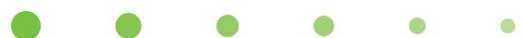


ANNUAL REPORT

Massachusetts Toxics Use Reduction Program

FISCAL YEAR 2020

**Massachusetts
Toxics Use Reduction**



Report Submitted to:

The Governor of the Commonwealth of Massachusetts
The Commonwealth of Massachusetts House of Representatives
The Commonwealth of Massachusetts Senate

Prepared by the Office of Technical Assistance and Technology in collaboration with the Toxics Use Reduction Institute and the Massachusetts Department of Environmental Protection
May 2022

TURA Agencies

Massachusetts Department of Environmental Protection (MassDEP)

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

<https://www.mass.gov/guides/massdep-toxics-use-reduction-program>



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

Office of Technical Assistance & Technology (OTA)

100 Cambridge Street, Suite 900, Boston, MA 02114
(617) 626-1060

www.mass.gov/eea/ota



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

Toxics Use Reduction Institute (TURI)

126 John Street Suite 14, Lowell, MA 01854
(978) 934-3275

<https://www.turi.org/>



Provides education, training, and grants for Massachusetts industry and communities; sponsors research and demonstration sites on safer materials and technologies; provides laboratory and library services and policy analyses; and manages the TURA Science Advisory Board.

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Executive Summary

The Toxics Use Reduction Act (TURA) Program works with Massachusetts businesses and communities to reduce the use of toxic chemicals while investigating and promoting the adoption of safer alternatives. This work helps to protect human health and the environment, making Massachusetts a safer place to live and work while improving the competitiveness of Massachusetts businesses.

In Fiscal Year 2020 (FY20), the TURA program's work included scientific assessment of chemicals for possible addition to the TURA list of reportable substances, research, technical assistance for businesses, grants, educational events, and guidance documents and other publications.

Activities Related to the COVID-19 Pandemic

The TURA partner agencies adapted its priorities upon the onset of COVID-19 in Spring 2020. The [Toxics Use Reduction Institute](#) (TURI) shifted resources to focus on identifying safer cleaners and disinfectants, upgrading chemical assessment tools, and educating businesses and the public about effective safer COVID-related cleaning options. The [Office of Technical Assistance and Technology](#) (OTA) created a virtual site-visit program to continue providing technical assistance to Massachusetts businesses. The [Massachusetts Department of Environmental Protection](#) (MassDEP) delayed the TUR Plan deadline from July 2020 to November 2020 in response to the impacts of the COVID-19 pandemic on businesses and the industry.

Toxics Use Reduction Grants

TURI provided \$175,000 in funding to support 15 projects that reduced solvent use in the auto-repair, manufacturing, food-processing, and surface-finishing industries; reduced use of flame-retardant chemicals; communicated the hazards of bisphenol A (BPA), flame retardants, and per- and polyfluoroalkyl substances (PFAS); and researched alternatives to chemicals used in various industrial and aerospace applications.

Technical Assistance and Lab Services for Massachusetts Businesses

OTA personnel worked closely with 28 Massachusetts facilities and provided recommendations related to regulations, pollution prevention, energy efficiency, and water conservation. With OTA's help during FY20, Massachusetts companies eliminated the annual use of 500,000 gallons of water and eliminated more than 14,000 pounds of toxic chemicals.

The [TURI laboratory](#) provided no-cost services to businesses in sectors including electronics, heating and cooling, and parts manufacturing, among others. TURI continued its work to research and test safer alternatives to [paint strippers](#).

Educational Materials

TURI published a number of new resources, including a report on coating-removal alternatives; [videos](#) on TUR planning, chemical assessment tools, and Massachusetts organizations that have switched to safer alternatives; and [case studies](#) profiling the success of companies that have implemented toxics use reduction initiatives. Also, the TURI library provided information in response to a wide variety of inquiries about chemicals and products; queries came from individuals, businesses, state and municipal agencies, and others.

Inspired by a mapping activity conducted at a TURA program staff retreat in FY19, OTA has maintained a [Google map](#) displaying the location of toxics use reduction activities throughout the state. The map includes TURI grantees and companies collaborating with the lab and researchers at UMass Lowell, DEP Notices of Noncompliance and enforcement actions, and confidential site visits conducted by OTA. To avoid a breach of confidentiality, other than workshops or events, OTA site visits are solely listed by town or city name. The map demonstrates the reach and breadth of the TURA programs statewide work to reduce the use of toxic chemicals.

Toxics Use Reduction Reporting and Planner Certification

MassDEP collected approximately 1,600 chemical use reports from 453 companies on 131 different chemicals. There are 124 Toxics Use Reduction Planners currently certified as having the training and expertise needed to review and approve toxics use reduction plans.

Toxics Use Reduction Policy Activities

Effective January 1, 2020, pursuant to EPCRA Section 313 and following the public process according to MGL c.30A, the nonylphenol ethoxylates (NPE) category was added to the list of reportable substances in 301 CMR 41.00 (Toxic or Hazardous Substance List) following its inclusion in the Toxics Release Inventory (TRI).

On June 22, 2020, EPA published a final rule to add 172 per- and polyfluoroalkyl substances (PFAS) to TRI, initiating the process for adding these substances to the TURA chemical list under 301 CMR 41.00. Additionally, the Science Advisory Board continued their review of other PFAS of varying carbon chain lengths. PFAS contamination has been detected in

water supplies in the Commonwealth and is a high priority for action nationally and internationally.

Toxics Use Reduction in Massachusetts

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 World Watch Institute, and have become a national model for toxics use reduction.

TURA's cornerstone principle is that the best way to reduce pollution and prevent human and environmental exposures to toxics is to address the root cause: the decision to use toxics in the first place. Facilities subject to TURA ("TURA filers") are required to track and report the amounts of toxic chemicals used and generated as waste each year. This provides public information on the use and waste of covered toxic chemicals. In addition, every other year, TURA filers analyze whether it is in their best interest to adopt toxics use reduction techniques to use fewer pounds of toxic chemicals per unit of product produced.

Because the biennial Toxics Use Reduction Plans are designed to reveal cost savings opportunities, they lead to voluntary reductions in toxic chemical use, which lead to reductions in worker exposures, hazardous releases, and the generation of toxic wastes.

The resulting efficiencies, financial savings, product improvements, and improved environmental performance all work together to support the competitive position of Massachusetts businesses. Public data demonstrating progress by TURA filers is available through 2017.

Progress by TURA Filers

In 2017, the following chemical quantities were reported:

- ◆ Chemical use: 692 million pounds
- ◆ Byproduct generation: 78 million pounds
- ◆ Shipped-in product: 348 million pounds
- ◆ On-site releases: 3 million pounds
- ◆ Transfers off-site: 34 million pounds

From 2007 to 2017, 2007 Core Group facilities achieved the following reductions:

- ◆ reduced toxic chemical use by 41% (from 792 to 468 million pounds)
- ◆ reduced toxic byproducts by 3% (from 75 to 73 million pounds)

- ◆ reduced toxics shipped in product by 10% (from 272 to 244 million pounds)
- ◆ reduced on-site releases of toxics to the environment by 51% (from 6 to 3 million pounds)
- ◆ increased transfers of toxics off-site for further waste management by 21% (from 25 to 30 million pounds)

The 2007 "Core Group" includes all industry categories and chemicals that were subject to TURA reporting in 2007 and remained subject to reporting in 2017 at the same reporting threshold. This Core Group is used to measure progress from 2007 to 2017.

"The solution we worked with [the TURA program] on ... is both scalable and sustainable – consistent with our needs and mission."

Matthew Meisel, Chief Financial Officer, Little Leaf Farms

FY20 Project Highlights

Pandemic-Related Activities

The TURA agencies shifted many of its projects to virtual workspaces upon onset of the COVID-19 pandemic.

