CHAPTER 5 – HANDLING, STORAGE AND DISPOSAL OF RADIOACTIVE, BIOHAZARDOUS AND ANIMAL WASTES

This chapter addresses other hazardous wastes that do not meet the definitions or categories in Chapter 3.

Biohazardous Waste

In Illinois, biohazardous waste is referred to as "Potentially Infectious Medical Waste (PIMW)". It may also be called medical, infectious, red-bag, hospital, and regulated waste. This waste can be defined as any waste containing sufficient virulence and quantity so that exposure to the waste by a susceptible host could result in an infectious disease.

PIMW is generated in clinical and research laboratories, hospital and clinics, and in activities involving:

- the diagnosis, treatment or immunization of human beings or animals.
- biological or medical research, including recombinant DNA research, and education.
- the production or testing of biologicals.

PIMW includes articles such as contaminated gauze, disposable gloves and ALL used needles and syringes, body parts, fluids, specimens and cultures.

The University has instituted a comprehensive program for the disposal of PIMW. The program's policies and procedures are summarized as follows:

- *Segregation* - It is the responsibility of the generator to segregate PIMW from ordinary waste. The segregation should occur at the point of generation (where materials become waste). The generator of PIMW must segregate PIMW into solid and liquid (such as blood and body fluids) waste. Bulk blood, suctioned fluids, excretions, and secretions may be carefully poured down a drain connected to a sanitary sewer and flushed thoroughly. To adequately segregate waste, generators of PIMW must provide at least two receptacles for waste: one for ordinary waste and one for PIMW. The receptacles and bags intended for PIMW must be labeled with the Universal biohazard symbol. Red bags or red containers may be substituted for labels. A bag must be placed inside a leak-proof container.

- *Containment* – The disposal of PIMW must not compromise the strength and durability of the biohazard bag. It is imperative that objects that could potentially tear or puncture the bag be packaged in such a manner to prevent such an occurrence (see sharps disposal). ***DO NOT OVERFILL IT!*** A properly filled bag will allow the opening to be easily pulled closed and knotted, sealed, or twist-tied. If additional strength is necessary or if the outside of bag becomes contaminated, PIMW must be double bagged.

- *Handling and Transport* – The disposal of PIMW shall be in accordance with the department established to service the location of the generator (Building Services or Housekeeping). When removing bags from receptacles: immediately knot, seal, or twist-tie the bag closed. Never transport a bag that is not closed. When handling, avoid contact with skin, clothing, furniture, building fixtures, walls and floors. Personal Protective Equipment (PPE), such as rubber gloves and an apron should be worn. **ALWAYS** wash hands immediately after handling regardless of the use of gloves. The use of carts or containers is recommended to prevent damage or spillage.

- *Spills and Clean up* – In the event of a smaller biohazardous waste spill, wear PPE and carefully clean and disinfect the affected area. Proper techniques include surrounding the spill with an approved disinfectant (e.g. a 1:10 bleach solution) and cleaning into the middle of the spill. Discard non-sharp waste into a red bag, seal and remove from the area. Sharps must be placed into a sharp box. For larger spills, Building Service personnel assigned to the area should be contacted. Prevent all foot traffic through the spill and confine the area. When there is a delay in spill clean up, the responsible party should remain at the spill to provide assistance.

Sharps Disposal

The University has special procedures to insure safe sharps disposal. A "sharp" is any object that is capable of puncturing the skin (e.g. needles, broken glass, scalpel blades, wires, etc.). All sharps **contaminated** with infectious materials and ALL used needles, syringes and scalpel blades must be disposed of following these guidelines:

- **NEVER** bend, clip, deform, or break a needle in any manner. Devices for such purposes shall not be used.
- **NEVER** recap or reshear a needle after the protective covering has been removed.
- Deposit sharps directly into rigid, puncture and leak resistant containers labeled with the Universal Biohazard symbol.
- **ALWAYS** maintain sharps containers in an upright position.
- **NEVER** overfill sharps containers. Once filled, containers must have all openings securely closed.
- If leakage from a sharps container is possible, the container must be placed inside another leak-proof labeled container.
- **NEVER** abandon sharps or allow them to remain unattended on furniture surfaces such as countertops, lab benches, chairs, patient beds, procedure trays, etc.
- **NEVER** place sharps in the regular trash or in biohazard bags.

