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Office of the President

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MEMORANDUM CIRCULAR NO. 59
Series of 2004

T O: All Research Center Directors/College Deans, Department/Unit Heads

R E: Proper Disposal of Laboratory Wastes

The Chemical/Hazardous Waste Management Section of the LSU-Sanitation and Waste Management Committee is conducting a survey on the chemical substances commonly used in your respective units (please see attached survey form). The gathered information will guide us in identifying hazardous substances in campus, gathering chemical information on their proper handling/disposal and in informing the public of their presence. This will also guide us in revising the general guidelines to suit our local needs.

Furthermore, please request your personnel to observe proper disposal of biological/chemical wastes, in order to minimize and consequently eliminate the proliferation of laboratory wastes in our surroundings.

In the meantime, let us stop the pouring of potentially hazardous materials down the drain or sink nor put them in regular trash container. For quick reference of their toxicity, please refer to their original labels.

Your utmost cooperation is enjoined.

PACIENCIA P. MILAN
President

Survey Form #1

Research Center/Academic Unit _____

I. Research project title/Subject _____

Study #s/Experiment #s _____ to _____

Biological materials/ Chemicals used	Amount (Mass, g or volume, mL)	Frequency

Note: Please multiply this form as the need arises and submit to us one week after receipt.

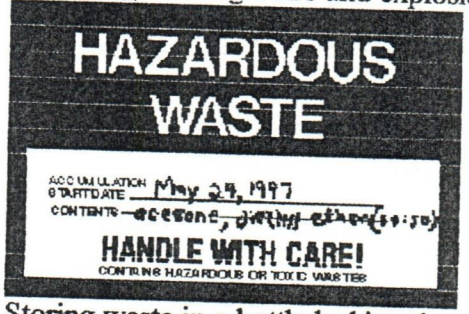
Study Leader's/Instructor's Name _____ Signature _____

A. PROPER MANAGEMENT OF LABORATORY CHEMICAL WASTES

1. Properly label all laboratory wastes

Typical examples of improper labeling include:

a. **Failing to label a waste bottle.** If the contents of the bottle are not listed, the next person to use the bottle could accidentally combine <u>incompatible chemicals</u>, causing a fire and explosion.



b. **Storing waste in a bottle lacking the words "Hazardous Waste".** Only these exact words must be used. "Organic Waste", "Xylene Waste" etc. are unacceptable. If something isn't really waste, don't put the word "waste" on the bottle. Label it "used" etc.

c. **Scratching out the former contents of the bottle and writing "Waste" on the bottle.** You must remove or totally deface the old label so there is no confusion over the contents.

2. Properly segregate all wastes

Typical examples of improper segregation include:

a. **Storing acids and bases in the same cabinet.** Leaking containers or a spill could cause a violent reaction which would release large quantities of toxic gases.

b. **Storing acids and organic waste in the same cabinet.** In the event of accidental mixing, a catastrophic fire or explosion could result.

c. **Mixing <u>incompatible chemicals</u> in a waste container.** For example, nitric acid and ethanol can form an explosive mixture.

3. Properly store all wastes

Typical examples of improper storage include:

a. **Storage of waste in a fume hood where reactions are being carried out.** If your reaction gets out of control, the waste bottle could explode and lead to a catastrophic fire or mixing of incompatible chemicals. **Always remove waste bottles from hoods where reactions are being performed.**

b. **Using metal cans for waste.** Even near neutral pH, solids and liquids can easily corrode through metal cans in a surprisingly short period of time. Use only glass or polyethylene containers for waste.
c. **Storing flammable waste containers on a bench or floor.** You wouldn't do this with reagent chemicals, so why would you do it with waste? Store your waste containers in a cabinet, preferably an explosion-resistant solvent cabinet.
d. **Storing waste bottles in or near a sink or floor drain.** This could allow toxic chemicals to enter the sewer.

4. **Cover with caps all waste bottles**

Typical examples of failure to cap waste bottles include:

a. **Leaving the cap off an organic waste bottle.** The only time a cap should be off a waste bottle is when you are actually putting waste into it. If you are afraid of a pressure buildup in the bottle, simply cap it loosely.
b. **Leaving a funnel in the waste bottle.** This is unacceptable. A funnel can too easily be moved to an adjacent (incompatible) waste bottle and result in a fire or explosion. When you are done with it, cap it!