In response to a growing number of questions about options for safer cleaning and disinfection, TURI reallocated resources toward the ongoing task of identifying safer cleaners and disinfectants. TURI has focused on this area for many years, but it became increasingly important and visible as various industry and public sectors reached out to TURI for guidance.

Following pandemic safety protocols established by UMass Lowell, TURI's lab reopened to continue testing safer cleaners. The lab was also able to start testing products for antiviral disinfection effectiveness. Disinfection testing was launched in partnership with UMass Lowell Associate Professor Nancy Goodyear, a clinical microbiologist with expertise in safer disinfection.

TURI also developed written materials, including fact sheets on safer cleaning/disinfection and on asthma; an online list of commonly available safer cleaners/disinfectants; cleaning guidelines and other resources for businesses reopening during the pandemic; and a list of safety measures for using disinfectants. Lab staff spoke to the press about mask materials and sanitizing and presented safer-cleaning webinars to local business groups, government agencies, and the general public. Lab staff and students devoted more time to upgrading TURI's online chemical assessment tools such as CleanerSolutions and P2OASys. TURI personnel also continued to educate community members and businesses about chemical-triggered comorbidity, with a particular focus on avoiding disinfectants that can cause or exacerbate chronic diseases such as asthma.

Upon suspension of in-person site visits starting in March 2020, OTA staff developed protocols for the provision of virtual technical assistance visits conducted via Zoom or Teams. Staff members developed an internal virtual site visit protocol to ensure the quality and consistency of virtual technical assistance visits, and a guidance document to prepare companies for virtual site visits. OTA began outreach to companies late in FY20 to conduct "dry run" virtual assistance visits to pilot-test and refine these documents; the first of these visits were conducted early in FY21.

OTA and TURI also participated in the Toxic Reduction Task Force to develop recommendations on safer cleaning and disinfection for Massachusetts facilities and contracts. These activities are further detailed beginning on page 16.

In order to provide TURA filers with needed time to prepare their TURA Plans and submit their Plan Summaries, MassDEP

extended the deadline for submissions from July 1, 2020, to November 1, 2020.

Methylene Chloride: Safer Alternatives for Paint-Stripping Products

TURI continued its efforts to help replace methylene chloride, a component in paint-stripping products widely used in professional and consumer markets, with safer alternatives.

During the past several years, TURI worked with UMass Lowell faculty and students to identify, test, and develop a [safer paint stripper](#) with effectiveness comparable to methylene-chloride-based products. UMass Lowell subsequently licensed the new paint stripper formulation and it is now available on the market.

In FY20, further testing was completed on additional coatings and coating surfaces, including adhesives, automobiles, boats, and bathtubs, and TURI staff published a technical report describing the environmental, health and safety factors as well as the cost and the relative performance of commercially available coating removal products.

Artificial Turf: Safer Alternatives for Sports Fields

In FY20, TURI continued to field inquiries from municipalities, schools, and others about [artificial turf](#), organically managed natural grass playing fields, and playground surfacing materials. TURI also created new educational materials on these topics.

Materials used in artificial turf fields can contain a variety of chemicals of concern. Other artificial-turf concerns include excess heat and microplastic pollution.

In FY20, TURI created a [fact sheet](#) on PFAS in artificial turf grass blades, including information on approaches for testing products for PFAS. TURI also collected data for case studies of [natural-grass playing fields](#), including detailed information on playable hours, maintenance practices, and costs. Other projects completed in FY20 included a [journal article](#) comparing chemical contents of multiple types of artificial turf infill, an [FAQ web page](#) about athletic fields, and a webinar for community organizations interested in using TURI's materials.

Organically managed natural grass fields have been identified as a safer alternative to artificial surfaces and are practical and cost effective when correctly designed. Throughout FY20, TURI staff continued to provide information on organic management of natural grass to community members and others.

Grant Projects

Each year, TURI allocates grants to Massachusetts businesses, community groups, municipalities, and industry-academic research partnerships to further the development, implementation, and dissemination of toxics use reduction strategies.

In FY20, TURI provided roughly \$121,000 to 12 businesses and community groups, and roughly \$55,000 to 3 academic research projects carried out in partnership with industry.

The projects addressed areas including industrial cleaning, automotive repair, gymnastics, manufacturing, food processing, PFAS and BPA, and textile coatings. See Appendix I for complete details on the [grant projects](#).

Industry Grants

- ◆ **Bird Precision (Waltham):** Worked toward eliminating its use of trichloroethylene (TCE).
- ◆ **CD Aero (New Bedford):** Eliminated its use of n-propyl bromide (nPB).
- ◆ **MSI Transducers (Littleton):** Reduced its use of lead and generation of lead waste.
- ◆ **Plenus Group (Lowell):** Worked with UMass Lowell to find alternatives to sodium hydroxide.
- ◆ **River Street Metal Finishing (Braintree):** Reduced its use of sulfuric acid.
- ◆ **Riverdale Mills (Northbridge):** Reduced its use of hydrochloric acid, sodium hydroxide, and ammonium hydroxide.

Small Business Grants

- ◆ **The Gym Club Gymnastics Center (Gardner):** Eliminated exposure of gymnasts to foam pit cubes treated with flame retardant, an endocrine disruptor.
- ◆ **Sonny's Auto Repair (Chicopee):** Eliminated its use of petroleum distillates for parts cleaning.
- ◆ **Outstanding Bath Refinishing (Milford):** Eliminated its use of methylene chloride.
- ◆ **Workshop Auto (Lowell):** Reduced its use of acetone, methanol, and toluene.

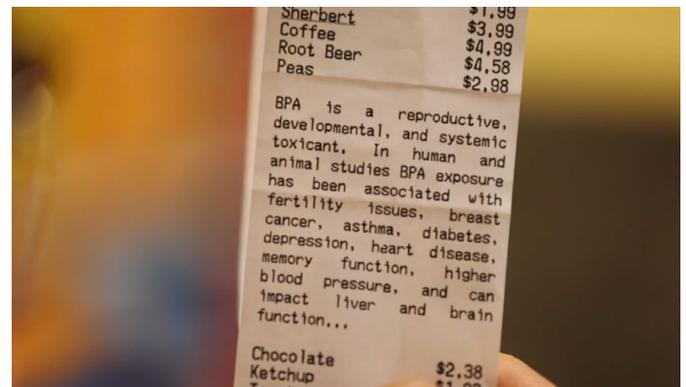
Academic Research Grants

- ◆ **Bradford Industries (Lowell), partnering with Dr. Ram Nagarajan of UMass Lowell:** Continued to evaluate safer alternatives to dimethylformamide.

- ◆ **Raytheon Company (Andover), partnering with Dr. Wan-Ting Chen of UMass Lowell:** Researched safer alternatives to methylene chloride.
- ◆ **Waters Corporation (Milford), partnering with Dr. Hsi-Wu Wong of UMass Lowell:** Continued to test safer replacements for acetonitrile.

Community Grants

- ◆ **Clean Water Fund (Boston):** Disseminated information to Massachusetts residents about toxic flame retardants and PFAS.
- ◆ **Don't Take That Receipt! (Holyoke):** Continued to communicate to businesses and the public about the dangers of BPA.



A partial frame from a BPA educational video produced by Don't Take That Receipt!

Confidential Technical Assistance

OTA provides Massachusetts businesses with free, non-regulatory, and confidential assistance for toxics use reduction, energy and water conservation, regulatory compliance, and waste reduction. The technical assistance providers aim to help businesses save money while improving public and worker health through reducing toxics and conserving resources. OTA also holds trainings and produces content to inform toxics users about safer alternatives, toxics use reduction techniques, best practices, technologies, and environmental compliance topics.