For supplies required for Biohazardous waste handling and disposal:

Campus-wide…..…….Fisher Scientific 3-0324
Hospital and Clinics……..Materiel Management 6-3682

For Biohazardous Waste Pickup:

Hospital and Clinics…….Hospital Environmental Services 6-3688
West Side ……Building Services 6-7468
East Side……..……Building Services 5-1036
College of Dentistry……Coordinator for Physical Plant Services 6-7633
MBRB……..Facility Manager 6-6963

Disclaimer: This narrative is provided only for informational purposes and does not constitute approved bloodborne pathogen training under 29 CFR 1910.1030. Only persons with current, documented annual training are permitted to work with or transport bloodborne pathogens.

Radioactive Waste

Several types of radioactive wastes are commonly generated by radionuclide projects at UIC. This section of the Hazardous Waste Management Manual will briefly discuss the proper disposal of these wastes. A more complete discussion of radioactive waste disposal procedures can be found in Chapter 5 of the UIC Radiation Safety Manual. If in doubt about the disposal of a particular type of radioactive waste, call the Radiation Safety Section at 6–7429.

Dry Solid Radioactive Wastes - Dry solid radioactive wastes should be disposed of in the containers provided by the EHSO Radiation Safety Section. These containers and their lids are provided with radioactive material warning labels and instructions for usage. Waste disposed of in these containers should be segregated according to half-life. Short half-life containers, which bear green labels and are lined with heavy green bags, are for radionuclides with half-lives of 90 days or less. Long half-life waste containers, which bear yellow labels on their lids and are lined with heavy yellow bags, are for radionuclides with half-lives greater than 90 days. No liquids, animals, biohazardous waste, needles, syringes, scintillation fluid, lead, or radioactive warning labels may be placed into these containers.

Aqueous Liquid Radioactive Wastes - Liquid radioactive wastes that are soluble or miscible in water or biological materials that are readily dispersible in water may be disposed of in the laboratory sink in limited quantities. In addition, some scintillation fluids have been approved for sink disposal (see "Scintillation Fluids"). The activity limit for most radionuclide projects is 3 mCi per month of all radionuclides combined. Only authorized sinks may be used for such disposals. The rules posted by the sink must be followed.

Scintillation Fluids - Two types of fluids are currently available. Traditional fluids, which are considered mixed waste, contain low flash point solvents such as toluene, xylene, and

pseudocumene. Use of these types of fluids is discouraged in favor of the newer high flash point fluids. Many of these newer fluids, sometimes called "biodegradable" or "nontoxic," were evaluated and approved for sink disposal by the EHSO Health and Safety Section. A current list of the fluids that are approved can be found on our web site at www.uic.edu/depts/envh. To have other scintillation fluids reviewed for possible sink disposal, contact the EHSO Radiation Safety Section at extension 6-7429.

Mixed Waste - Mixed waste is defined as waste that contains radioactive material that has been mixed or is a component part of an EPA hazardous chemical as defined in Chapter 3. Obtain advance permission from the EHSO Radiation Safety Section, 6-7429, before generating mixed wastes other than liquid scintillation fluids

Examples of mixed waste are:

- Traditional liquid scintillation fluids that are mixed with radioactive samples,
- HPLC fluid that is mixed with radioactive material,
- Hazardous chemicals that are radioactive such as uranium nitrate, $UO_2(NO_3)_2.6H_2O$, which is an oxidizer [CAS No: 13520-83-7 also known as uranyl dinitrate, uranyl nitrate, bis(nitrato-O)dioxo, and uranium hexahydrate]

Avoid generation of mixed waste since some types are very expensive to dispose of. Some have no legal disposal method. Consider using substitute solvents and chemicals that are not hazardous or that are not radioactive.

