. MassDEP also updated and administered the TUR planner exam in the fall of 2006 and 2007. All of the 28 individuals who took the exams passed.

► Compliance and Enforcement

MassDEP ensures that facilities file complete annual toxics use reports and biannual summaries of toxics use reduction plans, Resource Conservation plans, and EMS progress



Delaware Valley Corporation, Tewksbury, MA

- Delaware Valley Corporation, a specialty, non-woven textile manufacturer, installed heat exchangers to recover heat from gas-fired production ovens for process and space heating.
- The project payback was calculated at 61 weeks. By working with OTA and taking advantage of utility incentives, the payback was reduced to 35 weeks.
- The waste heat recovery system is part of an overall effort to become a zero-waste company.
- Savings from the heat recovery system are being invested to finance future energy conservation projects, including a possible solar photovoltaic installation.



A worker cuts the old roof membrane from the Marriott Long Wharf Hotel, Boston, which Sika Sarnafil, Canton, recycled into new product.

Sika Sarnafil, Inc., Canton, MA

- Sika Sarnafil, an international manufacturer of high-tech plastic membranes used in roofing and waterproofing systems, annually recycles four million pounds of waste vinyl trimmings. The company has reused more than one million square feet of membrane that had reached the end of its useful life. It has contracts for an additional three million square feet of end-of-life membrane to be recycled through the summer of 2009. Previously all of this material was landfilled.
- OTA helped Sika Sarnafil address regulatory issues to accelerate its resource recovery program and now is supporting company efforts to recycle manufacturing scrap and to address energy conservation opportunities.
- Based on success to date, Sika Sarnafil plans to expand the resource recovery effort to the south and midwest and make the program national by 2010.



Seaman Paper Company, Otter River, installed a wood-fired boiler (left), highly efficient pumps and lighting as part of its energy and fuel substitution program that has reduced electricity use by 2.6 million kilowatt hours per year and oil use by nearly 1.7 million gallons yearly.

performance. OTA has been instrumental in reducing the use of millions of pounds of toxic chemicals and saving companies millions of dollars in operating costs. Today, OTA maintains its focus on toxics use reduction while expanding its services to address energy and water conservation strategies, as mandated by the TURA Amendments of 2006.

reports. There were 560 facilities required to file toxics use reports by July 1, 2007 (the first reporting under the new program). MassDEP took seven enforcement actions for missing or incomplete reports. MassDEP also took enforcement action against two individuals for certifying plans without being certified by MassDEP to do so.

In 2007 MassDEP conducted multi-media inspections at 108 TURA facilities, using a whole-facility approach to simultaneously check for compliance with regulations for air, industrial wastewater, hazardous waste, and toxics use reduction. The inspections resulted in eight enforcement actions for TURA violations. In addition, as part of its regular inspection protocol, MassDEP refers companies to OTA if MassDEP believes the company could benefit from toxic use reduction advice. Companies are not obligated to contact OTA.

Office of Technical Assistance and Technology

Since its establishment in 1990, the Office of Technical Assistance and Technology (OTA) has provided non-regulatory, confidential technical and compliance assistance services and made over 3,300 site visits to help Massachusetts businesses use less toxic processes and boost their economic

► On-site Assistance Targets Efficiency, Compliance, Resource Conservation

On-site assistance is the core service through which OTA helps businesses improve process efficiency, ensure compliance with environmental regulations, conserve resources and reduce costs. Recently, OTA expanded its energy advisory services to help industry implement energy efficiency and renewable energy strategies. OTA also is staffed to help businesses comply with federal and state regulations, improve their water use efficiency and reduce wastewater discharges. OTA's on-site assistance program is voluntary and provided at no cost to facilities. Since 2006, OTA has conducted approximately 240 site visits to address environmental compliance issues, and to identify possible process improvements, pollution prevention, energy efficiency or water conservation opportunities.

