Pollution Prevention Manual
(EHS Program 5.1)

1.0 Overview

Weill Cornell Medicine (WCM) is committed to the protection of human health and the environment. To meet these commitments, the Medical College encourages the utilization of chemical waste minimization and pollution prevention techniques. These practices reduce the volume and toxicity of chemical wastes generated. An added benefit is the reduction of chemical waste disposal costs.

2.0 Table of Contents

3.0 Applicability

The waste minimization and pollution prevention techniques identified in this program apply to all students, faculty, staff, visitors, and contractors working on behalf of WCM who use chemicals at WCM.

4.0 Responsibilities

4.1 ENVIRONMENTAL HEALTH AND SAFETY (EHS)

The Department of Environmental Health and Safety will:

- Act as a resource to WCM personnel, providing technical assistance and guidance on waste minimization.
- Review and monitor existing waste minimization practices.
- Conduct College-wide waste minimization studies to identify new programs or practices to be implemented.
- Provide training as requested.

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4.2 PRINCIPAL INVESTIGATORS AND SUPERVISORS

Principal Investigator and Supervisor responsibilities include:

- Promoting and practicing waste minimization concepts.
- Establishing procedures for conducting specific waste minimization activities.
- Ensuring that all personnel and/or contractors adhere to the waste minimization concepts provided in this procedure, as well as Department internal procedures.

4.3 DEPARTMENT STAFF USING CHEMICALS

Personnel using chemicals must:

- Practice the waste minimization concepts detailed in this program.
- Follow internal procedures developed by their Principal Investigator (PI) and/or Supervisor.

4.4 CONTRACTORS

Contractors are responsible for:

- Removing all unopened or unused portions of chemicals brought on site upon completion of services.
- Using waste minimization techniques when feasible.

5.0 Chemical Waste Minimization Techniques

Chemical waste minimization and pollution prevention techniques include the following:

5.1 TRAINING

Every member of the WCM community must choose to minimize chemical wastes for the program to work successfully. Personnel is to be trained upon hiring, yearly thereafter, and when procedures change. For lab and clinical personnel, training includes Lab Safety training sessions and Waste Management Practices related to chemical wastes, regulated medical and sharps waste, and radioactive wastes. Members of EHS receive specific annual and periodic training in hazardous materials and waste as mandated by OSHA, EPA, and DOT in addition to site-specific training sessions mentioned above.

5.2 CHEMICAL REDISTRIBUTION

Unopened or unused portions of chemicals may be redistributed within the College to other users. If a chemical is needed, specifically an exotic, high-hazard, and single-use chemical, check with other laboratory personnel and colleagues within WCM for availability before ordering.

WCM currently has a Reagents, Equipment, and Databases Sharing Program, available on the WCM Research website. EHS will offer chemicals for redistribution that are collected from laboratory close-outs through this site.

To access information from the site, please follow these instructions:

1. Go to the new WCM Research website: https://research.weill.cornell.edu.
2. On the top toolbar, click on “For WCM Investigators” and then “Research Concierge.”
3. Navigate to and click on “Reagent, Equipment and Data Sharing.”
4. Log in to the system using your CWID and password.

Once the login is completed, scroll down to look through available reagents, equipment, and databases. Reagents available from labs can be submitted through this website directly as well.

For further information on this program, please contact the Office of the Research Dean at ResearchDean@med.cornell.edu.

5.3 END OF PROCESS TREATMENT

Principal Investigators and/or Supervisors must include the end-of-process treatment procedures into standard operating procedures and ensure they are being followed. An example would be to conduct “in container” neutralization of an acid with a base and flush to the local sewer with excess water, if in accordance with the College’s Drain and Trash Disposal of Chemicals procedure. Contact Environmental Health and Safety for additional information.

5.4 PROCESS MODIFICATION

To the extent that it does not compromise research, teaching, or service, laboratories are encouraged to modify experimental or standard processes to decrease the number of hazardous chemicals used and generated. Whenever possible, micro and semi-micro techniques should be used to reduce the volume of waste generated.

5.5 PRODUCT SUBSTITUTION

Substitute non-hazardous or less toxic materials in your chemical processes and experiments.

Examples of less toxic alternatives include:

- High flashpoint scintillation fluids (e.g., Ecoscint).
- Heptane as an alternative solvent to Xylene.
- Uranium-free compounds (e.g., Uranyless®).

NOTE: **Investigators should be aware that the use of Uranyl Acetate and Uranyl Nitrate incur high disposal costs to the lab. A minimum charge of $1000 dollars will be charged but may be higher depending on the specific constituents and volumes. A quote will be obtained for such materials and forwarded to the lab.**

- Non-mercury thermometers (e.g., Enviro-Safe™).
- Ethidium Bromide Substitute (e.g., SYBER Safe, GelRed, GelGreen, and EvaGreen).
- Reusable laboratory materials whenever possible such as glass Petri dishes in place of disposable plastic dishes.