During FY20, OTA worked closely with 28 Massachusetts facilities and provided recommendations related to regulations, pollution prevention, toxics use reduction, energy efficiency, and water conservation. Seventy-nine percent of those facilities were directly located in or within one half mile of an Environmental Justice community (22 out of 28).

During follow-up with facilities in FY20, OTA recorded that, because of OTA recommendations, companies:

- ◆ eliminated the annual use of over 500,000 gallons of water; and
- ◆ eliminated more than 14,000 pounds of toxic chemicals.

Chuck Shepard, Director of Safety at S.E. Shires – Eastman Brass, described OTA’s assistance this way: “[OTA’s] experience and knowledge have been a tremendous help over the years for a variety of projects that I needed help with. Last year they helped with a project that I had no knowledge of and were able to provide great assistance. They were able to help me learn that this project had some serious health and safety risks. I probably would not have learned early enough on my own about the problems associated with this project. This project could have turned into a financial problem at the very least. I hope that this year we can undertake another round to look at possible alternatives that might be safer.... I can’t say enough good things about the services that OTA provide that would be out of reach for our company. I think I can safely say that our workplace is safer and healthier because of the work that the OTA has been able to assist me with.”

Contacts at other companies OTA worked with during FY20 describe OTA staff as “very knowledgeable people who took the time to get a clear understanding of our business,” state that OTA “listened to concerns and provided realistic suggestions,” and indicate appreciation for OTA’s “immediate response to our questions.”

All consultations with OTA technical assistance providers are bound by statutory confidentiality, unless waived by the

company for case study development, special recognition, or other purposes. Confidentiality ensures that companies can form and maintain long-term partnerships with OTA. Through these relationships, OTA’s technical assistance providers are able to help companies discover opportunities to reduce their use of toxic or hazardous materials and achieve cost savings in the process.

Technical assistance usually consists of a site visit, report delivery with recommendations based on the facility’s needs and interests, and email and phone communications to discuss finer points and assist with the implementation of recommendations. To maximize the benefit to the company, for each visit, a team of technical assistance providers is selected based on the company’s stated needs and interests.

"I can't say enough good things about the services that OTA provide that would be out of reach for our company. I think I can safely say that our workplace is safer and healthier because of the work that the OTA has been able to assist me with."

Chuck Shepard, Director of Safety, S.E. Shires

Laboratory Services and Technical Assistance

Laboratory Services

[TURI's laboratory](#) continues to provide free testing services to Massachusetts companies seeking safer cleaning alternatives. In FY20, the lab tested the performance of safer cleaning alternatives for 24 Massachusetts businesses, primarily in the manufacturing industry, but also in the healthcare, agricultural, and public service sectors.

Additionally, the lab worked on 20 fee-for-service testing projects for formulators of cleaning products. These projects were part of the companies' efforts to have products certified for Green Seal, EPA Safer Choice or UL Ecologo. Of these, three companies were from Massachusetts.

The lab continued to offer services to industry and the Commonwealth in janitorial cleaning. The lab worked with various state, city, and community agencies and groups in their efforts to move to greener janitorial cleaning chemicals and systems.

In FY20, TURI updated and expanded the lab's [Cleaner Solutions](#) database, a web-based product-analysis tool that assesses the relative hazards and effectiveness of chemical ingredients in household and industrial cleaners. TURI staff, with the assistance of a database consultant, added content, streamlined functionality, and redesigned the interface to make it more appealing and useful for the public.



The revamped CleanerSolutions landing page

As the COVID-19 virus began to spread in spring 2020, TURI began to field pandemic-related questions about cleaning and disinfection. Lab work was reprioritized; lab staff reviewed and updated online reference materials, compiled summaries about safer cleaning devices and chemistries, and

organized informational webinars. Additionally, lab staff and students, in conjunction with Dr. Nancy Goodyear of UMass Lowell, began to conduct disinfection research and product testing to identify safer alternatives effective against COVID-19. This work continued into FY21.

Library and Information Services

The [TURI Library](#) responds to information requests from businesses, state and municipal agencies, nongovernmental organizations, and individuals. During FY20, information requests included queries about:

- ◆ specific chemicals (e.g., ethylene oxide, PFAS, bisphenols)
- ◆ products/methods/safer alternatives (e.g., children's play mats, cookware coatings, chrome plating)
- ◆ international regulatory requirements (e.g., REACH, RoHS)

Library staff, in conjunction with lab staff, also answered queries about cleaners and disinfectants effective against the COVID-19 virus.

Industry Focus: Food Processing Sector

Food and beverage manufacturers in Massachusetts use various hazardous chemicals to meet their cleaning and sanitizing needs. TURI is working with [this sector](#) to identify and test alternatives to improve efficiency and worker safety. OTA has a dedicated technical assistance provider for the food and beverage industry.

In FY20, TURI continued to work with Little Leaf Farms (a produce grower in Devens), Fat Moon Mushrooms (a mushroom grower in Westford), Kettle Cuisine (a soup maker in Lynn) and the Plenus Group (a soup, sauce, and side-dish manufacturer in Lowell), to find safer alternatives to chemicals used in cleaning processes. TURI also continued to research and draft an alternatives assessment for traditional cleaners and sanitizers used in breweries. Additionally, TURI staff helped organize activities for the National Pollution Prevention Roundtable's Food and Beverage Workgroup.

Education and Training

Demonstration Events

TURI organizes [industry demonstration events](#) to highlight the efforts of facilities that have reduced their use of toxic chemicals and the TUR Planners that have helped in the process. During FY20, TURI held an in-person demonstration event at Synventive Molding Solutions in Peabody and a virtual demonstration event of Riverdale Mills in Northbridge. Synventive manufactures systems for the plastics injection molding industry; the company switched from an n-propyl bromide system to an aqueous cleaner. Riverdale Mills, which

Riverdale Mills



manufactures wires mesh, installed a new filtration system to reduce its use of hydrochloric acid, sodium hydroxide and ammonium hydroxide.

"Beyond the SDS" Workshop

TURI conducts ongoing outreach and workshops for researchers and TUR Planners, educating them about databases, tools, and information to better identify chemical hazards. The "Beyond the SDS" [workshop](#) was provided three times in FY20 for 5 to 12 attendees per class.

Toxics Use Reduction Planner Certification Course

Every year, TURI conducts an intensive course to train new Toxics Use Reduction Planners (TUR Planners). Required pre-recorded sessions are available online, where participants can learn at their own pace, while the four classroom sessions are devoted to workshop exercises, group discussion, and team project work to develop a Toxics Use Reduction (TUR) Plan based on an example facility. The [course](#) culminates with a group presentation designed as a pitch to management about

the chosen toxics use reduction option featured in the Plan. In FY20, 17 industry professionals took the course.

Toxics Use Reduction Planner Continuing Education Conferences

TURI offers semi-annual [Continuing Education](#) conferences for TUR Planners to ensure that they have the most up-to-date information on chemical hazards, alternatives, and opportunities. The conferences allow planners to improve their skills and maintain their certifications. At the fall 2019 conference, topics included nanotechnology, aqueous cleaning, Safety Data Sheets, TUR regulatory drivers, and real-life examples of switching to safer alternatives. The spring 2020 conference (delivered online due to the COVID-19 pandemic) offered sessions on fundamentals, PFAS, evaluating the economic feasibility of TUR options, and using the chemical comparison tool Pharos.

Conferences and Workshops

TURI provided several training events. TURI's 40-hour course provided [training for new Toxics Use Reduction planners](#). The two [Continuing Education conferences](#) covered topics such as regulatory drivers for TUR, PFAS, and chemical comparison tools. Three [library-based workshops](#) provided guidance on how to use chemical databases and other tools.