5. **Don't accumulate excessive waste**

Ideally, you should have **no more than ONE** bottle of each kind of waste in your laboratory. If the organic waste bottle is full, take it to the Stockroom for disposal. There is no purpose in having four bottles of organic waste in your lab. If a fire were to occur, it would be much more serious.

B. HOW TO SEGREGATE WASTES IN THE LABORATORY

Proper segregation of laboratory waste is essential to good chemical hygiene and a safe workplace environment. Many researchers often tend to put all of their wastes into the same cabinet or fume hood. Doing so can have disastrous results!

The guidelines for temporary storage of chemical wastes in the laboratory are really no different than those that you use for the storage of your usual lab chemicals. The most important rule is to make sure that any chemicals or wastes that are stored together are compatible with each other!

Therefore, proper segregation of wastes involves making sure that wastes within a bottle are compatible, but it also means that you **should NEVER store the following types of wastes near each other**:

- Acids and bases.
- Organics and acids.
- Cyanide, sulfide or arsenic compounds and acids.
- Alkali or alkali earth metals, alkyllithiums etc. and aqueous waste.
- Powdered or reactive metals and combustible materials.
- Mercury or silver and ammonium containing compounds.

If a bottle broke in a waste storage area where incompatibles were present, the results could be disastrous. Remember: incompatible bottles of wastes should be stored in separate cabinets, preferably as far apart as possible!

Categories of Segregated Wastes

Organic waste - Phenol

Examples: any waste generated which contains phenol or phenol mixtures, including phenol-acid mixtures and phenol-chloroform mixtures.

Organic waste - Halogenated

Examples: any halogenated organic waste or any mixtures containing halogenated organic waste, except those containing phenol. Including chlorinated oils such as cutting oil. Examples: chloroform, 1,1,1-trichloroethane, methylene chloride

Organic waste - Corrosive

Examples: non-halogenated solvent-acid mixtures, non-halogenated organic acids such as acetic acid, trichloroacetate, acetic anhydride.

Organic waste - Non-halogenated plus water

Examples: non-halogenated solvent-water mixtures or non-halogenated solvents with greater than 20% water such as 80% ethanol.

Organic waste - Non-halogenated
Examples: acetone, toluene, acetonitrile, ethyl acetate, heptane, hexane, alcohol with less than 20% water.

Corrosive waste - Acid
Examples: hydrochloric acid, sulphuric acid, nitric acid, chromic acid, hydrofluoric acid.

Corrosive waste - Inorganic/acid mixture
Examples: iron III chloride, aluminium trichloride, mercury compounds dissolved in acid, other inorganic compounds dissolved in acid.

Corrosive waste - Alkali
Examples: hydroxides, phosphates, ammonia.

Corrosive waste - Alkali mixture
Examples: compounds dissolved in hydroxides, phosphates, ammonia.

Waste Oil
Examples: used pump oil, crankcase oil, hydraulic oil. Excluding halogenated oils such as cutting oils.

Reactive waste
Examples: air and water sensitive materials such as Grignard reagent, alkaline metals, reactive halides.

Waste oxidizers
Examples: all nitrates, potassium dichromate, metal peroxides such as chromium dioxide.

Inorganic waste
Examples: heavy metal compounds and solutions such as those of mercury, lead, copper and zinc (except those dissolved in acid), other inorganic compounds not covered by another category.

Hazardous waste - Other
Examples: waste not covered by any other category. All waste in this category must be segregated. No mixtures. Does not include radioactive waste, biohazardous waste, highly hazardous waste, explosive waste or surplus chemicals.

C. ADDITIONAL NOTES ON HAZARDOUS WASTE POLICIES

A. FLAMMABLE SOLVENT WASTE STORAGE

- A suitable solvent storage cabinet must be used for all containers of flammable solvent greater than ½ gallon in size, or if the total volume of all flammable solvents amounts to more than two gallons kept in one room.

B. SPILLS

- When spills occur, users of hazardous chemicals should consult the Material Safety Data Sheets. These MSDS's include physical and chemical properties and known acute or chronic health effects including carcinogenicity, exposure limits and emergency and first aid procedures. It is the responsibility of the researcher not only to be aware of such hazards but also to inform and educate all those who might come in contact with that hazard. Each hazard has its peculiarities and each spill has its own resolution. Learning each hazard and its emergency resolution must be standard orientation for everyone who could be exposed to that hazard. Also it is necessary to avoid thinking a spill is resolved after it is off the lab bench or floor. If a hazard is disposed unthinkingly into a normal trash receptacle, any unknowing housekeeper is at risk. MSDS's should be consulted for specific instructions. Only brief guidelines are given here.

