

University of Rochester

Management of Hazardous Materials and Wastes

Purpose: The purpose of this manual is to provide general procedures and background about the more common Hazardous Materials and Waste disposal issues faced by the University of Rochester.

Rationale: The government, through the Environmental Protection Agency (EPA), US Department of Transportation (USDOT), as well as the New York State Department of Environmental Conservation (NYSDEC) and local agencies has enacted regulations to protect life, property and the environment from the effects of improper Hazardous Waste management and disposal. The University of Rochester will conform to all applicable regulations with regard to the safe use, handling, transportation and disposal of Hazardous Materials and Wastes.

References:

1. Code of Federal Regulations (CFR), Title 40, Parts 260 to 280. Protection of The Environment. This is available online http://www.ecfr.gov/cgi-bin/text-idx?SID=4c2569c0624b33d8a220c839ba7d5657&mc=true&tpl=/ecfrbrowse/Title40/40tab_02.tpl
2. Code of Federal Regulations (CFR), Title 49, Subchapter C, Sections 171 to 180. Department of Transportation Hazardous Materials Regulations. This is available online at http://www.ecfr.gov/cgi-bin/text-idx?SID=e5050c11e595b4eb331d1c8a67625bea&mc=true&tpl=/ecfrbrowse/Title49/49tab_02.tpl
3. New York State Department of Environmental Conservation Rules and Regulations, Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, 6 NYCRR, Chapter IV, Parts 370 to 374. This is available online at <http://www.dec.ny.gov/regs/2491.html>.
4. *Destruction of Hazardous Chemicals in the Laboratory*, George Lunn, Eric B. Sansone, 1990 by John Wiley & Sons Inc.
5. *Prudent Practices in the Laboratory, Handling and Disposal of Chemicals*, National Research Council, 1995 by National Academy Press.
6. *Complete Guide to Household Chemicals*, Robert J. Palma, Sr. with Mark Espenscheid, 1995 by Prometheus Books.
7. University of Rochester Radiation Safety Unit website.
<http://www.safety.rochester.edu/homepages/radsafetyhome.html>
8. University of Rochester Environmental Health and Safety website.
<http://www.safety.rochester.edu/>

Section I: Definitions.

All University employees should be familiar with the proper disposal procedures for wastes generated in their areas, whether it be an office, patient care area, laboratory, or facilities area. These wastes can generally be broken down into solid waste (trash), Regulated Medical Waste, Radiological Waste, Hazardous Waste and Universal Waste. This document will be mainly concerned with Hazardous Materials and Hazardous Wastes.

A. What Is Hazardous Waste?

A Hazardous Waste is a particular class of waste (which can be either solid, liquid, or gas) that can, if improperly managed, pose a substantial threat or potential hazard to human health or the environment. These wastes are listed by their specific chemical name (Listed Wastes), or they can be determined to be Hazardous wastes based on physical characteristics such as ignitability, corrosivity, reactivity, or toxicity (Characteristic Wastes).

1. Listed Wastes. A current listing of all listed Hazardous Wastes can be found in 40 CFR 261 Subpart D. These include acutely toxic wastes (P-listed), toxic wastes (U-listed), wastes from non-specific sources (F-listed), and wastes from specific sources (K-listed) (available online at <http://www.ecfr.gov/cgi-bin/text-idx?SID=36bcb731e49bc8856e690a5f32246496&mc=true&node=pt40.26.261&rgn=div5#sp40.26.261.d>)

2. Characteristic Wastes. Reference 40 CFR 261 Subpart C. <http://www.ecfr.gov/cgi-bin/text-idx?SID=2990cd5db73067fc28c0785ec997a415&mc=true&node=pt40.26.261&rgn=div5#sp40.26.261.c>. Even if your waste does not appear on one of the hazardous waste lists, it still might be regulated as hazardous waste if it exhibits one or more of the following characteristics (D-listed):

a. Ignitability: Ignitable wastes create fires under certain conditions or are spontaneously combustible, and have a flash point less than 60 degrees C (140 degrees F) or are oxidizers. Two examples are rubbing alcohol and mineral spirits. The waste code for these materials is D001.

b. Corrosivity: Corrosive wastes are acids or bases that are capable of corroding metal containers, such as storage tanks, drums, and barrels. Examples would be compounds containing an acid (with a pH of 2 or less), or a base (with pH of 12.5 or greater). The waste code for these materials is D002.

c. Reactivity: A waste exhibits the characteristic of reactivity if:

- (1) It is unstable under "normal" conditions and readily undergoes violent change without detonating.
- (2) It reacts violently with water.
- (3) It forms potentially explosive mixtures with water.
- (4) When mixed with water, it generates toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment.
- (5) It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment.