Biohazardous Radioactive Waste - In general, biohazardous radioactive waste must be rendered non-pathogenic before disposal. Sections 5.9.1 and 5.6.7 of the UIC Radiation Safety Manual should be understood before such materials are generated. Needles, syringes and scalpels are considered biohazardous even if they are not contaminated with a biohazardous material. Avoid using needles and syringes whenever possible, but if such use is unavoidable, the EHSO Radiation Safety Section will provide a properly labeled disposal container for these items.

Radioactive Animal Waste - Animal waste that is radioactive must be packaged in opaque plastic bags with labels that include the date of generation and the identity and activity of each radionuclide in the waste. After packaging and labeling, animal waste must be kept frozen until collected by the EHSO Radiation Safety Section.

Disposal Records - Maintaining up-to-date records of all radioactive waste disposals is required. A waste disposal log must be maintained near each dry waste disposal container and each needle/syringe disposal container. All sewage disposals must be recorded on a sewage disposal log. All disposals must be summarized on the monthly Radionuclide Inventory Report, which must be submitted by each radionuclide project.

Animal Waste

Animal wastes include carcasses, tissue samples, bedding, and any other material that could be contaminated with animal blood or fluids. Animal waste must be properly packaged and labeled.

Animal waste (not radioactive) - This includes animal carcasses infected with pathogens or contaminated with carcinogens, teratogens, or other chemicals. Investigators obtain animals from the Biologic Resources Laboratory (BRL) and must have the animals transported back to BRL for proper disposal. On the east campus, fish, birds and small animals purchased from reputable dealers by investigators are to be handled through the current contractor for biohazardous waste.

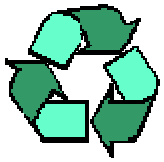
Radioactive Animal Waste – See section in Radioactive Waste section above.

Disclaimer: This narrative is provided only for informational purposes. Only persons with current, documented training and who are listed on an approved radionuclide authorization, are permitted to work with or transport radioactive materials.

CHAPTER 6 – MANAGEMENT OF NON-HAZARDOUS WASTES

This chapter addresses all other solid wastes generated on campus that have not been previously discussed in this manual.

Recyclables



Regular recyclable wastes such as mixed paper and bottles-and-cans may be disposed of in the various recycling containers found throughout each building. Different recycling opportunities occur in different buildings. A full list of acceptable recyclable materials in each building can be found at http://www.uic.edu/depts/ppad/uicycle/basics/what.htm. NEVER APPROPRIATE for recycling are broken glass, lab glass of any kind, or empty chemical bottles or containers. Any questions regarding recycling should be directed to the UICycle Waste Reduction & Recycling Program: call (312)996-2517, e-mail uicycle@uic.edu, or see http://www.uic.edu/depts/ppad/uicycle/ .

Some specialty recyclable items are also collected on UIC's campus. ***Batteries*** (all kinds except lead-acid) may be dropped off at either Micro/Station location room 230 in Chicago Illini Union or the 1st floor bookstore in Chicago Circle Center. Please note that batteries for recycling should not be brought from home. ***CD's, CD-ROM's, jewell cases, floppy diskettes,*** and ***transparencies*** may also be dropped off at the Micro/Station locations. For more specific information about these items and other specialty recycling opportunities both on and off campus, see http://www.uic.edu/ depts/ppad/uicycle/more/more.htm.

Nonhazardous Refuse

Nonhazardous refuse may be disposed of in ordinary trash containers. These containers are managed by Facilities Management Building Services. Contact the Service Desk with any requests: call (312) 996-7511, e-mail ServDesk@uic.edu, or see http://www.uic.edu/depts/ppad/service/servreq.htm.

Uncontaminated Broken Glassware

Do not place broken glassware, pipettes, or other sharp-edged materials of any type into the regular trash. Place in a cardboard box instead. When full, seal and label with the words "Broken Glass", and place next to the regular trash container.