OTA staff are active representatives on various committees and Advisory Boards such as the Boston Local Emergency Planning Committee, Environmental Business Council of New England of New England ([EBC](#)), the MA Department of Public Health's [Occupational Health Surveillance Program \(OHSP\)](#), the [Massachusetts State Emergency Response Commission \(SERC\)](#), [The New England Consortium \(TNEC\)](#), and the New Hampshire Department of Environmental Services [Biosolids Improvement Workgroup](#). OTA's participation in these committees allow the TURA Program to interact with like-minded agencies, collaborate with public health peers, and ensure that toxics use reduction is incorporated into other state programs. In June 2020, OTA began a collaboration with the Pacific Northwest Pollution Prevention Resource Center to develop resources for virtual site visits to companies. This partnership has continued into FY21 and has furthered OTA's efforts to develop virtual alternatives to its traditional in-person site visits.

OTA made several [Chemical Safety and Climate Change Resiliency](#) presentations with the goal of assisting companies and first responders in how to use OTA services to reduce risks of severe weather-related chemical or industrial accidents. These included:

- ◆ On July 16, 2019, EBC hosted a daylong workshop as part of their EBC Climate Change Program on the topic of Preventing Toxic Exposures During Climate Change Events: Severe Weather & Emergency Preparedness Tools for Facilities. OTA delivered a presentation at this workshop entitled “Building Chemical Safety into Climate Change Resiliency / Disaster Preparation through Pollution Prevention.”
- ◆ On September 10, 2019, OTA gave a presentation at a Central Massachusetts Business Environmental Network (CMBEN) meeting entitled “Chemical Safety & Climate Change Resiliency.”
- ◆ On October 10, 2019, OTA presented at the [New England Interstate Water Pollution Control Commission \(NEIWPC\)](#) Water Quality Standards Training on OTA’s services, specifically concerning toxics reduction for community climate change resiliency.
- ◆ In May 2020, OTA conducted an online presentation for a Climate Change and Environmentally Impacted and Chemically Hazardous Sites workshop for the City of Haverhill Massachusetts, a recipient of a Municipal Vulnerability Program (MVP) grant. OTA presented on services it can provide to facilities located in communities vulnerable to the effects of climate change. The proceedings from this meeting and an assessment of Haverhill’s chemical and climate change vulnerability can be found [here](#).

Per- and polyfluoroalkyl substances (PFAS) contamination is a high-priority topic for OTA and the TURA Program. OTA delivered several presentations on this topic during FY20:

- ◆ On November 12, 2019, EBC’s Solid Waste Management Program hosted a workshop entitled Impact of PFAS on Solid Waste Operations, at which OTA delivered a presentation entitled “Removing the Handle from the PFAS Pump” about source reduction activities for per-and polyfluoroalkyl substances (PFAS).
- ◆ On September 11, 2019, OTA presented to the Massachusetts Water Environment Association (MAWEA, formerly known as the Massachusetts Water Pollution Control Association, or MWPCA) on “OTA Resources for Tracking Chemical and Emerging Contaminants” and discussed OTA plans for outreach to industries upstream from wastewater treatment facilities.
- ◆ On October 10, 2019, OTA presented at the New England Interstate Water Pollution Control Commission (NEIWPC) Water Quality Standards Training on OTA’s services, specifically concerning toxics reduction for community climate change resiliency.

- ◆ In February 2020, OTA attended a half-day compliance assistance workshop conducted by US EPA on the Emergency Planning and Community Right-to-Know Act (EPCRA), to support environmental health and safety managers in remaining compliance with EPCRA requirements.
- ◆ In April 2020, OTA delivered a guest lecture in the graduate seminar Environmental Health Law and Policy at Boston University School of Public Health, where she discussed the history of the Toxics Use Reduction Act in Massachusetts and the roles of OTA, TURI, and DEP in administering TURA.

Toxics Use Reporting and Planner Certification

Toxics Use Reporting

Each July 1, large-quantity toxics users in TURA-covered industry sectors submit an [annual report](#) to MassDEP including data on each TURA-listed chemical used in above-threshold amounts during the previous calendar year. These reports supplement the federal [Toxics Release Inventory](#) (TRI) reports that must be submitted on the same date to document the quantities of chemicals released to the environment or shipped offsite to be managed as waste. The TURA report documents the quantities of chemicals used, processed, or manufactured.

Due to COVID-19 business interruptions, the due date for the annual reports was extended to November 1, 2020.

In FY20, MassDEP processed approximately 1,500 chemical use reports from 453 facilities. MassDEP continues to update their guidance documents and data systems to improve the information received from TURA filers.

Managing the reporting process involves:

- ◆ assisting filers with the reporting process
- ◆ checking reports for accuracy and compliance
- ◆ following up on chemical use report and plan summary anomalies
- ◆ identifying facilities that failed to submit required reports, plan summaries, and fees
- ◆ taking enforcement actions as necessary
- ◆ processing fees

Toxics Use Reduction Planner Certification

In even calendar years, large quantity toxic users must prepare a Toxic Use Reduction Plan or update an existing plan and analyze whether there are changes that can be made to their production processes that would reduce toxics use, waste, and production costs sufficiently to be in the company's interest to adopt. These TUR Plans must be reviewed and approved by a MassDEP-certified Toxics Use Reduction Planner (TUR Planner).

Facilities that have completed a plan and two updates can opt to substitute in every other planning year a [Resource Conservation Plan](#) which includes an analysis of the facility's water or electricity usage, generation of solid waste, or use of non-TURA-listed toxic substances. These Resource Conservation Plans must be reviewed and approved by a MassDEP-certified TUR Planner that has also been specifically certified to aid in the preparation of Resource Conservation Plans. Alternatively, the business may incorporate TUR

planning into its existing Environmental Management System (EMS). The EMS Progress Reports must also be reviewed and approved by a MassDEP-certified TUR Planner who is qualified to review EMS.

TUR Planners can be approved as General Practice TUR Planners, who can review and approve plans developed by any facility, or Limited Practice TUR Planners, who are allowed to review and approve plans at their place of employment only. General Practice TUR Planners are required to take the TUR Planner Certification Course offered by TURI and pass an exam managed by MassDEP.

As of the end of FY20, there were 124 MassDEP certified TUR Planners, including:

- ◆ 77 General Practice Planners
- ◆ 47 Limited Practice Planners

In FY20, MassDEP reviewed the qualifications of 24 TUR Planners. MassDEP also reviewed the successful completion of the required continuing education credits for 24 TUR Planners who were renewing their certifications. The TUR Planner Exam was offered on December 7, 2019.

Toxics Use Reduction Planner Continuing Education Credit Approval

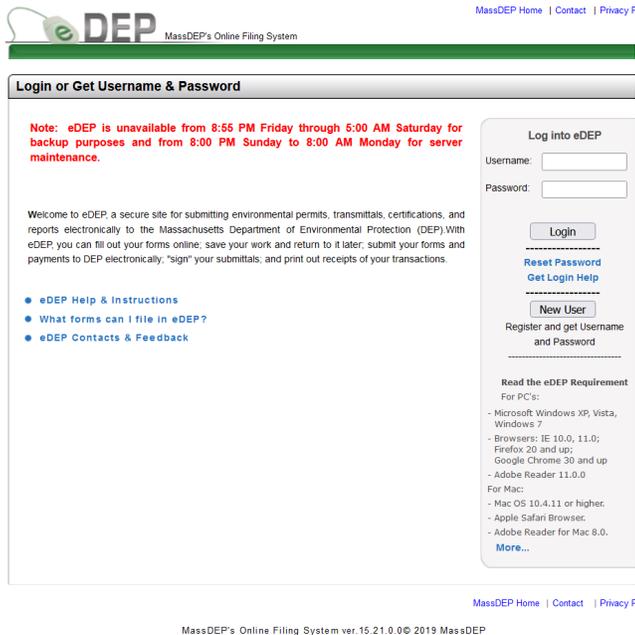
TUR Planners can maintain certification by attending certain TURA program training and education events that offer TUR Planning continuing education credits. Other organizations may request approval from MassDEP to offer TUR Planner continuing education credits for their workshops and events. During FY20, MassDEP approved 15 courses offered by non-TURA program organizations for continuing education credit.