- (6) It is capable of detonation or explosive reaction if it subjected to a strong initiating source, or if heated under confinement.
- (7) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.
- (8) It is a forbidden explosive as defined in 49 CFR 173.51, or a Class A explosive as defined in 49 CFR 173.53, or a class B explosive as defined in 49 CFR 173.88.

The waste code for these materials is D003.

d. Toxicity: Toxic wastes are harmful or fatal when ingested or absorbed. When toxic wastes are disposed of on land, contaminated liquid may drain (leach) from the waste and pollute ground water. Toxicity is defined through a laboratory procedure called the Toxicity Characteristic Leaching Procedure (TCLP). Toxic healthcare wastes include chloroform, lindane, m-cresol, mercury and mercury compounds (thimerosal), and certain metals (such as arsenic and barium). The waste codes for these materials range from D004 to D043.

B. What is Universal Waste?

There are four types of Universal Waste: hazardous waste batteries, hazardous waste pesticides that are recalled or sent to a collection program, metallic mercury-containing items, spent fluorescent lamps and other hazardous lamps (e.g. metal halide, mercury vapor, high intensity discharge). The EPA created the Universal Waste Rule (40 CFR, Part 273) in May 1995 to encourage and streamline recycling. This allows us to more easily recycle batteries, thermostats, and fluorescent lamps. This is available online at: <http://www.ecfr.gov/cgi-bin/text-idx?SID=2990cd5db73067fc28c0785ec997a415&mc=true&node=pt40.27.273&rgn=div5>.

C. Regulated Medical Waste.

The definition of Regulated Medical Waste can be found in the New York State Department of Environmental Conservation (NYSDEC) regulations 6 NYCRR, subpart 360-17, section 360-17.2(h). A partial excerpt of this section is as follows: This regulation is available online at: <http://www.dec.ny.gov/regs/2491.html>. Other New York State regulations concerning Regulated Medical Waste are 10 NYCRR Part 70, 6 NYCRR part 364.9, and 6 NYCRR part 360-17.

(h) *Regulated medical waste.*

(1) A regulated medical waste is any medical waste that is a solid waste, as defined in subdivision 360-1.2(a) of this Part, generated in the diagnosis, treatment (e.g., provision of medical services), or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals, that is not excluded or exempted under subparagraph 360-17.2(h)(2) of this paragraph, and that is listed below:

(i) cultures and stocks of infectious agents and associated biologicals, including: cultures from medical and pathological laboratories; cultures and stocks of infectious agents from research and industrial laboratories; wastes from the production of biologicals; discarded live and attenuated vaccines; and culture dishes and devices used to transfer, inoculate, and mix cultures;

(ii) human pathological wastes, including tissues, organs, body parts and body fluids that are removed during surgery or autopsy, or other medical procedures, and specimens of body fluids and their containers;

(iii) liquid waste human blood, products of human blood, items saturated and/or dripping with human blood, or items that were saturated and/or dripping with human blood that are now caked with dried human blood, including serum, plasma, and other blood components, and their containers, which were used or intended for use in either patient care, testing and laboratory analysis or the development of pharmaceuticals. Intravenous bags are also included in this category;

(iv) sharps that have been used in animal or human patient care or treatment or in medical, research, or industrial laboratories, including hypodermic needles, syringes (with or without the attached needle), Pasteur pipettes, scalpel blades, blood vials, needles with attached tubing, culture dishes (regardless of presence of infectious agents). Also included are other types of broken or unbroken glassware that were in contact with infectious agents, such as used slides and cover slips;

(v) contaminated animal carcasses, body parts, and bedding of animals that were known to have been exposed to infectious agents during research (including research in veterinary hospitals), production of biologicals, or testing of pharmaceuticals;

(vi) wastes from surgery or autopsy that were in contact with infectious agents, including soiled dressings, sponges, drapes, lavage tubes, drainage sets, underpads, and surgical gloves;

(vii) laboratory wastes from medical, pathological, pharmaceutical, or other research, commercial, or industrial laboratories that were in contact with infectious agents, including slides and cover slips, disposable gloves, laboratory coats, and aprons;

(viii) dialysis wastes that were in contact with the blood of patients undergoing hemodialysis or renal dialysis, including contaminated disposable equipment and supplies such as tubing, filters, disposable sheets, towels, gloves, aprons, and laboratory coats;

(ix) biological waste and discarded materials contaminated with blood, excretion, exudates, or secretion from humans who are isolated to protect others from certain highly communicable diseases, or isolated animals known to be infected with highly communicable diseases; and

(x) the following unused, discarded sharps: hypodermic needles, suture needles, syringes, and scalpel blades.