Empty Containers

Containers that have held non-radioactive chemicals should have their labels defaced, be triple rinsed with water or a suitable solvent to remove any residue, the cap left off, and then disposed of in the regular trash. The rinsate should be collected for

disposal as chemical waste. Indicate on the label "aqueous rinsate" or "waste solvents" and the specific solvents. A detailed procedure for bottle rinsing can be found in Appendix B. Containers that held acutely hazardous waste should be disposed without rinsing. Acutely hazardous wastes include some F-listed wastes and all P-listed wastes. See www.ipcb.state.il.us/title35/35conten.htm (Part 721.133) for the lists of the specific chemicals. Some examples include acrolein, allyl alcohol, benzyl chloride, osmium tetroxide, potassium cyanide, sodium azide, and vanadium pentoxide.

Fluorescent Lamp Disposal

Fluorescent lamps cannot be disposed of as regular trash. Most fluorescent lamps contain mercury. For disposal of these lamps, please call Clarence Bridges at Facilities Management at phone: 3-5946 or e-mail: cbridges@uic.edu to arrange for pick up and disposal. He can arrange for the changing of fluorescent bulbs and their collection. Fluorescent light bulbs are recycled!

Contractor Waste

All University contractors are responsible for labeling, storing, and disposing of waste in accordance with all environmental regulations and University policies. For example a contractor that removes lead based paint and fluorescent light bulbs must manage these waste appropriately. If questionable waste management and disposal activities are observed, contact the EHSO Health and Safety Section at 3-9706.

CHAPTER 7 – SPILL PREVENTION AND PREPAREDNESS

This chapter provides an overview on the steps to take to prevent spills and to how to respond to spills.

Preventing Chemical Spills

Good work practices

- Before beginning work, remove unnecessary equipment and clutter around current experiment.
- Eliminate tripping hazards and other obstructions.
- Assemble all needed equipment before starting.
- Work at least 6" from edge of bench to prevent a chemical container from being knocked off the bench.

Storage precautions

- Use sturdy shelves.
- Utilize flammable and corrosive cabinets. Keep doors closed.
- Limit quantities of flammable liquids in storage.
- Larger containers should be stored closer to the floor.
- Containers on shelves should be stored back from the edge to reduce the danger of falling.
- Storage shelves should have lips to further reduce the danger of falling.
- *Chemicals should be stored by compatibility class, not alphabetically.*
- Inspect the storage area monthly for leaking or defective containers.
- Use only approved storage containers.

Containment

- When utilizing mercury measuring devices, place a pan underneath to contain mercury in case of breakage.
- When working with solvents, perform work in an approved operational fume hood with at least a ½" sill to contain a spill.
- When transferring chemicals do not overfill and use pumps or other mechanical devices in place of simple pouring.
- Maintain sash height at level indicated on fume hood inspection label.

Transporting chemicals

- Use carts where feasible.
- Use secondary containment, i.e., bottle carrier, bucket, dish pan, original shipping container, when transporting chemicals, even between rooms.
- Consider using plastic coated "shatter resistant" bottles when chemically compatible.

Refrigerated chemicals

- Store flamm able and reactiv e chem icals only in an explosio n-proof refrigerator.
- Provide secondary containm ent for flas ks and other unsealed containers of liquids.

Responding to Chemical Spills

Immediate Response Procedures

- Vacate the affected area.
- Isolate area by taping it off.
- Define and classify the spill.
- Summon help.
- Do not attempt victim rescue unless spill evaluation indicates it is safe to do so.

Defining and Classifying a Spill

There are two basic types of chemical spills:

Simple spills which one person can clean up usi ng a spill k it with gu idance from the EHSO Health and Safety Section,
Complicated spills which require outside assistance or equipment.

If your spill meets ANY of the following conditions of a complicated spill, call 312-996-HELP(4357) immediately. Inform the campus police that there is a chemical emergency, the nam e of the chem ical(s) invo lved, and th at the Chicago Hazm at team must be dispatched imm ediately. The campus police will con tact the app ropriate r esponse personnel.