► Innovative Strategies to Protect the Environment, Transform Industries

Through a variety of events, OTA highlights technological advances and strategies that reduce the use of toxics, energy and water. In 2008, a demonstration event was held at Seaman Paper, Inc., Otter River. By applying innovative conservation

Massachusetts is one of the first states to establish a methodology for categorizing substances based on hazard.

and fuel substitution strategies over the last 10 years, Seaman has reduced electricity use by 2.6 million kilowatt hours per year and oil use by nearly 1.7 million gallons annually. OTA also convened a conference on a promising, high-speed digital printing technology that could offer textile finishing and other types of printing companies a more economical, more environmentally friendly and less energy intensive alternative to conventional rotary screen printing. (See Pacesetting Projects: John Adams Innovation Institute). OTA continues to work with Churchill Coatings Corporation, Grafton, to promote the development of low- or no-Volatile Organic Compound coatings for wood siding.

► Workshops and Publications Vital to Outreach

OTA sponsors conferences and workshops and prepares publications focusing on toxics use reduction, regulatory requirements, green chemistry applications, nanotechnology, energy efficiency, water conservation and other topics. Since 2006, OTA has held 13 workshops and conferences and published a wide range of fact sheets, case histories and other publications. A comprehensive listing of workshops and publications is presented in the Appendix.

► School Mentoring to Boost School Safety

OTA recently expanded the program to help schools statewide improve their chemicals management practices. Twelve schools now participate and three more will join the program in 2008. The Partnership for Environmental Health & Safety (EHS) teams schools with EHS mentors from industry who help the schools develop long-term toxics use reduction and pollution prevention strategies. Mentors advise on best management practices related to chemical inventories, purchasing, handling and disposal of hazardous materials, safety and green chemistry.

► Barriers Report Identifies Strategies to Advance TUR

OTA recently completed a report entitled: "The Assessment of Barriers to Toxics Use Reduction, Pollution Prevention and Resource Conservation," which is a study mandated by the 2006 TURA Amendments. OTA found that companies do not adopt toxics use reduction practices primarily because of concerns about costs and possible negative impacts on the quality of their product. OTA concluded that strategies to increase adoption of these practices should include trials and demonstration projects coupled with cost-benefit information, stronger economic incentives and better regulatory drivers.



At Gentex Optics, water recycling of rinse water used in lens cleaning is now approaching 80 to 85 percent. This represents nearly a 2 million liter per month reduction of water use during the lens cleaning process.

Motion sensors in utility closets and other non-work areas eliminate wasteful energy use. In 2009, this project is expected to save 2000 kwh per month.

Gentex Optics, Dudley, MA

- Gentex Optics served as the host of a TURI Environmental Management System (EMS) Workgroup that helped the following Massachusetts companies improve their EMS: Callahan Company, Bristol-Myers Squibb, Webco Chemical Corporation, and GEM Gravure Co. Gentex and several others now meet the new TURA EMS criteria.
- Environmental innovation was first evident in 1996 when Gentex eliminated the use of Freon in its lens cleaning operation. Volatile organic compound emissions from this process were reduced by up to 90 percent through installation of bio-filtration.
- The company has reduced water use by 4.5 million gallons per year or 34 percent and this year, energy conservation efforts will achieve an impressive 2.2 million kWh per year reduction.
- The employee driven Turn-It-OFF energy campaign resulted in employee awareness, pledges, and energy saving ideas for the manufacturing facility.

Silver Hanger Cleaners, Bellingham, MA

- By converting its dry cleaning plant to dedicated wet cleaning technology, Silver Hanger Cleaners will eliminate the use of perchloroethylene (PCE), a probable human carcinogen, as classified by the International Agency for Research on Cancer.
- Silver Hanger Cleaners received a matching grant from TURI to help the company renovate its garment cleaning operation, remove the PCE machine, and install wet cleaning equipment, a safer alternative that allows "dry-clean-only" clothes to be washed with water and detergents in computer-controlled machines.
- The company will collect cost data and analyze the differences between using PCE and using wet cleaning technologies. TURI will use this information to encourage other dry cleaners to convert to professional wet cleaning. Within the year, Silver Hanger Cleaners will host a demonstration at the plant to encourage more Massachusetts cleaners to make the switch.



