

Prohibition on Certain Life Sciences Facilities in Boxborough

Introduction

- This would **protect** Boxborough from those hazards inherent to life science facilities that use animals
- It is **consistent** with hazardous materials zoning bylaws and is specific to these facilities
- **Other** life science facilities would be **allowed**
- These facilities pose **more problems** and **expenses** than other facilities
- Boxborough may not have the necessary **infrastructure** to handle potential emergencies at these facilities

Change 1:

- ***Add to Definitions***

Life sciences. Advanced and applied sciences that expand the understanding of human physiology and have the potential to lead to medical advances or therapeutic applications including, but not limited to, agricultural biotechnology, biogenetics, bioinformatics, biomedical engineering, biopharmaceuticals, biotechnology, chemical synthesis, chemistry technology, diagnostics, genomics, image analysis, marine biology, marine technology, medical devices, nanotechnology, natural product pharmaceuticals, proteomics, regenerative medicine, RNA interference, stem cell research and veterinary science. (**M.G.L, Chapter 130 of the Acts of 2008**)

Change 2:

- This changes footnote 3 in the Use Regulations of the Zoning Bylaw as follows:
 3. Provided that hazardous materials are not a primary part of the ***facility and provided that use of animals in research, development, testing, or training is not any part of the facility.***
- Footnote 3 applies **only** to Research & Development in the Business/Industrial Uses table

Potential hazards from Life Science Facilities using Animals

- Biological
- Chemical
- Radioactive

Animal Biosafety Levels (ABSL)

- 1: Microorganisms not known to cause ***disease***
- 2: Microorganisms associated with ***human disease***
- 3: Microorganisms causing ***serious or lethal disease*** with ***high individual risk – low community risk***
- 4: Microorganisms causing ***infections that are frequently fatal***, with ***no vaccines or treatments*** – ***high individual risk – high community risk***

Hazardous chemicals used in these facilities

- ***Solvents*** – cause damage to skin and respiratory tract; systemic damage to liver, kidneys, nervous system, etc.
- ***Oxidizers*** – cause burns
- ***Carcinogenic compounds*** – cause cancer
- ***Irritants, corrosives*** – cause damage to skin and respiratory tract

Hazardous chemicals used in these facilities

- ***Neurotoxins*** – cause central nervous system damage such as memory impairments, epilepsy, and dementia
- ***Asphyxiants*** – cause suffocation
- ***Reproductive and developmental toxins*** – cause infertility and birth defects
- ***Flammable, reactive, explosive chemicals***
- ***Chemicals of unknown hazard***

Radioactive Materials

- ***Radioisotopes*** – may cause acute or chronic systemic damage, cancer, infertility, and birth defects

Hazardous Waste

- These facilities **generate** many harmful substances
 - **ignitable, corrosive, reactive, and toxic wastes**
 - **gaseous air contaminants** – waste anesthetic gases
 - **air pollutants as particulate matter**
 - **carcinogens**
- **Animal Carcasses** are the most prominent hazardous waste
 - contain a combination of **chemical, radioactive, and biological hazards**
- On-site **incineration** is one disposal method
- An alternative to incinerators, tissue digesters use thermal or hot alkaline hydrolysis leaving a liquid waste.

Hazards to public, fire and police, and environment

- Exposure to hazardous microorganisms and toxic chemicals and radioactive materials
 - via ***contaminated air, soil, and groundwater***
 - to ***fire and police*** during an emergency or natural disaster
 - by ***accidental release*** of material from facility into air or septic
 - via ***transportation*** of materials, waste, or animals
 - by ***escape*** of infected test animals
 - from ***contact*** with infected of lab personnel

Need for Disaster Response Planning

- ***Kinds of emergencies:***
 - ***naturally occurring*** – blizzards , fires, floods, and tornados
 - ***human-related*** – human error or incorrect operating procedures
 - ***mechanical*** – electrical, plumbing, heating ventilation and air conditioning malfunctions
 - ***hazardous materials events*** - chemical spills, plumbing leaks, and radiologic and biohazard exposures.
- The facility disaster plans should be shared with Boxborough’s police, fire, and other relevant municipal and state departments

Summary

- This would **protect** Boxborough from those hazards inherent to life science facilities that use animals
- It is **consistent** with hazardous materials zoning bylaws and is specific to these facilities
- **Other** life science facilities would be **allowed**
- These facilities pose **more problems** and **expenses** than other facilities
- Boxborough may not have the necessary **infrastructure** to handle potential emergencies at these facilities

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Facility Accidents

- Vials of bacteria gone missing
- Sending live anthrax instead of killed anthrax to labs in US and S. Korea
- Failure to ensure specimens of a deadly bacteria had been killed before shipping to a co-worker in a lower level lab who handled them without critical protective gear
- Deadly outbreak of SARS in China that was traced to lab workers at the National Institute of Virology in Beijing
- Deadly bioterror bacteria got out of the Tulane Primate Research Center near New Orleans via a lab workers clothing.
- Lab workers sticking themselves with needles containing pathogens
- Animal bites and scratches
- Ruptures and tears in protective suits at Ft. Detrick MD
- Rats from outside facility built a nest from discarded biohazard materials which were supposed to be locked in waste storage containers. 30% of locks were broken.
- Brucella, a select agent, was found outside a BSL-3 containment facility.
- A researcher at Univ of Michigan, imported MERS virus from Spain without permission, started research without permission in a BSL-2 lab instead of the required BSL-3 lab.
- Four accidental monkey deaths occurred at the New England Primate Research Laboratory, one of which was accidentally leaving one of the animals in the operating cage washer set at 170 degrees. The other three died of dehydration.
- Primates left in cages died in washing machine set at 170 degrees – 2019 University of Florida four mice killed in cage washing machine
- Rutgers Univ Jan 2019 – rabbit autoclaved at 300 deg – Sep 2018 USCLA eighteen mice autoclaved – 2020 Colorado State Univ bats autoclaved – University of Washington 2018 bats autoclaved
- 2019 Vanderbilt University - 4 crates of mice were inadvertently placed on the wrong cart and tossed into the trash. They were accidentally placed into the trash compactor and could not be found after employees had found out what had happened.

Are any other businesses prohibited in Boxborough?

- 4003(2) - Airports, Heliports, Or like facilities
- 4003(4) - Fast Food Restaurants
- 4003(4) - Retail Stores containing more than 25,000 square feet gross floor area
- 6402 Nuisances
 - Rendering plants, Slaughterhouses, Junk yards, Commercial dumps, Fur farms, Tank farms
- 6403 Storage of Waste or Refuse
 - No facilities for hazardous waste
 - No facilities for disposal of hazardous waste
 - No facilities for the garaging or temporary storage of vehicles used in the transportation of such hazardous waste
- Allowed businesses would include those listed in the definition of Life Sciences (*See Warrant Article or page 3 above*)