Due to the COVID-19 pandemic, MassDEP also presented an [eight-part online training program](#) in lieu of the in-person Toxics Use Reduction Act (TURA)/Toxic Release Inventory (TRI) reporting workshops it normally presents across the state in partnership with the Office of Technical Assistance & Technology (OTA) and the Toxics Use Reduction Institute (TURI). The training modules focus on the various elements of TUR Reporting via the eDEP Online Filing Platform, and on TUR Planner certification.

TURA Enforcement and Data Analysis

TURA Compliance Training and Outreach

MassDEP worked with OTA and TURI to provide four TURA [Reporting and Planning Training sessions](#) in Spring 2019. These annual trainings provide a refresher course on TURA reporting and planning and the eDEP portal that companies use to submit their information.



The eDEP home page

Enforcement

MassDEP administers the regulatory components of the TURA program and supports the work of the other TURA agencies with data and policy analysis, strategic planning, training outreach, and education.

During FY20, MassDEP inspected 41 TURA filers and screened another 3 facilities to determine if they were subject to TURA. Due to COVID-19 inspections restrictions, fewer inspections were conducted in FY20. These inspections and screenings resulted in:

- ◆ 11 Notices of Non-Compliance (NON) for failure to submit complete or timely TURA reports or for failure to comply with reporting or planning requirements.

In FY20, MassDEP did not send out formal Requests for Information to TURA facilities due to acknowledgement of facility business interruptions by the pandemic. TURA plans developed during FY20 required facilities to examine their processes and operations during the pandemic. MassDEP extended the reporting deadline to November 1, 2020, to provide additional time to TURA facilities for this

collaborative planning. MassDEP planned to issue Requests for Information in FY21 for those plans that were written/updated in FY20. The purpose of these reviews was to evaluate whether additional compliance support focused on aspects of the TURA program would be beneficial to TURA filers, as well as issuing enforcement to those facilities and TUR Planners who did not comply with the TURA regulations.

Fee Revenue

TURA-regulated facilities must pay annual fees unless they have obtained a financial hardship waiver. In FY20 there were no fee-waiver requests. MassDEP collected:

- ◆ \$2,728,600 in annual fees
- ◆ \$39,700 in statutory late fees
- ◆ \$21,300 in fees from TUR Planners who applied for the DEP's certification or recertification

Appendix VI contains FY20 expense information.

Data Analysis

MassDEP manages the TURA data and information releases on the reported chemical use data and toxics use reduction progress.

The most recent data available derive from the 2019 calendar year- reports that were due on November 1, 2020. Four hundred fifty-three facilities submitted 1,567 individual chemical reports on 131 different chemicals. These facilities:

- ◆ used a total of 691 million pounds of these chemicals
- ◆ generated 73 million pounds of chemical as byproduct (chemical waste)
- ◆ released 3 million pounds of chemical waste on-site as pollution
- ◆ transferred 34 million pounds of chemical waste offsite for further treatment, management, or disposal

Toxics Policy

Administrative Council on Toxics Use Reduction

The TURA [Administrative Council](#) coordinates toxics management statewide and is responsible for making decisions about the TURA Toxic or Hazardous Substances List. The Administrative Council is chaired by the Secretary of the Executive Office of Energy and Environmental Affairs and includes representatives from five additional state agencies.

Fiscal Year 2020 Council Members

- ◆ Secretary Kathleen Theoharides, Executive Office of Energy and Environmental Affairs (Chair)
Designee: Daniel Sieger, Undersecretary of Environmental Affairs
- ◆ Commissioner Martin Suuberg, Department of Environmental Protection
Designee: Greg Cooper, Director, Business Compliance and Recycling Division, Bureau of Air and Waste
- ◆ Commissioner Monica Bharel, Department of Public Health
Designee: Marc Nascarella, Director of Toxicology
- ◆ Secretary Rosalin Acosta, Executive Office of Labor and Workforce Development
Designee: Michael Flanagan, Manager, Department of Labor Standards Safety and Health Programs
- ◆ Secretary Tom Turco, Executive Office of Public Safety and Security
Designee: Jennifer Hoyt, Chief Fire Protection Engineer
- ◆ Secretary Michael Kennealy, Executive Office of Housing and Economic Development
Designee: Edward Palleschi, Undersecretary for the Office of Consumer Affairs and Business Regulation

Addition of Nonylphenol Ethoxylates Category to TURA Hazardous Chemical List

Following the Administrative Council's vote on September 25, 2018, to list the nonylphenol ethoxylates (NPE) category, the addition of this category was promulgated on November 15, 2019. Tracking of these chemicals by Massachusetts filers began on January 1, 2020, and initial reporting to MassDEP was due by July 1, 2021.

Formation of the TURA Program Strengthening Ad Hoc Committee

At the November 2019 Administrative Council meeting, the chair outlined a proposal for an ad hoc subcommittee of the

TURA Advisory Committee. The subcommittee, open to all Advisory Committee members, would also include additional TURA stakeholders. The objective of the TURA Program Strengthening Ad Hoc Committee is to review and strengthen the effectiveness and value of TURA program activities to Massachusetts businesses while ensuring ongoing progress in reducing the use of toxics in the Commonwealth and increasing the adoption of safer materials. Discussions that occur within the Ad Hoc Committee will be summarized by TURA Program staff for the consideration of the TURA Advisory Committee.

[Nominees for the Ad Hoc Committee](#) were proposed and appointed in the February 2020 Administrative Council meeting. Defining topics for its meetings and commencing its activities was planned for FY21.

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

A multi-stakeholder [Advisory Committee](#) provides input to the Administrative Council. The Committee includes representation of large and small businesses, labor, environmental and health advocacy, and others. FY20 members were:

- ◆ Robert Audlee, Stainless Steel Coatings
- ◆ Karen Blood, Hollingsworth & Vose
- ◆ Lawrence Boise, Franklin Paint
- ◆ Kathryn Flannery, Massachusetts Department of Labor Standards
- ◆ Andrew Goldberg or Jillian Riley, Attorney General's Office
- ◆ William Judd, Industrial Compliance Group
- ◆ Mark Monique, The Savogran Company
- ◆ Mark Rossi, Clean Production Action
- ◆ Kari Sasportas, Lexington Office of Public Health
- ◆ Elizabeth Saunders, Clean Water Action
- ◆ Lucy Servidio, Capaccio Environmental Engineering
- ◆ Jodi Sugarman-Brozan, Massachusetts Coalition for Occupational Safety & Health (MassCOSH)
- ◆ Rebecca Weidman, Massachusetts Water Resources Authority

Members of the Science Advisory Board

The [Science Advisory Board](#) works with TURI to provide a sound scientific basis for program decisions and includes members from a variety of scientific backgrounds. Members' organizational affiliations are listed, but members serve as individuals, bringing their diverse expertise to the board; they do not represent their organizations. FY20 members were:

- ◆ Amy Cannon, Beyond Benign
- ◆ Robin Dodson (Vice Chair), Silent Spring Institute
- ◆ Christy Foran, Rand Corporation
- ◆ Rich Gurney, Simmons University
- ◆ Hilary Hackbart, Massachusetts Department of Labor Standards
- ◆ Wendy Heiger-Bernays, BU School of Public Health
- ◆ Denise Kmetzo, Collaborative Risk Solutions
- ◆ Heather Lynch, CardnoChemRisk
- ◆ Christine Rioux, Tufts University
- ◆ Kenneth Weinberg, Safdoc Systems
- ◆ David Williams (Chair), Massachusetts Department of Public Health