A broad range of toxics use reduction support to Massachusetts businesses and communities make the Commonwealth a safer place to live and work.

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.

Much of TURI's efforts in the past two years was focused on implementation of the 2006 TURA Amendments. This included the collection of chemical data to support the Science Advisory Board (SAB) and analysis of the policy implications of retaining or delisting CERCLA chemicals and designating higher and lower hazard substances. TURI also developed training and guidance materials to help companies complete Environmental Management System (EMS) and Resource Conservation plans and to prepare Toxics Use Reduction Planners for certification. The following are selected highlights from the last two years; a complete list of activities is included in the appendix.

► Trained more than 600 managers and consultants in two years

Every year, TURI develops and hosts a seven-week intensive course for new TUR planners and offers continuing education sessions in both the fall and spring on topics such as managing nanotechnology risk, using biobased materials and designing for the environment. TURI developed new workshops for

Resource Conservation and Environmental Management Systems. During FY'07 and '08, more than 600 health and safety managers and environmental consultants attended the trainings.

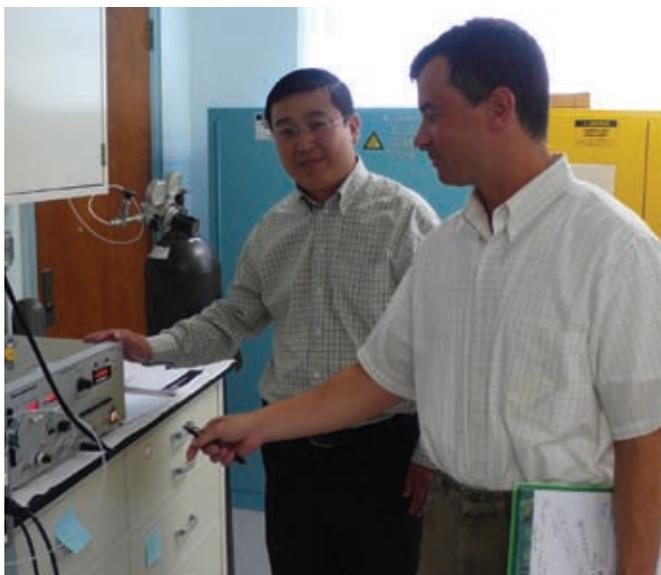
► Tested safer cleaning alternatives for Massachusetts companies

The TURI Laboratory helps companies reduce the amount of hazardous solvents used in surface cleaning, including trichloroethylene (TCE), one of the recently designated higher hazard substances. The Lab tested the performance of safer cleaning solutions for 21 Massachusetts companies during FY07 and FY08. Industries included metal working, optics, aerospace, hospitals, solar, pharmaceutical and other sectors. All of the testing results along with vendor profiles were added to *www.CleanerSolutions.org*, TURI's free online database that companies use to find safer cleaning products that work.

► High Tech Research Gives Massachusetts Companies a Competitive Advantage

Taking advantage of the National Science Foundation-supported Center for High-rate Nanomanufacturing and extensive research capacity at the University of Massachusetts Lowell, TURI supports research into innovative applications of nanomaterials to reduce the use of toxic chemicals. Dr. Michael Ellenbecker, TURI Director, also leads research into

The Program has successfully achieved many of the mandates of the 2006 Amendments and is moving forward to identify priorities for 2009 and beyond.



Dr. Zhiyong Gu, Professor of Chemical Engineering at the University of Massachusetts Lowell, who received a University research grant from TURI, describes the investigation process for the lead-free nanowire fabrication process to Greg Morose of TURI.

occupational health issues, working toward the design and implementation of safe systems of nanomaterials production.

TURI funded \$177,000 in research projects in FY'07 and '08 to help keep Massachusetts companies on the leading edge of technologies that are safer for workers and the environment, and good for the economy. For example, the ability to create reliable electrical connections using lead-free materials at the nanoscale may lead to safer methods of creating the next generation of electronics.

TURI also manages the New England Lead Free Electronics Consortium, a seven-year effort of electronics companies evaluating the long-term reliability of a non-lead alternative for solder joints.