D. Radiological Waste. Contact Radiation Safety at 275-3781.

Additional information concerning the disposal of laboratory wastes can be found in Appendix 4 of the University of Rochester Chemical Hygiene Program. This can be found online at: <https://www.safety.rochester.edu/labsafety/chp/chpindex.html>.

Section II: Generation and Storage of Waste.

The Hazardous Waste generated at the University of Rochester can generally be broken down into two categories – 1) unused/unwanted items that are in their original container/packaging, and 2) waste that is not in its original container/packaging. Waste that comes from areas other than the laboratories is usually in its original packaging. If this original packaging is still in good condition - intact, not leaking etc., most of the time all that is necessary is for the person who wants to dispose of the item is to access the online Chematix Chemical Management System, create a waste card for the item, and to create and submit a pickup worksheet.

Questions regarding the use of the Chematix system to dispose of Hazardous Waste items can be directed to the EH&S/Environmental Compliance Department's Hazardous Waste Management Unit at 275-2056. There are information and instructional videos at the Environmental Health and Safety website at: http://www.safety.rochester.edu/labsafety/chematix/waste_module.html.

If the container is not in a suitable condition to be picked up and transported by the HWMU technician, it is the responsibility of the person requesting the disposal to repackage the material so that it can be safely handled and transported. HWMU personnel will advise and assist as required. Many times we have been called to handle and dispose of a container that has been “found” somewhere. These containers usually have been sitting around, ignored and unwanted long enough for the labels to deteriorate to the point where they are hard to read, are illegible, or are even missing. This makes it difficult to determine what the contents are, and this can make them dangerous to handle, and expensive to dispose of. If you have something that is no longer used or wanted, don't let it sit in a closet or in a corner until it becomes a problem.

When it becomes necessary for a waste material to be placed in a container other than its original container, or if a waste material is placed back in its original container after being used, the following regulatory requirements must be followed:

- A. The container must be in good condition and not in danger of leaking. 6 NYCRR 373-3.9(b).
- B. The container must be made of a material that is compatible with the material that is to be stored in it. Acids and bases must not be stored in metal containers. 6 NYCRR 373-3.9(c).
- C. The container must be closed at all times with a proper fitting cap, except when waste is being added to the container. 6 NYCRR 373-3.9(d)(1), or 40 CFR 265.173(a).
- D. The container holding the hazardous waste must not be opened, handled or stored in a manner which may rupture the container or cause them to leak. 6 NYCRR 373-3.9(d)(2), or 40 CFR 165.173(b).
- E. The container must be marked with the words “**Hazardous Waste**” and other words that describe the contents. These items must be securely affixed to the container. Hazardous waste waste cards alone are not sufficient to meet this requirement. 6 NYCRR 373-3.9(d)(3). If the

waste is to be placed in a container that previously contained another material, all old labels must be removed or completely defaced so that there will not be any confusion as to whether the contents of the container is the original material or the waste material. See Figures 1 and 2.

F. Waste containers must be kept in a designated accumulation area. These areas must be clearly marked with the words “**Hazardous Waste Satellite Accumulation Area**”.

G. Containers must not be overfilled. Overfilled containers are hard to pour, inclined to burst, likely to leak, and can endanger persons handling the container.

H. Containers holding liquids must have secondary containment. Containers holding wastes that are incompatible (solvents & acids) must be in separate secondary containments. 6 NYCRR 373-3.2(h)(2).

I. Inspections. At least weekly, the generator of the waste, and/or the person responsible for the Hazardous Waste Accumulation Area where the waste is accumulated/stored must inspect the Hazardous Waste Accumulation Area and the containers within it. Items to be checked for will be proper secondary containment, segregation of incompatible wastes, leaking containers, and for deterioration of containers and the containment system caused by corrosion or other factors. The containers must be compatible with the waste being put in them, and they must be properly labeled.



