

# Laboratory Pollution Prevention Checklist

## **Material Substitution:**

- Substitute less hazardous chemicals for more hazardous ones.
- Use laboratory detergents rather than hazardous cleaning baths.
- Use less toxic/hazardous solvents rather than more toxic/hazardous solvents.
- Avoid the use of reagents containing: barium arsenic, cadmium, chromium, lead, mercury, selenium, and silver.

## **Purchasing/Inventory Control:**

- Develop a purchasing strategy for chemicals and other hazardous materials.
- Purchase chemicals in smaller sizes.
- Standardize chemical purchases across laboratories and establish an area for central storage of chemicals.
- Designate a single person to be responsible for purchasing chemicals and monitoring inventories.
- Link purchasing requests into an inventory system so that excess chemicals in stock can be used before buying more.
- Find a supplier who will accept unopened/expired chemicals that are returned, or will otherwise support waste minimization efforts.
- Use tags, bar codes, or some other system to establish a computer tracking of chemicals.
- If trying out a new procedure, try to obtain the chemicals needed from another lab or purchase a small amount initially. After you know you will be using more of this chemical, purchase in larger quantities.

## **Process Efficiency:**

- Write a waste management/reduction policy.
- Include waste reduction as part of employee/student training.
- Set up specific reduction goals. (e.g. 50% reduction in amount of waste generated per year)
- Create an incentive program for waste reduction.
- Evaluate laboratory procedures to see if less hazardous or nonhazardous reagents could be used.
- Consider the quantity and type of waste produced when purchasing new equipment. Purchase equipment that enables the use of procedures that produce less waste.
- Review your procedures regularly to see if quantities of chemicals and/or chemical waste could be reduced.
- When preparing a new protocol, consider the kinds and amounts of waste products and see how they can be reduced or eliminated.
- Scale down experiments producing hazardous waste wherever possible.
- Use pre-weighed or pre-measured reagent packets for introductory teaching labs where waste is high.

## **Recovery/Reuse/Recycling:**

- Set up an internal surplus chemical exchange or participate in an outside chemical/waste exchange program.
- Filter/Distill spent solvent for reuse onsite or via a solvent recycling service.
- Reclaim metal-bearing waste
- Segregate Individual Waste Streams. Keep hazardous waste separate from nonhazardous waste and organic waste separate from inorganic waste.

## **Innovation:**

- Move to microscale chemistry.
- Substitute computer simulations, videos, etc. for actual experiments.
- Use alternatives to solvent-based extraction (e.g., Solid Phase Microextraction or Supercritical Fluid Extraction).
- Use instruments in place of wet chemistry (e.g., chromatography, spectrophotometry, atomic absorption, nuclear magnetic resonance, X-ray diffraction).
- Adopt green chemistry principles as a standard laboratory management strategy.