► Reducing PCE Use in Dry Cleaning

To help drycleaners replace the solvent perchloroethylene (PCE) with a safer alternative, TURI has undertaken an education and outreach effort. The program includes informational mailings, videos, a demonstration of state-of-the-art wet cleaning equipment, and a grant to convert a facility to 100 percent wet cleaning.

TURI's Community and Industry programs jointly awarded a \$17,000 matching grant to Silver Hanger Cleaners of Bellingham, Massachusetts, which will showcase the new wet cleaning technology to other dry cleaners in FY09.

► Improving Environmental Management Systems Now a Planning Option for Companies

For seven years, TURI has facilitated interactive workgroups

"We are thrilled with the investment in this (waste heat recovery) technology, as it is saving us money in utility bills every month – for life –and it keeps the factory temperature uniform in the winter."

D. Paul DiMaggio, Jr.
President, Delaware Valley Corporation

"The TURI Wire and Cable workshops have helped us understand the various international trends and requirements affecting our business so that we can compete globally."

David B. Kiddoo, Global Business Manager
AlphaGary, Leominster

"I would have done all of these things even if they weren't good for the environment because they have kept us competitive in the global marketplace. We're very pleased to look back at what we've done, and see the significant reductions in carbon dioxide and other emissions. It feels good to see that because everyone has to try to play a part in addressing these important issues."

George Jones
President, Seaman Paper Company

"The OTA staff assisted us in wading through the federal and state regulatory requirements and provided us with the pertinent information so that we could move the resource recovery project forward. We are currently working with OTA on an effort to recycle manufacturing scrap and to address energy conservation issues."

Mark Franklin
Environmental Health and Safety Manager,
Sika Sarnafil, Inc.

RECOGNITION

Along with the State Legislature, TURI honors “Champions of Toxics Use Reduction” at an annual State House ceremony that motivates industry and community organizations to continue making the Commonwealth a safer place to live and work.



ABOVE: Cathy Benjamin of Gentex Optics of Dudley (left) speaks with Marty Meehan, Chancellor of the University of Massachusetts Lowell, and Liz Harriman, Deputy Director of TURI, at a June 2008 recognition event.



TOP RIGHT: With the help of a TURI community grant, the Worcester Youth Center (WYC) increased awareness—among lower-income, inner-city youth—of harmful chemicals found in household products. Pictured left to right: Rosa Fernandez, WYC project manager, TURI Director Michael Ellenbecker, and WYC members James Brimmage, Davita Hollingsworth, and Jean Clemente.



RIGHT: Mark Isabelle (right), owner of Silver Hanger Cleaners of Bellingham accepts an award from the Director of TURI, Michael Ellenbecker, for switching to 100 percent wet cleaning technology and eliminating the use of perchloroethylene.

for industry peers implementing or improving an existing Environmental Management System (EMS). The 2006 TURA Amendments allow companies to develop EMS plans to further improve their environmental performance.

TURI awarded Gentex Optics of Dudley, Massachusetts a grant to host the FY'08 workgroup sessions that focused on the specific elements required under the EMS Toxics Use Reduction Planning option. As a result, three firms in the workgroup submitted EMS progress reports using this option.

► Survey to Highlight Future Opportunities

As the TURA program enters its 20th year, there is much to be learned from Massachusetts' experiences that can help guide future Program direction. TURI's policy research program is currently conducting an assessment of the TURA Program, including a survey of TURA companies and TUR Planners, to capture the impact of TURA and highlight opportunities for the future.

A P P E N D I X

TURA Program Accomplishments Fiscal Years 2007 & 2008

Toxics Use Reduction Institute

Training Events

In FY'08, the Toxics Use Reduction Institute offered Massachusetts companies the following training opportunities to stay current on new planning options and toxics use reduction methods:

- **The Toxics Use Reduction (TUR) Planner Class** was attended by 21 professionals.
- **The Fall TUR Planner Continuing Education Conference** was attended by 91 professionals, predominantly Toxics Use Reduction Planners.
- **The Spring TUR Planner Continuing Education Conference** was attended by 100 professionals.
- **The Resource Conservation Planning Basics Workshop** was offered three times with a total of 110 professionals attending.
- **Resource Conservation Asset Specific** training was attended by 80 professionals.
- **TURA Environmental Management System (EMS)** course was attended by 34 TUR Planners.
- **TUR Planning for EMS professionals training** was attended by 15 professionals.
- **Introduction to Tools for Risk Assessment and Control of Chemicals** – An online continuing education course was taken by nine professionals.

