

# Massachusetts Toxics Use Reduction



## TURA Program Update

Nov 13, 2019

Norwood, MA



# TURA Chemical List

- **C1-C4 Halogenated Hydrocarbons/ Halocarbons Not Otherwise Listed**

- State only chemical

- **First reports due July 1, 2020 (for RY2019)**

[https://www.turi.org/Our\\_Work/Training/Continuing\\_Education/Recent\\_Training\\_Presentations/Continuing\\_Education\\_Conference\\_Spring\\_2019/C1-C4\\_Halogenated\\_Hydrocarbon\\_Halocarbons\\_Not\\_Otherwise\\_Listed\\_NOL\\_Category/\(is\\_direct\\_download\)/1](https://www.turi.org/Our_Work/Training/Continuing_Education/Recent_Training_Presentations/Continuing_Education_Conference_Spring_2019/C1-C4_Halogenated_Hydrocarbon_Halocarbons_Not_Otherwise_Listed_NOL_Category/(is_direct_download)/1)

- **Nonylphenol ethoxylates (NPEs) TRI/EPCRA category**

- Category of 13 specific NPEs

- TRI/Federal: First reports due July 1, 2020 (for RY2019)

- **TURA/State: First reports due July 1, 2021 (for RY 2020)**

- <https://www.epa.gov/toxics-release-inventory-tri-program/addition-npes-category-tri-list-final-rule>

- <https://www.mass.gov/files/documents/2019/04/04/turachanges.pdf>

# TUR Planning

- 2020 is a TUR planning year!
  - TUR Plan summaries due July 1, 2020
- Compliance: MassDEP has issued selected Requests for Information (RFIs) to submit plans for inspection
- Revised guidance available

# Resource Conservation Planning

- Certified RC Planner training - required once to become RC certified
  - Jan 23, 2020, Lowell, MA – full day
  - Only an option if you have not yet been certified in RC planning
- RC Planning Conference
  - Feb 7, 2020, Devens, MA
  - Open to everyone, for RC Certification, full day = 6 RC credits
  - Priority registration given to new RC planners

# Resource Conservation Planning

*Note: Non-reportable/Exempt Toxics alternative under TURA  
RC planning provisions*

*RC Plans that must be signed by RC Certified Planner*

- 1. Energy**
- 2. Water**
- 3. Materials That Contribute to Solid Waste**

*Only needs to be signed by certified TUR Planner*

- 4. Toxic Substances Used Below Threshold;  
Chemical Substances Exempt from TURA Reporting**

# Planning for Non-reportable and Exempt Chemicals

- Toxics below threshold
- Emerging, unlisted hazards
- Toxics in laboratories
- Toxics in pilot plant production
- Toxics in janitorial uses
- Toxics in products sold
- Toxics in articles used in facility
- R&D, DfE

# PFAS and Science Advisory Board

- Update: Science Advisory Board Work on Per- and Polyfluoroalkyl Substances (PFAS)
  - Reviewed scientific literature and voted to recommend listing:
    - PFBA, PFBS (C4)
    - PFHxA, PFHxS (C6)
    - PFHpA (C7)
    - PFOA, PFOS (C8)
    - PFNA (C9)
    - PFECA: GenX/HFPO-DA (C3 ether)
  - Upcoming meeting - Nov 14, 2019
    - MassDEP, Boston 12:30pm
    - PFPA, PFPiA (phosphonic and phosphinic acids)
    - Precursors and degradation/transformation pathways

# TURA Administrative Council

- Upcoming Meeting:

November 18, 2019

10:00 A.M. to 12:00 noon

Saltonstall Building

100 Cambridge Street, Suite 900, OTA Conference Rm.

## Agenda

- NPE category regulations
- SAB work on PFAS chemicals
- Draft PFAS policy analysis
- Ad Hoc committee on TURA Improvement



# TURA Staff Changes



- Andrea Lynch – TURI Learning Support Specialist



- Hayley Byra – TURI Science/EHS Support Specialist

## TURI Co-Directors



- Prof. Emeritus Mike Ellenbecker
  - Industrial hygienist, expertise in aerosol science, nanomaterials, ventilation and occupational health and safety



