

Climate Resiliency & Chemicals Management – Case Study

Office of Technical Assistance and Technology (OTA)



Case Scenario: Hypothetical polyurethane foam manufacturer

BestRest, Inc., a polyurethane foam manufacturer, is located on Hanson Street in Lynn, MA. Their flexible polyurethane foam is produced for the bedding and furniture market. The production process for their polyurethane foam involves 5 main ingredients. The following lays out the steps of the process:

- 2,4-toluene diisocyanate reacts with polyether polyol
- A triethylamine catalyst is used to control the reaction rate
- A silicone copolymer is used as a stabilizer to control cell size
- Water used as a blowing agent to create the foam's porous structure
- The ingredients are injected under pressure and components react in a mold which creates heat
- Anhydrous ammonia is used to cool and solidify the product.

The facility operates in a single-story building with a basement. The production zone is located on the first level of the facility. Chemical storage is located at the other end of the first level, adjacent to the loading dock and outside loading entrance. The mechanical room is located on the basement level and contains boilers and a machinery room with compressors for the anhydrous ammonia system. Ammonia detection sensors are located in the basement as are manual emergency ventilation switches.

Exercise – 30 minutes total (6 minutes per question)

1. BestRest, Inc. is a manufacturer covered under the Massachusetts Toxics Use Reduction Act (TURA) that uses listed toxic chemicals above threshold levels. A list of TURA chemicals as of April 2022 may be found at [this link](#) and TURA [Higher Hazard Substances are listed here](#).
 - a. What are the listed TURA chemicals that BestRest, Inc. uses?
 - b. Are there any chemicals in use that are designated under TURA as higher hazard substances (i.e., persistent, bioaccumulative, and toxic)?

2. What are the physical hazards associated with these chemicals? Is there potential for unintended chemical reactions? What are potential health risks of exposure to these chemicals?
3. Look up the street where BestRest, Inc. is located in OTA's Chemical Safety & Climate Change [mapping tool](#). Be sure to turn on and explore data layers for Sites with Chemicals, Flood Threats, Public Safety, and Infrastructure, including the MA 2020 Environmental Justice Block Groups layer.
 - a. What are the climate hazards at this location?
 - b. What risks do you think the community surrounding the facility might face in the event of an extreme weather event? What impacts do you think flooding or power loss at the facility might have?
 - c. Is the location in a designated environmental justice census block group?
4. Evaluate chemical storage, chemical safety, and the physical facility.
 - a. From the information given, are there concerns about chemical storage at the facility?
 - b. Is there potential for toxic chemical release in an extreme weather event?
 - c. Are there any concerns regarding location of equipment and operation of controls?
5. Think about opportunities for toxics use reduction and primary toxics use reduction methods. Review [this TURA fact sheet](#) to help you evaluate options.
 - a. Are there options for input substitution or product reformulation?
 - b. Are there opportunities for production unit changes (redesign, modification, or modernization)?
 - c. Do you have recommendations for improvement in operations and maintenance?