



## BMPs for Laboratories - General

There are significant potential sources of pollutant discharges to the sanitary sewer from the various operations in a laboratory. Many lab waste solutions may contain concentrations of metals and other chemicals.

The Best Management Practices (BMPs) combines current technology and pollution prevention practices to ensure that these metals and chemicals are reduced or eliminated in the waste stream in a cost-effective but environmentally sound manner. It is a performance-based approach that imposes fewer burdens on laboratories and regulators alike.

### General Program Details and Documents

**Drain Protection Safety Showers:** Use one of the three (3) methods to keep spilled chemicals from reaching safety shower drains.

1. Install a temporary plug that opens automatically when the safety shower is turned on.
2. Eliminate the drain.
3. Protect the safety shower drain from lab spills with a sump. The capacity of the sump must be greater than the volume of the largest chemical container used or stored in the lab, or the sump must be double-contained. The sump may be covered by a grate to reduce hazards to people in the area.

#### **Container Security/Secondary Containment:**

- Secondary containment for all regulated chemicals should prevent leaks and spills from reaching the city sewer. Secondary containment should be large enough to hold at least 110 percent of the capacity of the primary container.
- Reduce bottle breakage by ordering chemicals in plastic coated bottled whenever possible. Always use plastic or insulated holders for solvent bottles.
- Never store chemicals above sinks on shelves or in cabinets. Store in approved chemical cabinets or on low shelves. Always latch doors on chemical storage cabinets.
- Separate incompatible chemicals to prevent mixing in the event of an accidental spill.
- Keep countertop chemical containers in trays of appropriate capacity or within bermed areas away from sinks and drains.

#### **Waste Minimization:**

- Substitute chemicals with less toxic alternatives.
- Use minimum amounts of chemicals required by each experiment or process to minimize disposal volume at end of procedure.
- Keep all waste manifests on site.

#### **Training:**

- All lab workers and employees should understand the importance of utilizing BMPs for water quality protection. Train new employees and refresher training. Keep training records and spill response plan on site for inspection.

## Specific Laboratory Categories

**Chemistry Labs:** Problem substances include mercury, copper, chromium, and cyanide.

- Most lab chemistry analyses are run on several different automated system or other instrumentation that use small amounts of reagents.
- Lab managers and analysts should be aware of the available options and choose the one that produces the best results with the least amount of waste.

**Hematology Labs:** Problem substances include cyanide, formaldehyde, chloroform and other solvents, xylenes, mercury, copper, chromium, zinc, and low-level radioactive wastes.

- Cyanide-containing cell lysing solutions are common reagents in many blood tests. Cell sorter/counting instruments using these solutions generate a waste solution that is just below the hospital's discharge limit for cyanide and acceptable for discharge.
- Manual iron-cyanide test yields a concentrated cyanide solution that should be collected, stored in secondary containment and disposed of as hazardous waste.

**Chemistry and Hematology Labs:**

- The following solvents and chemicals are considered hazardous and should be disposed of by a certified waste hauler:
  - Bouin's solution and other concentrated formaldehyde solutions;
  - Waste solvents – chloroform, methylene chloride, and solvents used for TLC analysis;
  - Waste from atomic absorption (AA) standards for heavy metals;
  - All solutions from the titrimetric method;
  - Highly concentrated chromium reagent used in at least one albumin method;
  - Copper concentrated reagent used in total protein method;
- Minimize use of xylenes for extractions. Terpene based solvents (Hemo-D) may be substituted for xylene used for slide cleaning in some applications.
- Use the ion-selective electrode (ISE) over the calorimetric method when analyzing chloride.

**Pathology/Histology:** Problem substances include mercury, glutaraldehyde, formaldehyde, alcohols, xylene, and other solvents.

- Most common hazardous materials found in pathology and histology labs are preservatives and fixatives used to prepare specimens.
- Waste glutaraldehyde, formaldehyde, alcohols, xylene, and other solvents should be collected and disposed of as hazardous waste.

**Microbiology:** problem substances include reagents containing heavy metals (copper and silver) and solvents

- All staining supplies should be stored in secondary containment.
- Both waste and contaminated rinsate volumes can be reduced if slides are stained with a few drops of solution rather than a dipping bath.
- If stains contain hazardous or metal ingredients, rinse slides and containers to a hazardous waste container.

### RESOURCES:

Department of Public Works Santa Cruz. "BEST ENVIRONMENTAL MANAGEMENT PRACTICES MEDICAL FACILITIES." <http://www.dpw.co.santa-cruz.ca.us/Pretreatment/BMpMedicalFacilities.pdf>