- Prof. Joel Tickner, Public Health
  - Expertise in environmental and chemicals policy, alternatives assessment and green chemistry (GC3)



- Assoc. Prof. Chris Hansen, Mechanical Engineering
  - Expertise in development of safer materials, additive manufacturing, and composites

# TURA Staff Changes

- MassDEP TURA/Toxics team
  - Richard Blanchet – Deputy Director Hazardous Materials Management, Bureau of Air and Waste
  - Veronica O’Donnell – Branch Chief Compliance and Enforcement and TURA/Toxics Programs
  - Lynn Heisey Cain – Environmental Analyst TURA
  - Hardiesse Dicka-Bessonneau – Environmental Analyst TURA/Toxics Programs
- OTA Team <https://www.mass.gov/service-details/otas-team>
  - Jim Cain – Sr. Engineer/Technical Assistance Team Lead
  - Tiffany Skogstrom – Outreach and Policy Analyst

# TURA Program Resources

**Playground Surfaces**  
Choosing Safer Materials for Children's Health and Safety

**Natural Grass Playing Field Case Study: Springfield, MA**  
Organic Grass Fields Meet Athletes' Needs and Protect Connecticut River Watershed

THE CITY OF SPRINGFIELD, Massachusetts, manages 12 properties, or a total of 67 acres, organically. This includes sports fields, park areas, and other public properties. Springfield's organically managed fields fully meet the community's needs for sports and other recreational activities, with high quality grass and soil.

Since starting the organic program in 2014, the city has doubled the number of properties and an increase in overall recreational use due to the conditions.

Additional information is available at three parks, five and one communities.

**Grass Playing Field Case Study: Marblehead, MA**  
Organically Managed Playing Fields

TOWN OF MARBLEHEAD, Massachusetts, has managed all of its playing fields organically since 2002. This approach had its origins in a policy adopted by Marblehead's Board of Health, which noted the adverse health and environmental effects of pesticides and made a commitment to protecting children's health.

Marblehead has achieved its performance goals by focusing on building and maintaining a healthy ecosystem with active grass in the soil and a strong root system. Key elements of the program are soil aeration, frequent mowing, soil pH, and the use of organic fertilizer and amendments.

The study provided detailed information on the number of hours played at multi-use fields in Marblehead. If these fields may serve as a useful guide for other communities interested in organic field management. For example, the 100 Park field is used for baseball and field hockey. The scheduled practice and play time is 105,000 square foot field totaled about 1,180 hours in 2018. With estimated informal time included, the field was used for approximately 1,360 hours.

Annual cost of organic management of Marblehead's fields is approximately \$5,650 to \$9 per acre for products and labor, not including mowing. With mowing, the cost is approximately \$8,050 to \$8,900 per acre.

Marblehead also has one artificial turf field, installed in 2011. Information is provided on maintenance costs for the artificial turf field, including grooming, cleaning, compaction, testing, decomposing, and dismantling.

**Athletic Playing Fields**  
Choosing Safer Options for Health and the Environment

TURI News December

TURI News December

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July 2019

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Making Massachusetts a safer place to live and work

**Assabet Valley Technical High School Auto Technology Program Switches to Bio-Based Degreasers**

“[Assabet students] are going to be the next generation of automotive professionals, and hopefully the whole industry can swing over to a way that's better for the environment, better for the people using it, and will let them have longer, healthier careers.”

Dan Caputo, Lead Teacher, Automotive Technology – Assabet Valley Regional Technical High School

**Little Leaf Farms Overpowers Algae**

“The solution we worked with TURI on, which is a physical means of removing the algae, is both scalable and sustainable – consistent with our needs and mission.”

Matthew Meisel, Chief Financial Officer, Little Leaf Farms

**Shifting Gears to Adopt Safer Cleaners at Free Wheelers Bike Shop**

“Switching to the chemicals that we identified as good alternatives did not cost us a dime. It may even save us some money. You can't put a price on having clean air for the staff to breathe – we've gained long term benefits for health and safety of our workers.”