Detergents and enzymatic cleaners can be substituted for sulfuric acid/potassium dichromate (Chromerge) cleaning solutions and ethanol/potassium hydroxide cleaning solutions.

Avoid the use of known carcinogens, mutagens, or extremely hazardous chemicals where possible.

5.6 RECYCLING

WCM collects some precious metals and valuable chemicals for recycling by outside contractors to reduce waste disposal costs. In addition, some departments are involved in the reclamation of precious metals and chemicals from laboratory processes. Examples include:

- Reclamation of silver from photo fixing chemicals.
- Reclamation of lead and lead-containing materials.
- Collection of mercury (e.g., thermometers and lamps) for distillation by an outside recycler.
- Collection of surplus electronics (e.g., computers) for recycling by an outside recycler.
- Notice to laboratories of surplus chemicals that may no longer be used at the time of lab cleanouts or closures.

5.7 SEGREGATION AND CHARACTERIZATION

Do not consolidate various process/experiment wastes into the same container unless the wastes contain similar constituents, or you are otherwise authorized to do so by EHS.

Accurately label waste containers, including all chemical contents and approximate percentages. Segregation and characterization simplify the waste stream, facilitating treatment and disposal.

5.8 INVENTORY CONTROL- SALUTE

Keeping an updated inventory of the chemicals in your lab helps reduce cost, unnecessary chemical deliveries, and the need to dispose of the virgin product in the event of a lab move, inspection, or emergency response incident. Salute is used to manage laboratory chemical inventories at WCM. EHS has created the Chemical Inventories - Salute document to offer specific guidance on how to maintain chemical inventories. For additional assistance, please contact EHS to receive training on how to use the program.

It is important to audit chemical supplies and use inventory control measures:

- Purchase only the quantity of chemicals required for a specific project and do not stockpile chemicals unnecessarily.
- Chemicals in storage should be examined periodically for changes in the condition of the chemical, the container holding the chemical, and/or the storage area.

- Signs of degradation such as split caps, accretion of deposits on the bottles or shelf surfaces in the storage area, formation of two phases or change in physical state, or formation of crystalline structures within liquids should be corrected immediately or submitted for disposal through EHS.
- Some changes in the chemical may not be readily visible (e.g., formation of peroxides in ether). Before using or storing chemicals, one must become familiar with their physical and chemical hazards.

6.0 Chemical Storage Practices

6.1 CHEMICAL STORAGE, SEGREGATION, AND SECONDARY CONTAINMENT

Chemical containers should be stored and segregated according to their hazard (e.g., flammables, acids, bases, oxidizers, reactives, and poisons) and away from incompatible chemicals. Measures such as secondary containers to protect the stock container may be required to store chemicals safely. This will help minimize the damage and/or deterioration of chemicals in the event of spills.

Information on the specific hazards for a given substance is available on the chemical's Safety Data Sheet (SDS). A listing of best general practices for safe chemical storage and information about chemical incompatibilities is available in Section 17 of the EHS Program Manual 4.1 - Laboratory Chemical Hygiene Plan.

Examples include:

- No storage of chemicals, excluding standard detergents, under sinks.
- Hazardous chemicals must not be stored above eye level.
- Store acids and bases in dedicated cabinets and separate acids and bases.
- Flammables must not be stored near ignition sources or oxidizing chemicals.

6.2 CHEMICAL LABELING PRACTICES

All containers must have an appropriate container label intact and legible at all times. Correct determination of hazardous waste streams allows for safe waste consolidation with other compatible materials, improves the potential to use recycling options rather than treatment or incineration, and prevents non-hazardous items from being misrepresented.

All defaced, faded, or separated labels should be addressed immediately, either by correcting the label or requesting disposal of the chemical to EHS. Any unknown chemicals must be labeled as such and immediately submitted to EHS for disposal.

6.3 EXPIRED CHEMICALS

Expiration dates must be clearly marked for chemicals that are in reactive groups; or chemicals with similar functional groups that may develop hazardous characteristics upon long-term storage (e.g., peroxide-forming chemicals). Storage of chemicals should be consistent with FDNY storage limits found in Section 17.2 of the Laboratory Chemical Hygiene Plan.

7.0 References

- EHS Program Manual, section 4.1 - Laboratory Chemical Hygiene Plan.
- EHS Update, Drain and Trash Disposal of Chemicals.
- EHS Update, Photographic Processing Waste Management
- EHS Update, Peroxide Forming Chemicals
- EHS Update, Chemical Inventory - Salute
- NYS Environmental Conservation Law, Title 9 – Industrial Hazardous Waste Management, Section 27-0908 - Hazardous Waste Reduction Plans.
- Salute Safety, https://ehs.salutesafety.com/users/sign_in