Boston University
Pollution Prevention & Chemical
Waste Minimization Plan

The goal of the Boston University Pollution Prevention and Chemical Waste Minimization Plan is to reduce the volume and/or toxicity of hazardous wastes on campus whenever possible. The University is committed to utilizing management techniques as well as technologies for treatment, storage or disposal to minimize the present and future threat to human health and the environment.

It is important that every member of the Boston University community be aware of the environmental impacts related to the disposal of hazardous chemical wastes and to help minimize the volumes that are generated. Proper waste management should be an integral part of Boston University's operating procedures.

There are three general methods of waste minimization:

A. Source Reduction
B. Re-use/Recycling
C. Treatment

A. **Source reduction** involves changing practices and procedures to reduce or eliminate the generation of hazardous waste materials.

B. **Re-Use/Recycling** is when a waste material is used for another purpose, treated and reused in the same process or reclaimed for another process.

C. **Treatment techniques** involve wastes that are neutralized or detoxified and managed at the source.

Source Reduction

<u>Inventory Management</u>

- Maintain an up-to-date inventory of the chemicals in your laboratory to avoid re-purchasing existing materials and to understand usage patterns.
- Only purchase the amount of chemical you will need in the short term. Buying in bulk never makes financial sense when the risks of storage and the costs of disposal are considered.
- Use the RIMS system to identify coworkers in your area who might have a chemical that you need.
- Dispose of outdated or unwanted chemicals immediately. Some materials, such as peroxide-forming chemicals, become more dangerous over time. It is much safer and much less expensive to get rid of ether that does not have significant peroxide formation.

- Label all chemical containers, regardless of what's inside. Unknown chemical wastes are difficult and expensive to dispose of.
- Only purchase cylinders from companies who will pick them up for re-use when empty.

Scaling and Substitution

- Consider using microscale experiments to reduce the volume of chemical wastes generated.
- Avoid unnecessary dilutions in experimentation which might increase the volume of hazardous waste generated.
- Substitute less hazardous materials into experiments, for example:
    - Use biodegradable detergents instead of toxic, chromium-based cleaners
    - Use latex paints and coatings instead of oil-based
    - Use non-mercury thermometers and equipment
    - Select non-mercury preservatives, and choose products such as antibodies which have been manufactured using non-mercury preservatives
    - Preserve specimens in ethanol instead of formaldehyde which is much more toxic
    - Use non-halogenated solvents in place of halogenated solvents wherever possible to reduce toxicity and disposal costs
    - Use sodium hypochlorite instead of dichromate
    - Use 'SYBR safe' or other DNA gel stain instead of ethidium bromide
    - Substitute F-TEDA-B54 or other product in place of fluorinating agents
    - Use scintillation cocktails which are non-toluene/xylene based
    - Eliminate metal catalysts whenever practical, even if it means longer experimentation times
    - Purchase chemicals pre-mixed or in the desired concentration to avoid unnecessary experimental steps and un-needed chemical stores
    - Substitution of ethanol in place of methanol in experiments can often provide more waste management options.

Mixing Chemical Waste Streams

- Flammable liquids are the most cost-effective waste stream to dispose of. Avoid mixing halogenated solvents, metals or other hazardous materials with flammable liquid wastes.
- Wastes containing heavy metals should not be combined with any other waste streams.
- Mercury wastes should be kept separate from all other waste streams.

If you have any questions about waste minimization, substitution, optimization and mixing of waste streams, please contact the Environmental Health and Safety Department.

Re-Use/Recycling

Solvent Recycling

EHS supports solvent recycling by helping departments, such as chemistry, with capital and maintenance costs. Acetone and ethanol are examples of solvents which can be collected and reclaimed via a recycling unit. Contact EHS if you would like to evaluate the feasibility of solvent recycling for your laboratory.

Photo Processing

Boston University has continued to transition from wet processing techniques to digital photo processing, and encourages digital processing wherever possible. Only a few wet processing procedures remain, and each has a silver recovery system to collect silver for recycling. All wet photo processing operations must include silver recovery, so contact EHS prior to startup of any new process.

Chemical Reuse

The university works with laboratory research groups to re direct unused chemicals after a laboratory has closed down or moved. EHS staff works with the principle researcher or lab safety coordinator to help find a new home for chemicals that would otherwise be disposed of. There is also a chemical reuse marketplace link on the BU research compliance PI page where researchers can post and search for chemicals which are available.

Treatment

Generally speaking, on-site treatment of chemical wastes is prohibited; chemicals must be disposed of in the form/state/concentration they are generated. In some cases, neutralization of acids/bases to render them neutral and non-hazardous is allowed. Specific conditions apply in these cases (for example the neutralization cannot result in the generation of dangerous gases or dangerous levels of heat, and the waste must not be hazardous for any reason other than its pH). Contact EHS for assistance with benchtop neutralization.