Figure 1 - Properly Labeled Waste Containers in Secondary Containment

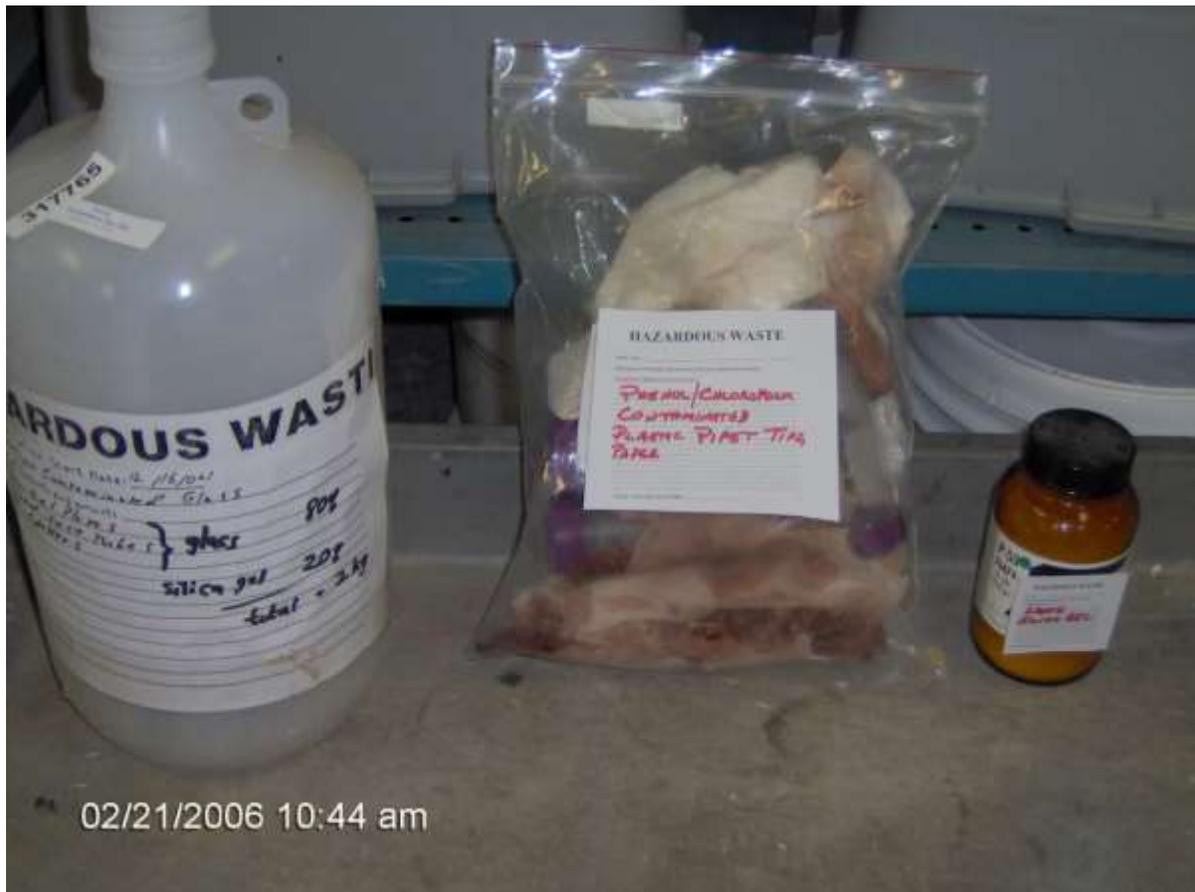


Figure 2 - Properly Labeled Waste Containers

As stated above, waste containers must be in good condition, non-leaking, and compatible with the waste being stored. Each container must be labeled specifically with the words “Hazardous Waste” and an accurate identification of the waste being put in it.

Do not use abbreviations or chemical symbols because in an emergency situation, it may be necessary for a person (fire or security officer) who does not have a working knowledge of chemicals to be able to read what the contents of a waste container are.

Each waste container must always be closed except when it is necessary to add or remove waste. The containers must be stored in an area that is specifically labeled as a “**Hazardous Waste Satellite Accumulation Area**”. This area does not have to be in a fume hood. It can be an area on top of or under a lab bench, or in a cabinet as long as it is properly labeled and has adequate secondary containment for the containers.