Science Advisory Board Work on Per- and Poly-Fluoroalkyl Substances

In FY20, the Science Advisory Board completed its 3-year review of per- and poly-fluoroalkyl substances (PFAS). In FY17, the Board reviewed the science on two eight carbon chain length (C8) substances, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) and their salts, which are very persistent, bioaccumulative and toxic. In FY18, the Board reviewed additional PFAS — perfluorohexane sulfonic acid (PFHxS) (C6), perfluorohexanoic acid (PFHxA) (C6), perfluorobutanesulfonic acid (PFBS) (C4), and perfluoro-n-butyric acid (PFBA) (C4). In FY19, the Board also reviewed PFHpA (C7) and PFNA (C9); GenX and Adona (PFECAs); and PFPA/PFPiAs (phosphonic and phosphinic acids). To accomplish this work, TURI developed detailed health and environmental safety summaries for the PFAS compounds. These documents summarized information available on these chemicals, including the results of a detailed review of existing peer reviewed literature and information submitted by stakeholders and Science Advisory Board members. These environmental health and safety summaries were used by the Board as the basis for its review of each chemical.

In FY20, the Science Advisory Board considered the information and recommendations above along with the Organization for Economic Cooperation and Development (OECD) list of PFAAs and PFAA precursors and information about known and potential breakdown pathways. At the

conclusion of this review, the SAB recommended listing a PFAS category defined as "those PFAS that contain a perfluoroalkyl moiety with three or more carbons (e.g., $-C_nF_{2n-}$, $n \geq 3$; or $CF_3-C_nF_{2n-}$, $n \geq 2$) or a perfluoroalkylether moiety with two or more carbons (e.g., $-C_nF_{2n}OC_mF_{2m-}$ or $-C_nF_{2n}OC_mF_{m-}$, n and $m \geq 1$)."

Massachusetts Toxics Use Reduction Taskforce

Toxics Reduction Task Force Identifies Chemicals of Concern in Products: To facilitate the implementation of EO 515, the Toxics Reduction Task Force (TRTF) was established in 2009 with oversight and leadership by the Operational Services Division (OSD) and the Executive Office of Energy and Environmental Affairs' (EEA) Office of Technical Assistance and Technology (OTA). The TRTF includes staff from OSD, OTA, the Department of Public Health (DPH), the Department of Labor Standards (DLS), the Toxics Use Reduction Institute (TURI), and the Department of Environmental Protection (DEP).

The TRTF remains a technical advisory group to help the OSD's Environmentally Preferable Purchasing (EPP) Program identify and eliminate toxics in products on statewide contracts and explore safer and healthier options. The goals and objectives of the TRTF are to select priority focus areas for reduction in toxic substances in products or services.

During FY20, in response to the COVID-19 pandemic, TRTF primarily focused its activities on providing information about safer disinfection practices and products. The TRTF also continued its focus on per- and polyfluoroalkyl substances (PFAS), flame retardants, and methylene chloride.

COVID-19 and safer disinfection: Increased widespread use of disinfection products resulting from the COVID-19 pandemic led the TRTF to undertake a review of available information concerning greener products effective against SARS-CoV-2, the virus responsible for COVID-19, in order to support buyers in selecting the safest effective available products. [TRTF partnered with the Massachusetts Facilities Management Association \(MAFMA\)](#) to identify disinfectant products that could safely be used in schools, specifically products that: 1) contain the safest ingredients; 2) do not create safety hazards when stored in large volumes; 3) have shorter dwell times; and 4) do not require PPE or other specialized safety equipment. Guidance provided by TURI played a primary role in developing [guidance for schools](#) on safer disinfection practices, including creating resource guides and developing a webinar on safer disinfection. During FY20, OSD distributed guidance on safer disinfection products and practices in OSD's *Buy The Way* magazine, beginning with its [March-April 2020 edition](#). DPH was frequently consulted on issues related to disinfection ingredients and technologies.

Per- and polyfluoroalkyl substances (PFAS): The TRTF continued to discuss PFAS, given their persistence and connection to potential health effects. In addition, the TURA Science Advisory Board has been reviewing the class of PFAS over the last several years, and at the end of FY20, recommended adding a PFAS category to the TURA list of toxic or hazardous substances.

- ◆ **Firefighting foams:** Third-party certification is now available to identify firefighting foams that have been tested to be both PFAS-free and free of the chemicals of highest health and environmental concerns. The GreenScreen Certified™ Standard for Firefighting Foam (v 2.0) is now available for Class A Foam Concentrates, Class B Foam Concentrates, Class A Wetting Agents and Class A&B Wetting Agents through GreenScreen Certified. Enabled by this certification standard, the Task Force continues to press vendors to pursue safer alternatives and will pursue integrating the new standard into future bids. The Task Force is exploring the technical assistance that may support more widespread adoption of these safer alternatives. TURI and OTA are also collaborating with other state and local governments through the Interstate Chemicals Clearinghouse (IC2) to share information and experiences with fluorine-free foams (F3). TURI is also part of a federal DOD-funded alternatives assessment project beginning in FY21 that will evaluate F3 alternatives to PFAS-based AFFF (aqueous film forming foam).
- ◆ **Food packaging:** In FY19, OSD was asked by multiple buyers whether there was PFAS-free compostable dishware on statewide contract GRO35: Food Service Supplies and Equipment. The TRTF met to review the products and requested that the GRO35 contract manager require vendors to provide a disclosure in their price sheet on whether products contained PFAS. The disclosure was completed by most of the vendors. The TRTF again met and approved a requirement that compostable serviceware must limit any PFAS to under 100ppm effective January 1, 2020. This change was consistent with changes that all the approved third-party certifications were making or had already made, except one.

Methylene chloride: The TRTF continued its work on reducing the use of methylene chloride and N-methylpyrrolidone (NMP) by working with OSD to have the Maintenance, Repair, and Operations (MRO) vendors disclose any products containing methylene chloride. Outreach to vendors is ongoing and the TRTF plans to continue these efforts into FY21. In FY21, the TRTF will be working to understand how the EPA's [final rule on methylene chloride](#) will impact state contracts.

Flame retardants: In FY20, the TRTF continued to pursue reductions in the use of flame retardants. Members of the Task Force have cultivated partnerships with a variety of organizations, including Silent Spring Institute and the Center for Environmental Health, and continue to consult with these partners, and TRTF members have initiated discussions with buyers and vendors to identify opportunities for further reductions. [Newly passed Massachusetts legislation](#) in FY21 banning the sale or import of furniture containing flame retardants including tris, pentaBDE, hexabromocyclododecane, antimony trioxide and other toxic substances will support TRTF's efforts to encourage the adoption of safer alternatives.

APPENDICES

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Appendix I: Grants

Annual TURA Program Grants

Each year, TURI allocates grants to Massachusetts businesses, community groups, municipalities, and industry-academic research partnerships to further the development, implementation, and dissemination of toxics use reduction strategies.

In FY20, TURI gave roughly \$121,000 to 12 businesses and community groups, and roughly \$55,000 to 3 academic research projects carried out in partnership with industry.

Auto Shops

- ◆ Sonny's Auto Repair of Chicopee purchased a new washing system to replace its old method of using petroleum-based solvents and mineral spirits to clean oils and grease from car parts. The new washing unit is mobile and uses a biodegradable solution which uses microbes to filter out the oil and grease, regenerating the solution and making it reusable.
- ◆ Workshop Auto of Lowell installed an engine and parts washer that will reduce the use of solvents such as acetone, methanol, and toluene. The business worked with an equipment company and the TURI lab to identify a safer aqueous alternative to use in the machine.