- HAZARDOUS CHEMICAL SPILLS should be reported immediately to the Physical Plant office. They will issue instructions and send special assistance if necessary.
- CYTOTOXIC DRUG SPILLS require special precautions to isolate. Inexpensive CD spill kits with double latex gloves, goggles, respirators and spill mats are available.
- MERCURY SPILLS require specific precautions to avoid inhalation, ingestion or absorption. The Physical Plant Office should be notified immediately and a mercury spill team will be dispatched.

C. PROHIBITION OF CHROMIC ACID AS GLASS CLEANER

Due to the extreme toxicity of chromates (including carcinogenicity), and the expense of their proper disposal (it is illegal to simply dilute chromic acid and run it down drains), the practice of using chromate solutions to clean glassware is PROHIBITED

NOCHROMIX or similar substitute should replace this outdated practice.

D. LABORATORY GLOVE POLICY

- Laboratory gloves are not to be worn in lobbies, rest rooms, administrative offices, libraries, vending areas, elevators, college glassware facility, or stores. It is assumed that one is wearing gloves for protection from a lab hazard. That hazard is most probably on the outside of the glove. For this reason, lab gloves should not leave the immediate lab area to prevent contamination of door knobs, elevator switches, and other public areas. If a chemical or biological hazard must be conveyed outside the immediate laboratory area through public spaces, it must be packaged in a sealed, secondary container to facilitate cleanup or decontamination should the hazard be accidentally spilled or dropped. When such hazards are properly protected in transit, gloves are superfluous. If gloves are worn to protect clean glassware from grease or fingerprints, they become immediately contaminated with grease from hundreds of building occupants as soon as an elevator button or door pull is touched thus defeating the purpose of the gloves.

E. WASTE SOLVENT CANS

- Use plastic or metal solvent waste cans. Cans should be used for all discarded solvents including chloroform, acetone, ethyl ether, methanol, formaldehyde, phenol, toluene, methyl chloroform, or xylene. Keep track of the kind and amounts of organic compounds added to a can and record on the tags.
- NOTE: solvent waste cans are NOT for disposal of mercury, mercury contaminated solvents, lead, selenium, cadmium, chromium, arsenic, silver, barium, sulfides, cyanides or unbuffered mineral acids or bases pH<5 or >9. These items must be collected separately as Hazardous Waste.

F. BATTERY DISPOSAL

- Collect and separate all exhausted batteries including silver, lithium, mercury, NiCad or lead acid.

G. ASBESTOS AWARENESS

- Asbestos is present in most buildings constructed prior to the early 1980's usually in the form of plumbing insulation, floor tiles, chemical resistant lab tops, hood inner panels & ductwork, or sprayed fire retardant. In this encapsulated form, it presents little or no hazard.
- However, plumbing work or renovations can disturb asbestos creating airborne hazard. Therefore, in older buildings all repair and renovation areas must be certified to be free of asbestos or abated prior to work.

H. AVOIDANCE OF ROUTINE EXPOSURES -- MOUTH PIPETTING

- Never pipette by mouth--use a vacuum or pipette bulb.
- Do not smell or taste chemicals.
- Skin contact with chemicals should be avoided.
- Any chemical operation giving off toxic fumes should be carried out in functioning chemical fume hood.
- Eating, chewing, cosmetic application and installation/removal of contact lenses are not permitted in the laboratory.
- Glassware, utensils, or ice generated for laboratory use should not be used in contact with food/drink for human consumption.
- After contact with laboratory chemicals, hands and forearms should be washed before using the rest room or breaking for lunch or a snack.

DEPARTMENT OF PURE AND APPLIED CHEMISTRY
College of Arts & Sciences
Leyte State University
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August 13, 2004

TO: All Research Center Directors/College Deans, Department/Unit Heads

RE: PROPER DISPOSAL OF LABORATORY WASTES

In order to minimize and consequently eliminate the proliferation of laboratory wastes in our surroundings, please request your personnel to observe proper disposal of biological/chemical wastes (general guidelines attached thereto).

We are also passing around a survey form for your researchers and laboratory staff to accomplish of chemical substances commonly used in your respective units. The gathered information will guide us identify hazardous substances on campus, gather chemical information on their proper handling/disposal and inform the public of their presence. We will also use these data to revise as soon as possible our general guidelines to suit our local needs.

Thank you for your cooperation.

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LSU-Sanitation & Waste Management Committee

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