A spill is complicated if:

- A person is injured; or
- Identity of the chemical is unknown; or
- Multiple chemicals are involved; or
- The chemical is highly toxic, flammable, or reactive; or
- The quantity is sufficient that potential to contam inate the air with hazardous vapors exists; or
- The spill occurs in a “public space” such as a corridor; or
- The spill has the potential to spread to other parts of the building such as through the ventilation system; or
- The clean up procedures are not known, appropriate m aterials or n ecessary personal protective equipm ent (e.g. chem ical protective clothing and supplied air respiratory protection) are not readily available; or

- The spill may endanger the environment such as reaching waterways or outside ground.

If none of the above conditions are met, the spill is defined as simple. You must clean up simple spills as described in the Chemical Hygiene Plan, Chapter 4.

Spill and Release Reporting

Call the EHSO Health and Safety Section at 6-7233 to report chemical spills and for follow-up. If the spill or release also involves a radioactive material, then the EHSO Radiation Safety Section should be notified immediately at 6-7429 during business hours or 6-8440 after business hours. Never attempt to hide or deny a chemical spill. Certain chemical spills in reportable quantities must be reported to regulatory agencies within 24 hours to avoid massive fines and possible criminal charges.

Spill Kits

Each area in which the hazardous material or waste is stored shall have spill response kits for all categories of chemicals. Kits must be equipped with absorbent materials that are capable of at least stopping the spread of spilled chemicals to drains or other areas. Examples of absorbent materials are pads, appropriate absorbent and sorbent pillows. Most areas that have less than 100 ml of chemicals could use lab towels or paper towels when compatible with the spilled material. Do not use paper towels to clean up flammable solvents or strong acids. Other areas, such as chemical storerooms and maintenance shops, will require more extensive supplies of sorbent materials. Protective equipment, such as gloves and eye protection, must be worn for spill cleanup as well as normal chemical usage. See Chapter 9.7 of Chemical Hygiene Plan and the MSDS for the chemical involved for more information.

Management of Supplies from Spill Cleanup

> Contaminated supplies that are generated as a result of spill cleanup are considered to be hazardous waste if the original chemical(s) when disposed of would have been a hazardous waste. Place them into compatible sealed containers and manage as any other hazardous waste, i.e., proper labeling and a chemical removal form. The EHSO Health and Safety Section (3-2436) can provide appropriate containers. Label ALL waste containers, and EVERY package, noting ALL chemical constituents.

Separate solid waste (debris, gloves, rags, plastic, paper, glass, oil-dry, chemical protection suits, etc.) from liquid waste. Solid waste may only contain chemical residue; do not place a bottle holding liquid chemical into a solid waste container. Double bag solid waste if it is heavy. When the plastic bag inside a container is full, tie it up and fasten the lid on the container.

Liquid waste should be transferred into a rep lacement container or the entire bottle overpacked into a new container. Sa turated rags and paper towels should be packaged separately to account for free liquid.

Disclaimer: The information provided here only refers to incidental spill response. This does not constitute approved OSHA Hazardous Waste Workers and Emergency Response Training under 29 CFR 1910.120.

CHAPTER 8 – DEFINITIONS, REFERENCES, CONTACTS

Acutely hazardous waste - wastes that are listed by the EPA including some F-listed wastes and all P-listed wastes. See www.ipcb.state.il.us/title35/35conten.htm (Part 721.133) for the lists of the specific chemicals. Some examples include acrolein, allyl alcohol, benzyl chloride, osmium tetroxide, potassium cyanide, sodium azide, and vanadium pentoxide.

Carcinogen – Any substance that causes the development of cancerous growths in living tissues, e.g. asbestos, nickel carbonyl, dimethyl sulfate.

Chemical Hygiene Plan – A written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment and work practices that are capable of protecting employees from the health hazardous presented by hazardous chemicals used in that particular workplace and meets the requirements of 29 CFR 1910.1450 - Occupational Exposure to Hazardous Chemicals in Laboratories.

CFR – Code of Federal Regulations is a codification of the general and permanent rules published in the Federal Register by the Federal Government. It is divided into 50 titles which represent broad areas subject to Federal regulation. Each title is divided into chapters which usually bear the name of the issue agency. Relevant titles are 40 CFR, Protection of Environment which gives authority to the EPA, 29 CFR, Labor, giving authority to OSHA and 49 CFR, Transportation, for laws related to transporting hazardous waste.