Whenever possible, keep different Hazardous Wastes in separate containers so that disposal options remain clear and more cost effective. Some examples are:

- A. Halogenated Solvents (carbon tetrachloride, chloroform, methylene chloride)
- B. Non-Halogenated solvents (xylene, toluene, alcohols, hexanes)
- C. Nonflammable liquid solutions (ethidium bromide, formaldehyde, diaminobenzidine)
- D. Acids. Do not use metal containers. Keep organic acids (acetic, formic) separate from inorganic acids (hydrochloric, nitric, phosphoric, sulfuric). Hydrofluoric acid wastes must not be stored in glass containers. **Bottles containing sulfuric acid/nochromix , sulfuric acid/peroxide mixtures, or acid/metal/organic compound wastes should be labeled properly, but the caps should NOT be put on tightly because the gases produced by these mixtures could cause a tightly capped bottle to explode. Safety caps that are designed to vent excess pressure and still prevent the leakage of liquids can also be used.**
- E. Bases. Do not use metal containers. Bases can react with metals, especially aluminum and cause the container to explode.
- F. Heavy metals (cadmium, chromium, lead, silver) and solutions containing heavy metals.
- G. Chemically contaminated debris such as gloves, pipet tips, paper towels, and other items can be collected in plastic bags. Keep debris contaminated with EPA regulated chemicals such as formaldehyde, phenol and chloroform separate from debris contaminated with non-regulated chemicals such as ethidium bromide and diaminobenzidine. These bags must be labeled and treated just like any other waste container, and the bag must be of sufficient strength/thickness that they will not leak or will not be punctured by the items being put in it. **Red bags** (biohazard/regulated medical waste) must **not** be used for the collection of chemically contaminated items. They are for regulated medical waste only. Plastic buckets or containers used for the collection of agarose gels and other debris must follow the same requirements. See Figure 3.



Figure 3 - Properly Labeled Plastic Bag Containing Chemically Contaminated Debris

Plastic buckets or containers used for the collection of agarose gels and other debris must follow the same requirements. See Figure 4.



Figure 4 - Properly Labeled Plastic Bucket For Collecting Ethidium Bromide Contaminated Gels and Debris

H. Special wastes such as cyanides, sulfides, pesticides, oxidizers, and peroxides should be collected separately whenever possible

I. Used oil is collected and recycled. In order to do this, it must be kept uncontaminated by other chemicals and solvents. If it is contaminated with chemicals such as refrigerants, pesticides, PCB's and solvents, it must be labeled as such and disposed of as hazardous waste.

If you have any questions about how to best segregate, package, and store your wastes, call the Hazardous Waste Management Unit at 275-2056 for assistance.

Section III: Waste Disposal Procedures.

When a waste container is full, or you decide that it is necessary to have it disposed of, Use the online Chematix system to generate and print out a Hazardous Waste card , attach it to the container, and use the online Chematix system to generate and submit a Hazardous Waste pickup worksheet to the Hazardous Waste Management Unit to arrange a pickup.

A Hazardous Waste Card must be filled out by the waste generator and attached to each container. Each Hazardous Waste Card and container receives a unique number, These tags are **legal documents** subject to review by the EPA and/or DEC. **It is YOUR legal responsibility as the generator to properly identify the contents of each container.** Please fill them out accurately, and completely. A Hazardous Waste Card must be filled out for each container, even the container already has a label.

Section IV: Empty or Partially Full Bottles and Containers.

When a container has been emptied of all material that can be possibly be removed using the practices commonly employed to remove material from that type of container (pouring, pumping, aspirating) it can be disposed of. If the container held a non-hazardous material, the empty container can be thrown in the trash or recycled. If the container held a chemical or other hazardous material it should be triple-rinsed (rinsed out and emptied three times), the labels and hazard warnings should be removed or defaced, and then it can be thrown out or recycled. If the hazardous material container is not empty, or if the empty container held an EPA P-listed hazardous material (see section IA1 above), the law requires that the container be treated as hazardous waste. You can use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet for the container be picked up by the HWMU. Another option is to triple-rinse the container, save the rinsate solution in another waste bottle (which has to be disposed of through the HWMU), and throw out or recycle the original container. If you have any questions, call the Hazardous Waste Management Unit at 275-2056.

Section V: Drain Disposal of Unused or Waste Material.