In FY'07, TURI held four training events for 286 professionals.

Research and Demonstration

In FY'08, TURI funded \$72,000 for the following research and technology projects to help promote and identify safer alternatives:

- "Identifying targets for reducing exposure to agents that cause or exacerbate asthma in Massachusetts," D. Kriebel, R. Clapp, UMass Lowell Dept. of Work Environment.
- "Greener routes to halogen-free flame retardants," J. Kumar, R. Nagarajan, UMass Lowell Chemistry Dept.
- "Demonstrating Energy Efficiency and Toxics Use Reduction in a Massachusetts Facility" Rohm and Haas Electronic Materials, Marborough.
- "Converting a Dry Cleaning Operation to Wet Cleaning to Avoid Perchloroethylene Use," Silver Hanger Cleaners, Bellingham.
- "Nanoscale lead-free solders ("nano solders"): synthesis, characterization and reflow properties," Z. Gu, UMass Lowell, Chemical Engineering

In FY'07, TURI funded research grants for \$40,000.

Toxics Use Reduction Community Program

In FY'08 TURI awarded \$68,200 in grants among the following 10 organizations to leverage toxics use reduction within Massachusetts communities:

- **Cape Cod Cooperative Extension, Barnstable, MA** promoted the use of new LED flares to boaters and emergency responders as an alternative to chemical flares containing perchlorate.
- **Vietnamese American Initiative for Development, Inc., (Viet-AID), Dorchester, MA**, promoted safer hardwood floor finishing products to companies and consumers.
- **ECOprojects, Jamaica Plain, MA**, educated asthmatic residents in Lynn about how to identify and reduce chemical hazards due to common household practices that trigger asthma symptoms.
- **Worcester Youth Center** increased awareness among low income inner city youth about harmful chemicals found in everyday products used at home.
- **Town of Townsend, Conservation Commission** educated residents about the benefits of organic lawn care practices by creating a demonstration site at the Town Hall and Library lawns without using pesticides.
- **The Organic Mom, Inc., Berkley, MA**, hosted two free environmental lectures at local schools to raise public awareness of toxics inside and outside of the home.
- **Friends of Tyler Park, Lowell, MA**, encouraged the reduction of pesticide use in Lowell's residential and civic spaces with a non-pesticide demonstration lawn site at Tyler Park.
- **The Organic Land Care Program of Northeast Organic Farming Association--Massachusetts Chapter, Barre, MA**, awarded six Massachusetts municipal employees scholarships to attend an organic lawn care course.
- **Brazilian Women's Group, Allston, MA**, educated Brazilian housecleaners about how to choose safer cleaning products.
- **Holliston Fire Department** educated the public about Massachusetts Department of Environmental Protection pesticide regulations, the risks of pesticides, and alternative ways to maintain a healthier yard.

In FY'07, TURI awarded \$57,409 in grants to seven community organizations that raised awareness of toxics use in auto shops, lawn care, floor finishing, and other industries.

TURI Laboratory

- Tested the performance of safer cleaning solutions for 21 Massachusetts companies and suppliers representing metal working, optics, aerospace, hospitals, solar, pharmaceutical and other sectors.
- Received a \$31,000 contract from the Veteran's Administration to evaluate bio-based replacements for floor stripping and hard surface cleaning at the Bedford VAMC. "Biobased Products Pilot Study at the Edith Nourse Rogers Memorial Veterans Hospital," Bedford, Massachusetts.

Peer Networks and Workgroups

- The New England Lead-Free Electronics Consortium completed assembly and rework for lead-free/halogen-free materials. Financial assistance received from USEPA Region I.