Container - A waste receptacle that is capable of being securely sealed, and transported. The container must be compatible with the waste stored in it.

EPA - Environmental Protection Agency.

Generator - A person, department, or institution that creates hazardous waste.

Halogenated solvents – Incorporation of one of the halogen elements, usually chlorine or bromine, into a chemical solvent, e.g. chlorobenzene, ethylene dibromide.

Hazardous Material - A material capable of causing harm to humans or the environment.

Hazardous Waste - A waste material that meets one or more of the characteristics identified in state and federal regulations and this manual.

Hazardous Waste Label - Required wording on each container of hazardous waste, stating the words “Hazardous Waste” and the name of all chemicals contained within.

Lab Packs – Containers, often 5, 30 or 55-gallon drums, in which small containers of compatible waste are packed with an absorbent material.

Lecture Bottle – a compressed gas cylinder that is typically 12 inches long and 2 inches in diameter.

Mixed Waste – A waste that is either listed as or characterized as a RCRA hazardous waste and is radioactive, e.g. uranyl nitrate, solvent-based scintillation cocktail.

MSDS – Material Safety Data Sheet - informational tool developed by chemical manufacturers containing the following information for a hazardous chemical: substance identification and synonyms, hazardous components (if mixture), physical data, fire and explosion data, toxicity data, health effects and first aid, reactivity, storage and disposal procedures, spill and leak procedures, and recommended protective equipment.

Mutagen – A chemical compound able to induce mutations in DNA and in living cells.

OSHA – Occupational Safety and Health Administration – part of the Department of Labor that regulates worker safety and health.

PIMW - Potentially Infectious Medical Waste is any waste containing sufficient virulence and quantity so that exposure to the waste by a susceptible host could result in an infectious disease.

RCRA - Resource Conservation and Recovery Act, federal act that regulates hazardous wastes from cradle to grave (generation to final disposition).

Satellite Accumulation Area – An area at or near the process that generates the waste and is under the control of the operator of that process. Regulations allow generators to store up to 55 gallons of hazardous waste or 1 quart of a particular acutely hazardous waste in a satellite accumulation area. The containers must be closed, labeled, compatible to contents, and in good condition.

TCLP – Toxic Characteristic Leaching Procedure is an EPA test method for evaluating solid waste. The extract from a representative sample is analyzed to determine if it contains any of certain contaminants at concentrations equal to or greater than the value given in the regulations.

Teratogen – An agent that causes growth abnormalities in embryos, genetic modifications in cells, etc.

Waste Minimization – Any pollution prevention measure that reduces hazardous waste, including environmentally sound recycling. The material must be used, reused or reclaimed according to the definitions of RCRA.

References

Bretherick's Handbook of Reactive Chemical Hazards: An Indexed Guide to Published Data, L. Bretherick, P.G. Urben (Editor), Martin J. Pitt, 5th edition, Butterworth-Heinemann; 1995.

Destruction of Hazardous Chemicals in the Laboratory, George Lunn and Eric B. Sansone, John Wiley and Sons, Inc., New York, 1990.

Hawley's Condensed Chemical Dictionary, Richard J. Lewis, 13th Edition, John Wiley and Sons, Inc., New York, 1997.

Hazardous Laboratory Chemicals Disposal Guide, Margaret-Ann Armour, Lewis Publishers, Inc. 1996.

"Less is Better" http://tungsten.acs.org:80/government/publications/tech_lessisbetter.html

Prudent Practices in the Laboratory: Handling and Disposal of Chemicals, National Research Council, National Academy Press, Washington, D.C. 1995.

Sources for MSDSs - can be obtained from the chemical suppliers and many internet sites, such as http://www.siri.org.