It is against the law to dispose of hazardous materials and wastes by putting them down the drain. One exception is the rinsing out of **empty** containers as in Section IV above. Another exception is for certain alcohol and formaldehyde solutions. Certain small amounts, or low percentage solutions of alcohol and formaldehyde may be disposed of down the drain provided that **WRITTEN** permission is first obtained from the Monroe County Sewer District authorities. This permission must be requested through the Hazardous Waste Management Unit, and if granted, the letter must be kept on file in the laboratory for inspection purposes. This letter of permission is good only for the lab or researcher that has requested it, and only for the quantity and frequency that is specified in the letter. Just because one particular lab in a department has been granted permission, does not constitute approval for any other lab in that department.

Section VI: Disposal, Handling, and Storage Instructions for Materials.

1. **Aerosol Cans.** All aerosol cans, whether empty or not must be disposed of as Hazardous Waste. The HWMU has a device that can safely puncture and depressurize aerosol cans, and collect the material contained in the can. The empty cans are then recycled. In the Medical Center, Facilities has collection points at S-1402 in the sub-basement near the bed repair shop, G-4959 in the HVAC shop, G-4967 in the Paint Shop, and G-4964 in the Plumbing Shop. On River campus, the Auto Shop and the Paint Shop at 612 Wilson Blvd. have collection areas. A plan is being developed where the building service workers in each building will have a container where they can collect aerosol cans for disposal. All other people should collect their empty or unwanted aerosol cans, and use the Chematix system to generate a Hazardous Waste waste card, and to generate and submit a pickup worksheet to request a pickup. If you have more than one aerosol can, you can put them all together in a bag or box, and generate one waste card for the entire bag/box. Use the weight of all the cans in the bag/box as the amount.
2. **Anesthetic Materials.** For humans and animals. Chloroform, ether, fluoroethanes, haloethanes. Unused/unwanted materials must be disposed of as Hazardous Waste. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.
3. **Antifreeze Solutions - Ethylene Glycol/Propylene Glycol.** These solutions are not regulated wastes, but are toxic and should not be put down the drain. Use the Chematix system

to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.

4. **Art Materials.** Used flammable paint thinner, and the paper towels and rags used with it must be disposed of as Hazardous Waste. It is a fire safety code requirement that these rags must be stored in a closed metal container. Some paints contain heavy metal pigments such as chromium, lead, and cadmium. The empty tubes or containers for these paints must be disposed of as Hazardous Waste. Check the MSDS for the products. A good reference article on art materials can be found at the EPA website <http://www.northeastern.edu/ehs/wp-content/uploads/2014/12/EHSinthearts.pdf>

5. **Ballasts.** Fluorescent light ballasts are considered Hazardous Waste if they are determined to contain PCB's. Ballasts manufactured after 1979 that do not contain PCB's will be labeled with the words "No PCB's". If the ballast has "No PCB's" on the label, and is not one of the newer electronic ballasts, they can be thrown in the trash. If the ballast is not labeled with "No PCB's", it should be considered as containing PCB's, and disposed of as Hazardous Waste. The newer lightweight electronic ballasts should be disposed of as computer/electronic waste. In the Medical Center PCB ballasts can be put in the collection barrel at the facilities Engineering Stores, room G-4912. For River Campus facilities, they can be dropped off at the HWMU building. For other off-site locations, use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet to schedule a pickup. Leaking PCB ballasts should be separated from the non-leaking ballasts. They should be handled wearing gloves, double wrapped in plastic or some other impervious containment, labeled as being leaking PCB ballasts, and then placed in the "Leaking PCB Ballast" containers.

6. **Barium Compounds.** Used in medical imaging (CAT scan, MRI, X-ray). Unused/unconsumed barium solutions must not be put down the drain/toilet. There are three radiology units that have barrels for collecting the unused materials.