Education

- ◆ Clean Water Fund of Boston shared information with Massachusetts residents about the presence of toxic flame retardants and polyfluoroalkyl substances (PFAS) in everyday products and communities. The project team conducted workshops, wrote articles and brochures, and shared information in public forums and with members of the Clean Water Fund and the Alliance for a Healthy Tomorrow network. Clean Water Fund's communications included information on safer alternatives.
- ◆ Don't Take That Receipt! of Holyoke, a public health and environmental justice group of youth and adults, built upon a previous project that provided information about BPA in cash register receipts and safer alternatives. In FY20 the project provided information about BPA in other thermal papers, including sticky labels and tickets used in fast food, shipping, delis, pill bottles and medical test labels. The project team visited businesses to provide information about shifting to phenol-free thermal papers, created a video about the risks of thermal paper, and shared practical tips for reducing exposure.

Flame Retardants

- ◆ The Gym Club Gymnastics Center of Gardner replaced foam pit cubes containing flame retardants with cubes not containing flame retardants.

Food Processing

- ◆ Plenus Group Inc. of Lowell worked with UMass Lowell Professor Boce Zhang's lab to research and evaluate alternatives to sodium hydroxide used in cleaning soup kettles. UMass Lowell student researchers tested alternatives with the goal of improving worker safety and lowering chemical usage and costs.

Manufacturing & Laboratories

- ◆ Bird Precision of Waltham, a manufacturer of precision glass jewels, eliminated its use of trichloroethylene. The company purchased new drying equipment and worked with the TURI lab to refine a new cleaning process.
- ◆ CD Aero of New Bedford, a leading manufacturer of film capacitors for industrial, medical and specialty applications, replaced a vapor degreaser that uses n-propyl bromide (nPB). The company bought a new conveyor/spray equipment cleaning system and worked with the TURI lab in choosing an aqueous cleaner for the new system.
- ◆ MSI Transducers Corp. of Littleton, a designer and manufacturer of acoustic transducers for commercial and defense applications, modified their injection tooling process to reduce the use of lead and lead waste. The new configuration of the tool is also expected to improve yield and efficiency.

- ◆ Riverdale Mills of Northbridge, a manufacturer of welded wire mesh fabrics, purchased equipment to reduce the use of toxic chemicals in their manufacturing process by reducing hydrochloric acid drag-out from a pickling tank. Installing this equipment reduced the use of hydrochloric acid, sodium hydroxide, and ammonium hydroxide.

Safer Alternatives Research

- ◆ Assistant Professor Wan-Ting (Grace) Chen of the Department of Plastics Engineering at UMass Lowell partnered with Raytheon Company in Andover to find a safer alternative for methylene chloride. The team identified alternative solvents and tested their performance.
- ◆ Professor Ramaswamy Nagarajan of the Department of Plastics Engineering at UMass Lowell partnered with Bradford Industries in Lowell to continue finding and evaluating safer solvent blends to replace the use of dimethyl formamide (DMF). Previously, the research team identified safer alternatives with performance comparable to DMF for a new product application. In FY20, the team evaluated coating quality and explored solvent combinations for three of Bradford's current products.
- ◆ Assistant Professor Hsi-Wu Wong of the Department of Chemical Engineering at UMass Lowell continued to collaborate with Waters Corporation in Milford to identify and test the performance of safer solvents to replace acetonitrile used in liquid chromatography applications. In this phase, the team tested safer solvents for mass spectrometry detection of dye, food, and environmental compounds.

Surface Finishing

- ◆ Outstanding Bath Refinishing of Milford purchased equipment and an alternative paint stripper that does not contain methylene chloride.
- ◆ River Street Metal Finishing of Braintree, a provider of precision metal finishing, reduced its use of sulfuric acid. The company purchased a filtration system for three aluminum anodizing process tanks. The system filters the sulfuric acid and allows it to be reused.

Appendix II: Selected Events and Workshops

TURA Program Workshops

Each year the TURA program agencies hold workshops to provide continuing education for Toxics Use Reduction Planners, regulatory guidance and updates, and tools and resources for businesses to enhance their ability to implement pollution prevention. Some of these workshops and events are described in greater detail in the main report.

Note: This list does not include events led by TURI grantees.

Workshops and Training Events:

- ◆ “Beyond the Safety Data Sheet” training workshops in Lowell on September 26, 2019, at CD Aero in New Bedford on October 24, 2019, and in Lowell on March 4, 2020.
- ◆ Halogenated Solvents Alternative Assessment Workshops, in New Bedford, December 10, 2019, and in Lowell, January 30, 2020.
- ◆ Resource Conservation Planning advanced training, Devens, February 7, 2020.
- ◆ Resource Conservation Planning fundamentals training, Lowell, January 23, 2020.
- ◆ Toxics Use Reduction Planner certification course, online course sessions in August and in-person sessions in Lowell on October 3, 10, 17, and 31, 2019.
- ◆ TUR Planner exam, administered by DEP and hosted by TURI, December 5, 2019.
- ◆ TURA fall Continuing Education conference, Norwood, November 13, 2019.
- ◆ TURA spring Continuing Education conference, online, April 14 and 23, 2020.
- ◆ TURI tour and lab workshop for Tsongas Industrial History Center teachers, Lowell, February 12, 2020.
- ◆ Visit to TURI from representatives of Korea Environmental Industry & Technology Institute (KEITI) to learn about TURI’s work, with a particular focus on lessons that can be learned for Korea’s work on consumer products, September 24, 2019.

Demonstration Events:

- ◆ Synventive Molding Solutions demonstration event, Peabody, October 10, 2019.
- ◆ TURI lab tour and demonstration for Manufacturing Month, Lowell, October 17, 2019.
- ◆ Riverdale Mills virtual demonstration event, online, June 25, 2020.

Appendix III: Selected Publications

TURA Program Publications

The TURA program produces, curates and updates:

- ◆ Informational fact sheets on chemicals, technologies and pollution prevention techniques
- ◆ Case studies

Reports, Journal Articles, Case Studies, Fact Sheets and Blog Posts

- ◆ “Kettle Cuisine Refines its Cleaning Process,” TURI, September 2019. Available at https://www.turi.org/TURI_Publications/Case_Studies/Food_and_Beverage/Kettle_Cuisine_Refines_its_Cleaning_Process.2019
- ◆ “Little Leaf Farms Overpowers Algae,” TURI, August 2019. Available at https://www.turi.org/TURI_Publications/Case_Studies/Food_and_Beverage/Little_Leaf_Farms_Overpowers_Algae.2019
- ◆ “Massachusetts Chemical Fact Sheet: Hydrogen Fluoride,” TURI, August 2019. Available at https://www.turi.org/TURI_Publications/TURI_Chemical_Fact_Sheets/Hydrogen_Fluoride_Fact_Sheet
- ◆ “Chemical Ingredient Transparency in Products: Review of Existing Public Policies & An Industry Standard,” Clean Production Action / NEWMOA, April 2020. TURI staff member Rachel Massey participated in the development of this project. Available at <https://www.cleanproduction.org/resources/entry/chemical-ingredient-transparency-in-products>
- ◆ Massey, R. and Pollard, L. “Natural Grass Playing Field Case Study: Marblehead, MA,” TURI, July 2019. Available at https://www.turi.org/TURI_Publications/Case_Studies/Organic_Grass_Playing_Fields
- ◆ Massey, R., Pollard, L., Kaplan, S. (contributing writers), “UNEP Guidance: National Authority for Chemicals Control: Structure and Funding,” UN Environment, 2019. Available at <https://wedocs.unep.org/handle/20.500.11822/28403>
- ◆ Massey, R., Pollard, L., Kaplan, S. (contributing writers), “UNEP Guidance: Risk Reduction Tools for Chemicals Control,” UN Environment, 2019. Available at <https://wedocs.unep.org/handle/20.500.11822/28400>
- ◆ Massey, R., Pollard, L., Kaplan, S. (contributing writers), “UNEP Guidance: Enforcement of Chemicals Control Legislation,” UN Environment, 2019. Available at <https://wedocs.unep.org/handle/20.500.11822/28402>
- ◆ Massey, R., Pollard, L., Jacobs, M., Onasch, J., Harari, H., “Artificial turf infill: A comparative assessment of chemical contents,” New Solutions: A Journal of Environmental and Occupational Health Policy, February 23, 2020. Available at <https://journals.sagepub.com/doi/10.1177/1048291120906206>
- ◆ Morose, G., “Assessment of Safer and Effective Alternatives for Coating Removal Products,” TURI, January 2020. Available at https://www.turi.org/TURI_Publications/TURI_Reports/Assessment_of_Safer_and_Effective_Alternatives_for_Coating_Removal_Products
- ◆ “Per- and Poly-fluoroalkyl Substances (PFAS) in Artificial Turf Carpet,” TURI, January 2020. Available at https://www.turi.org/TURI_Publications/TURI_Chemical_Fact_Sheets/PFAS_in_Artificial_Turf_Carpet
- ◆ “Process Improvements Reap Large Rewards [for US Pack],” TURI, October 2019. Available at https://www.turi.org/TURI_Publications/Case_Studies/Process_Efficiency/US_Pack-Process_Improvements_Reap_Large_Rewards.2019