Contacts

Emergency: Health & Safety Section 6-SAFE (7233) Radiation Safety Section 6-7429 (during business hours) 6-8440 (after business hours)

Waste Management:

Description	Contact	Phone	e-mail
Chemical waste pickups/ Chemical redistribution	Pickup requests Jamar Simmons	Fax 3-3703 3-7260	chemwaste@uic.edu jamar@uic.edu
Chemical waste questions/ Waste minimization/ Chemical safety/Training	Cindy Klein-Banai	3-9706	cindy@uic.edu
Chemicalsafety/Chemical Hygiene plan/ Training	Ausrine Karaitis	3-3702	Ausrine@uic.edu
Biohazardous waste/Blood-borne pathogen training	Paul Umbeck	3-8732	umbeck@uic.edu
Radioactive and mixed radioactive/ chemical waste	Allan Jackimek	6-1182	allan@uic.edu
UICycle Program		6-2517	www.uic.edu/depts/ppad/uicycle

EHSO Administration:

Title	Name	Phone	e-mail
Director, EHSO	Marilyn Hau	6-6873	mhau@uic.edu
Associate Director, HSS	Rich Anderson	3-2140	Safe@uic.edu
Assistant Director, Chemical Safety	Cindy Klein-Banai	3-9706	cindy@uic.edu

Further information can be found at the EHSO web site: http://www.uic.edu/depts/envh/.

Appendix A

Screening Procedure by Laboratories for Unlabeled Chemicals

Introduction

Unlabeled chemicals present potential hazards and are expensive to dispose. The following are classified as “Unlabeled Chemicals”: bottles without a label, containers labeled with only codes or chemical formulas, generic process labels that do not specifically list chemicals contained, and obviously mislabeled chemicals. Note: Trade names are not considered unlabeled chemicals, but an MSDS should be obtained from the company. Since unlabeled chemicals cannot be accepted for disposal, the following steps should be taken to eliminate them from your storage:

A. Attempt to locate the person responsible for creating the unlabeled container, to provide some clues to its contents. (Departments should not allow students/staff to vacate a laboratory without first identifying all containers.)

B. Information about the type of research done is usually helpful. Contact former coworkers; ask what chemicals were commonly used in the laboratory, what was created in research, etc. (Step C should still be performed at this point, instead of making an “intelligent guess.”)

C. If the bottle(s) are not identified by their creator in step A, the following simple four-step procedure will enable the removal of practically any container from a laboratory.

Important Exceptions

- Peroxidizable compounds such as ethers, dioxanes, tetrahydrofuran, etc., tend to absorb and react with oxygen to form potentially explosive compounds with time. Exposure to air and light accelerates these formations. Therefore, if the unlabeled LIQUID has partially or fully evaporated and crystals are present (or the liquid has become unclear), label the container as “POSSIBLE PEROXIDE”. DO NOT follow the screening procedure for this bottle. Request assistance by calling the Chemical Safety Specialist at 3-3702 or the Assistant Director for Chemical Safety at 3-9706.

- On occasion, unlabeled chemicals contain radioactive materials. If there is access to a Geiger counter, check the container to determine if the material is radioactive. If radioactivity is found, DO NOT follow the screening procedures for this bottle. Request assistance from the Radiation Safety Section by calling 6-7429.

- On occasion, unlabeled chemicals contain biological materials. If there is any reason to suspect a biohazard, DO NOT follow the screening procedures for this bottle. Request assistance from Health and Safety Section at 6-7411.

Safety Considerations

Use the appropriate chemical resistant gloves, goggles, a face shield and/or a poly work shield. In addition to personal protective equipment, all screening work should be performed in an operative chemical fume hood. Since the procedure tests items for flammability, have a functioning fire extinguisher available in case of unexpectedly violent reactions. Locate the nearest fire alarm pull station, in case of an emergency. Only qualified, trained individuals in your department should perform screening procedures.

Screening procedures for unlabeled containers

Each unlabeled material should be screened for the following: air reactivity, water reactivity, flammability, and corrosivity. Because of the small quantities involved for each unlabeled container, a rigorous sampling method is not required. One container (aluminum dish, watch glass) can sometimes be used for all four steps of the procedure. Residues from this procedure can be disposed down the sanitary sewer. When labeling containers, do not cover the original label or any markings with the new label.

1. Air reactivity

Pour a small amount (a few drops or crystals) of the material into your container in the hood. If the material is air reactive, a reaction will be apparent within 30 seconds and should be labeled “Air Reactive-positive”. If not air reactive, label “Air reactive-negative”, and proceed to step two.