7. **Batteries.** The Hazardous Waste Management Unit will accept certain types of batteries for recycling - lead-acid, nickel-cadmium, nickel-metal hydride, lithium, silver (button batteries), and mercury. There are collection points in the Medical Center at the Main Lobby Information Desk, Engineering Stores at G-4912, Photo Illustration at G-7542, the Environmental Services offices at 1-3604 and G-6305, and the Parking Services office in the ramp garage. . The nursing staff should place batteries from the patient care units on their soiled utility carts. On River Campus there are collection containers at the Hutchinson Hall Chemistry Supply Room B-14, Wilson Commons Information Desk, the Todd Union Post Office, Engineering Stores at 612 Wilson Blvd., and the IT/Computer Store at Rush Rhees Library. Other collection areas are located in the Laboratory for Laser Energetics, the Eastman School of Music, and the Memorial Art Gallery. If you are unable to drop off your batteries at one of these areas, Use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet to request a pickup. Large lead-acid batteries such as are used in the floor cleaning machines and motorized pallet jacks are supposed to be taken away by the vendors who install new batteries. Alkaline batteries can be thrown into the trash. HWMU will not drive out to collect non-regulated alkaline batteries from off-site locations. The Hazardous Waste collection site run by Monroe County will not accept alkaline batteries for recycling.

8. **Betadine.** See Iodine solutions.

9. **Biocides.** See Germicides.

10. **Boiler Treatment Chemicals.** These are usually corrosive – either acidic or basic, and must be disposed of as Hazardous Waste. Use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet to request a pickup.

11. **Broken Bottles or Glassware.** If the glass is not contaminated with chemicals, such as an empty chemical bottle that has been triple-rinsed out, it can be placed in the proper receptacle and given to Environmental Services for disposal. If the glass is chemically contaminated and cannot be cleaned (such as a broken chemical bottle), place the material in a puncture proof

container, Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.

12. **Ceramic Glazes and Pigments.** These usually contain heavy metal pigments, and must be disposed of as Hazardous Waste. Be prepared to provide a MSDS. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.

13. **Chemically Contaminated Debris.** Chemically contaminated debris such as gloves, pipet tips, non-Pasteur pipets, paper towels, bench paper, lab soaker pads, and other items can be collected in plastic bags. Keep debris contaminated with EPA regulated chemicals such as formaldehyde, phenol and chloroform separate from debris contaminated with non-regulated chemicals such as ethidium bromide and diaminobenzidine. These bags must be labeled and treated just like any other waste container, and the bag must be of sufficient strength/thickness that it will not leak or will not be punctured by the items being put in it. **Red bags** (biohazard/regulated medical waste) must **not** be used for the collection of chemically contaminated items. They are for regulated medical waste only. See Figure 5.



Figure 5 - Properly Labeled Plastic Bag Containing Chemically Contaminated Debris

14. Plastic buckets or containers used for the collection of agarose gels and other debris must follow the same requirements. When full, use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup. Please use the waste description “Ethidium Bromide Contaminated Gels and Debris (Weight of Material), and indicate the amount of the material as being the weight of the material in the bucket. See Figure 6.

For Chemically Contaminated Debris, please use the waste description “Debris - Contaminated Glass, Paper and Plastic (by weight not %)(Each contaminant chemical must be listed separately by weight)”. Indicate the weight of the contaminated material, and list each contaminant separately by weight, not volume or percentage.

More detailed guidance for the disposal of Electrophoresis Buffer Solutions and Gels can be found at:

<http://www.safety.rochester.edu/envcompliance/pdf/ElectrophoresisBufferSolutionsandGelDisposalGuidelines.pdf>.



Figure 6 - Properly Labeled Plastic Bucket for Collecting Ethidium Bromide Contaminated Gels and Debris

15. **Chemically contaminated glass.** Whenever possible, unbroken contaminated glass items such as labware and empty chemical bottles should be washed and properly disposed of in glass disposal boxes. If it is not possible to properly clean and decontaminate these items, they must be disposed of as hazardous waste. Place them in a properly labeled plastic bag or bucket with a lid. Broken glass must be placed in a puncture-proof container such as a plastic bucket with a lid. When full, use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup. Please use the waste description “Debris - Contaminated Glass, Paper and Plastic (by weight not %)(Each contaminant chemical must be listed separately by weight)”. Indicate the weight of the contaminated material, and list each contaminant separately by weight, not volume or percentage.

16. **Chemically Contaminated Sharps.** These should not be confused with sharps that have been contaminated with blood or body fluids, which must be disposed of as regulated medical waste. **Syringes w/ needles, Pasteur pipettes, broken glass (except broken mercury thermometers), razor blades, scalpels, or any other object that may present a sharps hazard, and that have been contaminated with chemicals must be disposed of as Hazardous Waste.** These must be placed in properly labeled, puncture-proof containers. Black, green, or translucent plastic sharps shelters should be used. See Figure 7. Remove or deface any biohazard stickers, and place proper Hazardous Waste labeling on the container. When a container is full, use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup. Please use the waste description “Debris - Chemically contaminated Sharps (NON-BIOHAZARDOUS) (WEIGHT OF MATERIAL)”, and indicate the weight of the contaminated material, not volume or percentage.