Videos

- ◆ “The Journey of a Bag” video resource, TURI, July 2019. Available at <https://www.youtube.com/watch?v=3FEAysmC6ss>
- ◆ “Massachusetts Companies and Communities Reduce Toxic Chemical Use,” TURI, October 2019. Available at https://www.youtube.com/watch?v=rEEg7Mdv_8Y

- ◆ "Siemens Healthineers Collaborates with UMass Lowell Researchers to find a Safer Surfactant for Diagnostic Devices" video resource, TURI, August 2019. Available at <https://www.youtube.com/watch?v=W1LzxJcEMMO>
- ◆ "TURI CleanerSolutions Database Tutorial" video resource, TURI, May 2020. Available at <https://www.youtube.com/watch?v=7uvtTYTX4Nw>
- ◆ "Why Become a Toxics Use Reduction Planner: A Mother-Daughter Team Perspective," TURI, January 2020. Available at https://www.youtube.com/watch?v=kXwcu_BI9_U

Appendix IV: Selected Presentations and Webinars

About Presentations and Webinars

Throughout the year, TURA program staff present a wide variety of pollution prevention and regulatory topics to audiences at TURA program events and at events held by partner organizations. As presentations may have been repeated at multiple venues, this list includes both categories.

- ◆ Eliason, P., “Toxics Use Reduction Act Planning: Proven Methods for Identifying and Implementing Safer Manufacturing Techniques,” OSHA Education Center, Manchester, NH, March 10, 2020.
- ◆ Eliason, P., “Toxics Use Reduction Planning and Alternatives Assessment: Making it Happen,” Yale University class, online, March 30, 2020.
- ◆ Harriman, E., “Chemical Classes in Policy-Making,” BizNGO 2019 annual conference, Boston, December 10, 2019.
- ◆ Harriman, E., “Toxics Use Reduction: Reducing Hazard Benefits Society and the Value Chain,” IUPAC conference on Chemistry and Society, Paris, France, July 9, 2019.
- ◆ Harriman, E., panelist and Organizing Committee member, “Identifying Opportunities to Understand, Control, and Prevent Exposure to PFAS” two-day workshop at the National Academy of Sciences, Washington, DC, September 26-27, 2019.
- ◆ Kincannon, F., Q&A panelist at a film showing of “Toxic Beauty,” Lowell Parks and Conservation Trust, Lowell, February 25, 2020.
- ◆ Marshall, J., “Cleaning,” Environmental, Health and Safety Roundtable, Devens, February 7, 2020.
- ◆ Marshall, J., “COVID 19 and Green Cleaning,” webinar for the National Park Service, online, April 30, 2020.
- ◆ Marshall, J., “Guidelines to Safely Clean and Disinfect,” webinar for industry and the public, online, May 28, 2020.
- ◆ Onasch, J., “Reducing Toxic Chemical Use in Breweries,” NEIWPCC WWT Operator Training, Lowell, November 14, 2019.
- ◆ Onasch, J., “Reducing Toxics in the Food & Beverage Sector,” National Pollution Prevention Roundtable Food & Beverage Workgroup meeting, online, December 4, 2019.
- ◆ Onasch, J., “Reducing Toxics in the Food & Beverage Sector,” EPA P2 Greening the Bottom Line Grant F&B Recognition Event, Lowell, July 31, 2019.
- ◆ Onasch, J., “Toxics Use Reduction at Universities,” UMass Lowell Seed Grant Sustainability Workshop, Lowell, November 4, 2019.
- ◆ Onasch, J., “TURI Industry and Small Business Grants FY2020,” CMBEN Chemical Safety and Climate Change Resiliency seminar, Marlborough, September 10, 2019.
- ◆ Raschko, J. “OTA Energy Assistance Services for Massachusetts Industries,” Massachusetts Clean Energy Center, MassMEP, and Associated Industries of Massachusetts, October 7, 2019.
- ◆ Skogstrom, T. “Building Chemical Safety into Climate Change Resiliency / Disaster Preparation through Pollution Prevention,” Environmental Business Council of New England Climate Change Program: Preventing Toxic Exposures During Climate Change Events: Severe Weather & Emergency Preparedness Tools for Facilities, July 16, 2019
- ◆ Skogstrom, T. “Chemical Safety & Climate Change Resiliency,” Central Massachusetts Business Environmental Network meeting, September 10, 2019.
- ◆ Skogstrom, T. “OTA Resources for Tracking Chemical and Emerging Contaminants,” Massachusetts Water Pollution Control Association, September 11, 2019.
- ◆ Skogstrom, T. “Removing the Handle from the PFAS Pump,” Environmental Business Council of New England Solid Waste Management Program: Impact of PFAS on Solid Waste Operations, November 12, 2019.
- ◆ Skogstrom, T. “OTA and Climate Change Resiliency,” New England Interstate Water Pollution Control Commission, October 10, 2019.

Appendix V: TURA Program Revenue and Expenditures

Fiscal Year 2020 Revenues

| | |
|--------------------------------|--------------------|
| TURA annual fees: | \$2,728,600 |
| TURA statutory late fees:..... | \$39,700 |
| TUR Planner fees: | \$21,300 |
| Total revenues: | \$2,789,600 |

Fiscal Year 2020 Expenditures

OTA

| | |
|-----------------------------|------------------|
| Personnel costs: | \$602,400 |
| Administrative costs: | \$26,200 |
| Total: | \$628,600 |

DEP

| | |
|-----------------------------|------------------|
| Personnel costs: | \$334,500 |
| Administrative costs: | \$6,100 |
| Total: | \$340,600 |

TURI

| | |
|---|--------------------|
| Personnel (staff and students) ¹ : | \$1,216,900 |
| Education and training events ² : | \$35,900 |
| University research and laboratory support: | \$34,900 |
| Grants to businesses, community groups, and municipalities: | \$120,900 |
| Administrative costs: | \$38,300 |
| Library and information support: | \$15,300 |
| Communications, printing, website and educational outreach ³ : | \$140,200 |
| Total: | \$1,602,400 |

| | |
|----------------------------------|--------------------|
| Total expenditures: | \$2,571,600 |
|----------------------------------|--------------------|

¹Personnel expenditures include \$19,600 for research assistants working on industry grant and laboratory projects.

²TURI also collected \$21,100 in training registration fees, which goes to support staff salaries and operating expenses.

³Communications expenditures in FY20 were higher than normal because of web-tool development costs.