2. Water reactivity

Pour a small amount (a few drops or crystals) of the material into your container in the hood. Using a wash bottle filled with distilled water, add a few drops of water to the compound. If the material is water reactive, a reaction will be apparent within a few seconds. If reactive, label the container “Water Reactive-positive”; if not, label the container “Water Reactive-negative” and proceed to step three. Note: Steps 3 and 4 should both be performed if classification is not determined in steps 1 or 2.

3. Corrosivity

Obtain the pH of the sample using pH paper or a pH meter. Record the pH to the nearest whole number on the container label.

4. Flammability (Perform only on liquids)

Pour a few drops of the material into your container in the hood. Hold the dish over a Bunsen burner for a few seconds. If the material has not started burning, hold the flame from the burner in direct contact with the material. If the material has not started burning after 10 seconds of direct contact with the flame, it is considered to be not flammable. Label the container “Flammable-negative”.

5. Labeling containers

a. The label should indicate results of all four tests, positive or negative, and a number.
b. Indicate any other information about the contents of the container.

Pickup of Screened Containers

After containers have been screened and labeled request that pick up using the Chemical Removal Form as described in Chapter 4. Please use the name “Characterized Unknown” in the chemical column and list the results of each test as indicated on the label. Contact the chemical waste facility staff at 3-2436 with questions or for additional assistance.

CHEMICAL REMOVAL FORM

EHSO, HEALTH AND SAFETY SECTION, M/C 646, FAX 3-3703

GENERATOR SECTION (FILL OUT COMPLETELY ---PLEASE PRINT)					**SAFETY OFFICE USE ONLY**	
NAME: _____ BUILDING #:_____ ROOM #:_____ PHONE #:_____ MAIL CODE:_____	**LOCATION OF MATERIALS FOR PICKUP** BUILDING # : _____ ROOM # :_____				PICK-UP # COLLECTED BY: _____ COLLECTION DATE_________	
MATERIAL (LIST ALL CHEMICAL CONSTITUENTS)	NUMBER OF BOTTLES	BOTTLE SIZE	STATE (circle one)	CAS #	**CODE**	**ID #**
			L S G			
			L S G			
			L S G			
			L S G			
			L S G			
			L S G			
			L S G			
			L S G			
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ALL CHEMICALS MUST BE IN A **SEALED** CONTAINER WITH THE CONTENTS IDENTIFIED ON THE LABEL. **ANY QUESTIONS??? CALL 3-CHEM (2436)**

Appendix C

Empty Container Triple Rinsing Procedure

This procedure should NOT be implemented if the residual materials are water reactive.

Residual Liquids:

1. Fill the bottle ¼ full with water and replace the lid.
2. Gently shake the bottle.
3. Remove the lid and pour the rinsate into another container reserved for rinsate or a waste jar of the same liquid. This container should be labeled **"AQUEOUS RINSATE"**.
4. Repeat Steps 1-3 two more times so that the container is rinsed three times.
5. Deface the original container label and dispose of in trash.

Residual Water Insoluble Liquids:

1. If the liquid is not miscible in water, another solvent can be used first (acetone is an acceptable choice for a non-polar solvent).
2. Rinse the container once using the other solvent, using Steps 1-3 from the previous section.
3. Use water to rinse the container three more times after the water insoluble solute has been diluted.
4. Deface the original container label and dispose of in trash.

Residual Solids:

1. Put the solid material in solution by adding water.
2. If the material is not water soluble, another solvent may be used in order to put the solid in solution. Make sure that this solvent is water miscible so that the residual liquid waste can be washed out with water.
3. Empty the solution into an "**Aqueous Rinsate**" container.
4. Follow Steps 1-5 from the "Residual Liquids" section.

Residual Oils:

1. A soap solution should be used to clean oil residue.
2. Warm water is preferred as heat increases the effectiveness of soap.
3. Soap can be used for the first rinse and water for the next two.
4. Follow Steps 1-5 from the "Residual Liquids" section.