Kevin Soley, Assistant Director, Outdoor and Bicycle Programs

**Soup Manufacturer Refines its Cleaning Process**

Sodium hydroxide (NaOH) is commonly used in the food industry as an alkaline detergent in clean-in-place (CIP) processes. Kettle Cuisine, a large-batch maker of soup in Lynn, Massachusetts, uses over 10,000 pounds of NaOH per year in their cleaning operations. NaOH is on the list of toxic chemicals under the Toxics Use Reduction Act (TURA), which requires a facility using over a certain threshold to report on the use of the chemical and to consider options to reduce the use of the chemical. NaOH is a corrosive chemical; contact with eyes or skin can cause pain, redness, burns, and blistering. Facing these hazards, Kettle Cuisine chose to investigate how to optimize the use of NaOH and identify and evaluate the effectiveness of less toxic alternatives.

The Toxics Use Reduction Institute (TURI) at Umass Lowell facilitated a partnership between Kettle Cuisine and researchers in the Department of Biomedical and Nutritional Sciences at Umass Lowell to undertake this work. A TURI industry grant funded a student at UML to perform the research and testing.

The research team chose to test the cleaning performance of NaOH and the alternatives using macaroni and cheese as the model food. Macaroni and cheese is one of the highest volume production products at Kettle Cuisine. Dairy ingredients also leave the highest amount of scaling on equipment surfaces and provide the worst-case scenario for cleaning. Bench-scale testing was performed on stainless steel coupons that mimic the substrate of the soup-making vats in the facility. Researchers tested alkaline and acidic cleaners at different temperatures and concentrations, simulating the CIP process used at the facility.

Researchers measured effectiveness using both gravimetric analysis and ATP monitoring. Using a before and after method, gravimetric analysis weighs any soil residue left on a coupon after cleaning. ATP monitoring is a test swab method that detects any residue of organic matter remaining on a coupon after being cleaned. Kettle Cuisine uses ATP monitoring as their standard quality control test.

Kettle Cuisine's original standard cleaning protocol was:

- Using a mixed solution of 0.3817% w/w HCL-5000 (NaOH, 50% max) and 0.0957% w/w H<sub>2</sub>O<sub>2</sub> (<8%) to treat the kettle at 82°C for 1 hour
- Using 50% phosphoric acid to physically wash the kettle with a brush
- Rinsing the kettle with water

**OTA**  
OFFICE OF TECHNICAL ASSISTANCE & TECHNOLOGY

KEEPING MASSACHUSETTS GREEN AND LEAN

September 2018

**S.E. Shires Company**  
*Toxics Use Reduction Case Study*

**Summary and Results**

This Massachusetts maker of fine brass instruments has worked with OTA to successfully reduce the use of toxic Trichloroethylene (TCE), previously used to remove buffing compound and pitch residues, has been replaced with aqueous and semi-aqueous cleaners. This change eliminated the use of TCE in the process (approximately 3,600 pounds annually). Methylene chloride used in refinishing has been replaced with an aromatic alcohol; eliminating the use of methylene chloride at the facility (about 300 pounds annually).


**Background**

S.E. Shires was founded in Hopedale, MA, in 1995. The company has long been recognized as a leader in brass instrument design and craftsmanship. Promotional materials for S.E. Shires feature Doc Severinsen, Blair Bollinger, George Curran and more famous names who vouch for the quality of sound that S.E. Shires' clients can expect. In 2014, Eastman Music Company of California purchased the S.E. Shires Company which relocated to Holliston, MA, in 2018.

**Process**

At S.E. Shires, it takes approximately 8 to 10 days to finish each trombone and slightly less than that to finish a trumpet. The selected sheet alloys are cut, drawn, shaped, brazed, buffed, bright-dipped, and lacquered at the facility in Holliston, MA.

**Eliminating Trichloroethylene (TCE)**



**Massachusetts Chemical Fact Sheet**

**Hydrogen Fluoride**

This fact sheet is part of a series of chemical fact sheets developed by TURI to help Massachusetts companies, community organizations and residents understand a chemical's use and health/environmental effects, as well as the availability of safer alternatives.