TURA Environmental Management Systems (EMS) Peer Mentoring Workgroup

TURI awarded Gentex Optics of Dudley a \$10,000 grant to host the EMS workgroup of five Massachusetts firms. In FY'07, TURI funded \$10,000 for two companies to host EMS Workgroups that included 10 participating companies.

TURI Library, Outreach, and Publications

- TURI published technical reports, methods and policy reports along with many outreach materials, such as program and reports, demonstration site reports, brochures, tip sheets, and chemical fact sheets—all are online at www.turi.org.
- In FY08, there were over 8,100 off-site (remote) search sessions of the TURI Library catalog that was put online at the end of FY 07.
- The Greenlist Bulletin, which is emailed to approximately 300 subscribers, was published 44 times in FY08, and 43 times in FY07.
- In July 2006, at the request of the Massachusetts Legislature, TURI completed and published the "Five Chemicals Alternatives Assessment Study."
- Updated chemical facts sheets to support the Five Chemicals Study and the higher hazard substance designations including Cadmium and Cadmium Compounds, Trichloroethylene (TCE), Formaldehyde, Di (2-ethylhexyl) phthalate (DEHP), Lead, and Perchloroethylene.

Office of Technical Assistance and Technology

Since 2006, the Office of Technical Assistance and Technology has coordinated the following workshops and published the following materials. All OTA conference information and publications are available online: www.mass.gov/eea/ota.

Workshops and Conferences

"Energy Efficiency and Water Conservation (four workshop sessions);" "Tools and Resources for Enhancing the Energy Efficiency of Industrial Operations;" "Safe Development of Nanotechnology;" "Toxics Use Reduction Achievements by Massachusetts Manufacturers;" "Cleaner Technology and Energy Efficiency: Structuring a Competitive Advantage;" "Powder Coating: Benefits and New Opportunities;" "New Spray Coating Regulations: What you Need to Know;" "Environmental Compliance in the Medical Device Industry;" "Is On-Site Renewable Energy Right for Your Business;" and "To Install or Not to Install: Why Businesses are Choosing On-Site Renewable Energy."

Fact sheets

"Guidelines for Compliant Spray Booth Operation;" "Designating Higher and Lower Hazard Chemicals in Massachusetts: Q&A;" "Water Conservation Techniques and Resources for Massachusetts Industries;" "What You Should Know About Installing On-Site Renewable Energy for Your Massachusetts Company;" "Overview of Energy Efficiency Techniques and Resources for Massachusetts Industries;" "Persistent, Bio-accumulative, and Toxic (PBT) Chemical Fact Sheets;" "Energy Savings Tips for Industrial and Commercial Buildings."

Case histories

"Seaman Paper: Energy Efficiency Measures Save Resources and Money;" "Delaware Valley Corp. Energy Efficiency;" "Perstorp Compounds, Inc.: Input Reduction through Reuse of Waste;" "Lightolier, A Division of Genlyte: Elimination of Trichloroethylene and Reduction of VOC Emissions;" "Decorated Products, Inc.: Etchant Regeneration;" "Berkshire Industries: Solvent Substitution;" "SouthCoast Technical Products: Filtration and Wastewater Compliance."

Publications

"An Environmental Guide for the Medical Device Industry in Massachusetts;" "Best Management Practices for the Manufacture of Electronics with Lead Solder;" "Barriers to Eliminating Chlorinated Solvent Use In Cleaning Operations at Massachusetts Manufacturers;" "The Economic & Operational Impact of Environmental Regulations and New International Standards on Your Business: A Focus Group Meeting For the Marine Science & Technology Industry;" "Background and

Issues Paper for Marine Science and Technology Group Meeting; "Strategies for Streamlining Testing and Certification: Environmentally Friendly Wire and Cable;" "A Primer on Cleaning Equipment in the Food Processing Industry;" "The Assessment of Barriers to Toxics Use Reduction, Pollution Prevention and Resource Conservation."

Massachusetts Department of Environmental Protection TURA Publications

Regulations

- TURA Reporting Regulation Amendments, June 2007
- TURA Planning Regulation Amendments, December 2007

Guidance

- Toxics Use Reduction Planning Guidance, December 2007
- Resource Conservation Planning Guidance, December 2007
- Environmental Management Systems (EMS) Planning Guidance, December 2007
- Environmental Management Systems Frequently Asked Questions
- 2007 Reporting Instructions & Appendices, April 2008

Fact Sheets/Other

- Toxics Use Reduction Act, Redline Summary of Changes Made by Chapter 188 of the Acts of 2006
- Fact Sheet: Toxics Use Reduction Act – 2006 Revisions
- Fact Sheet: TURA Resource Conservation Plans & Environmental Management Systems
- 2005 Toxics Use Reduction Information Release

Toxics Use Reduction Planner Certification

- General Practice TUR Planner Certification or Recertification Form and Instructions, January 2008
- Limited Practice TUR Planner Certification or Recertification Form and Instructions, April 2008
- Resource Conservation Plan & EMS Certification Checklist for TUR Planners
- Environmental Management Systems (EMS) Certification Checklist for EMS Professionals

Toxics Use Reduction Act Program Revenues and Appropriations

The following chart details revenues and appropriations for the Toxics Use Reduction Program for fiscal years 2007 and 2008.

	FY 2007	FY 2008
Total Revenues	\$3,558,346	\$3,226,274*
Appropriations		
OTA	\$1,391,534	\$1,565,292
DEP	951,000	982,731
TURI	1,323,948	1,667,454**

* Expected revenue from reports received in FY08.

** This figure does not include an additional earmark, which was added to TURI's appropriation in FY08 for \$250,000 to fund a Breast Cancer Prevention Research project, a collaborative project of UMass Lowell, Silent Spring Institute and the Massachusetts Breast Cancer Coalition.

Successful Implementation of the Toxics Use Reduction Act

Toxics Use Reduction in Massachusetts

THE PROOF IS IN THE DATA

The Massachusetts Toxics Use Reduction Act (TURA) of 1989 encourages companies to reduce toxic chemical use in Massachusetts. The data show that companies have voluntarily reduced toxic chemical use while maintaining their competitive advantage. **Industries subject to reporting since 1990 have reduced their toxic chemical use by 40 percent, byproducts by 71 percent, and releases on site by 91 percent.**

The law was amended in 2006 to provide flexibility in planning and better focus program resources on helping companies reduce the use of higher hazard substances.

Companies benefit from the joint efforts of the Department of Environmental Protection, Massachusetts Office of Technical Assistance, and the Toxics Use Reduction Institute at the University of Massachusetts Lowell as well as from the following entities:

GOVERNANCE | Administrative Council: Representatives of state agencies responsible for environmental protection, public health, occupational safety, public safety and economic development. Has responsibility for governance of the TURA Program and coordination of all state activities regarding toxics.

FEEDBACK | Advisory Committee: The stakeholder committee advises the Administrative Council on program policies, higher and lower hazard chemical designations, the TURA fee structure, and chemical listing and delisting petitions.

SCIENCE | Science Advisory Board: Makes recommendations to add or delete chemicals from the TURA chemical list and to designate chemicals as higher and lower hazard—all based on science.



For more information, contact the following agencies:



Massachusetts
Department
of
ENVIRONMENTAL
PROTECTION

One Winter Street
Boston, MA 02108-4746
(617) 292-5500

www.mass.gov/dep/toxics/toxicsus.htm

Certifies Toxics Use Reduction (TUR) Planners, receives and reviews toxics use reports submitted by companies, provides guidance, takes enforcement actions against non-reporters, and collects chemical use data and makes it available to the public.



100 Cambridge Street, Suite 900
Boston, MA 02114
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www.mass.gov/eea/ota

A non-regulatory agency within the Executive Office of Energy and Environmental Affairs that provides free, confidential, and on-site technical and compliance consultations to Massachusetts manufacturers, businesses and institutions.



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Provides education and training for companies, sponsors research into the development of cleaner, safer materials and technologies. The Institute consults with the Science Advisory Board on chemical designations and additions or deletions of chemicals from the TURA chemical list.