**Overview**

Hydrogen fluoride (HF), also known as hydrofluoric acid, is used primarily for metal cleaning and etching in Massachusetts. Nationally, HF is mainly used to manufacture chemical refrigerants.

HF is highly corrosive to all tissues and any contact with HF liquid or vapor can cause severe burns (sometimes with delayed onset), necrosis, and death. Skin contact with HF may not cause immediate pain, so systemic poisoning can begin before the person is aware of the exposure.

In 2017, Massachusetts facilities subject to TURA reported the use of over 230,000 pounds of HF. HF is designated as a Higher Hazard Substance (HHS) under the Toxics Use Reduction Act (TURA), which lowered the reporting threshold to 1,000 pounds/year, effective January 2016.

**Hazards**

on the heart and lungs, including pulmonary hemorrhage, pulmonary edema, and bronchiolar ulceration. Deaths associated with HF exposure generally result either from pulmonary edema or from cardiac arrhythmias.<sup>2</sup>

Accidental releases have caused severe respiratory and gastrointestinal symptoms among residents that live near the facility.<sup>3</sup>

| TABLE 1: HF Facts       |  |
|-------------------------|--|
| <b>Chemical Formula</b> | HF   |
| <b>CAS Number</b>       | 7664-39-3  |
| <b>Vapor Pressure</b>   | 760 mm Hg at 68°F (20°C)   |
| <b>Solubility</b>       | Miscible in water; soluble in ether, soluble in many organic solvents  |
| <b>Flash point</b>      | Nonflammable   |
| <b>Reactivity</b>       | Reacts violently with strong bases and many other compounds; reacts with water and steam to produce toxic and corrosive gases.                             |
| <b>Description</b>      | Colorless, fuming liquid or gas at room temperature with a sharp, irritating odor that humans can detect at low concentrations (0.04-0.13ppm) <sup>4</sup> |

**Chronic Health Effects**

Individuals who breathe in hydrogen fluoride and survive

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**Greenlist Bulletin**

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**OTA Outlook**

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Toxics Use Reduction Institute Newsletter

October 2019

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Making Massachusetts a safer place to live and work

**Soup Manufacturer Refines its Cleaning Process**

**Overview**

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**Testing**

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# TURI Grant Projects – FY 2020

## Small Business

- The Gym Club Gymnastics Center - Gardner
  - Replacing flame retardant foam pit cubes with non-flame retardant cubes
- Outstanding Bath Refinishers - Mendon
  - Evaluating safer, non-methylene chloride paint removers
- Workshop Auto - Lowell
  - Safer engine and parts washer

# TURI Grant Projects – FY 2020

## Industry

- Bird Precision – Waltham
  - Eliminating TCE in precision parts cleaning
- CD Aero – New Bedford
  - Eliminating nPB in capacitor manufacturing
- MSI Transducers Corp. – Littleton
  - Redesigning acoustic transducer tools to reduce use of lead

# TURI Grant Projects – FY 2020

## Industry

- Plenus Group Inc. – Lowell
  - Evaluating safer CIP cleaners for food processing
- River Street Metal Finishing – Braintree
  - Using filtration to extend bath life of sulfuric acid anodizing tank
- Riverdale Mills – Northbridge
  - Reducing HCl drag-out from pickling tank and  $\text{NH}_4\text{OH}$  for pH adjustment



# TURI Grant Projects – FY 2020

## Academic Research

| Project   | Faculty Researcher                                    | Industry Partner            |
|---|---|-----------------------------|
| Researching safer alternative to methylene chloride for difficult to remove CARC coatings | Asst Prof Wan-Ting (Grace) Chen, Plastics Engineering | Raytheon Company            |
| Safer solvent blends to replace DMF in textile coatings                                   | Prof Ramaswamy Nagarajan, Plastics Engineering        | Bradford Industries, Lowell |
| Safer solvents to replace acetonitrile in liquid chromatography                           | Asst Prof His-Wu Wong, Chemical Engineering           | Waters Corp, Milford        |