Figure 7 - Properly Labeled Sharps Container for Collecting Chemically Contaminated Sharps

17. **Chemotherapy Wastes.** Certain chemotherapy drugs, such as arsenic trioxide, cyclophosphamide and mitomycin are EPA P and U-listed hazardous materials. It is therefore necessary to treat the empty containers as Hazardous Waste. The Cancer Center Pharmacy personnel will place the empty drug containers in the properly designated and labeled plastic buckets that have been provided to them. The full buckets will be removed by the HWMU technicians on a weekly basis. Empty IV bags and other items used in patient treatment can be yellow-bagged. For other non-listed drugs, empty containers and other items used in patient treatment can be yellow bagged. Containers containing pourable amounts of liquid, and overtly contaminated items should be collected and disposed of as Hazardous Waste.

18. **Computers/Cathode Ray Tubes/Electronic Equipment.** See <https://www.rochester.edu/it/security/data/disposal.html> for details. Ensure that all sensitive, personnel data has been destroyed in compliance with HIPAA regulations before disposal. Do not forget to fill out a U of R Property Disposal Form and send it to the Plant Accounting Office, 280 Goler House. Building service workers who transport trash within a building must separate computer components from the normal trash. Building managers and supervisors are responsible for ensuring that building service workers are not disposing of electronic wastes in the regular trash. Care must be taken not to damage the components, so that any possible salvage value can be obtained. This includes the cosmetics of the equipment.

19. **Concentrated Cleaning Products.** Detergents, floor cleaning products, disinfectants. These products are designed to be diluted before use. When the manufacturer's recommended instructions on usage are followed, the clean/unused or dirty/used material can be disposed of down the drain to the sewer. The unused/unwanted concentrated material must be disposed of through the HWMU. Use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet to request a pickup.

20. **Dental Office Related Materials.** Dental X-ray film contains lead foil that must be collected for recycling. Lead aprons used when taking the X-rays must also be collected.

Formo-Cresol solutions used in dental procedures must be disposed of as Hazardous Waste. Dental amalgam contains mercury and must be disposed of as Hazardous Waste. All amalgam scrap, to include excess amalgam from new restorations, amalgam residue from chairside traps and vacuum pump filters, and particles of amalgam from old restorations and extracted teeth, should be recovered, collected, and disposed of as Hazardous Waste. Amalgam scraps that have come into contact with body fluids are considered to be contaminated or “contact amalgam”. Excess, unused amalgam is considered to be non-contaminated or “non-contact scrap amalgam”. Separate waste containers should be maintained for each type. The containers should be air-tight and properly labeled. The contact amalgam containers should be half-filled with a 10% bleach solution. There should be no liquid in the non-contact amalgam container. Each container should be properly labeled with the words “Hazardous Waste” and with a description of the type of amalgam to be placed in it. When a container is full, use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup. Temporary filling materials – the 2-part, epoxy-type materials that harden when mixed together: Unwanted/leftover material should be mixed together according to manufacturer’s directions. After it has hardened, it is no longer a hazardous material and can be discarded of in the trash.

21. **Detergents.** Most commercial detergents like those used in food service areas or the vivarium are possibly corrosive – they are either acidic or alkaline depending on the purpose of the detergent. When the containers have been emptied they should be triple rinsed and properly disposed of. Partially full or unused/unwanted containers should be disposed of through the HWMU. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.

22. **Epoxy Paint.** Two part epoxy paints are paints consisting of “part A” and “part B” components. Both components typically contain a variety of chemical groups such as amines, amides, resins, cyanates, and phenols. Often these paints are flammable as well. These materials must be managed as RCRA regulated wastes. For the HWMU, epoxy paint components must be stored in the flammable storage area. These materials shall be disposed of in a profiled waste drum or lab-pack. Epoxy paint components can be reactive and should not be consolidated with other organic wastes. Use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet to request a pickup. Please use the waste description “Paint: Epoxy Part A and/or Part B”, and use the weight of the paint for the amount.

23. **Etching Materials.** Glass, metal and/or circuit board. These processes use chemicals that usually are corrosive (acid or basic), and the used chemicals contain trace amounts of the material being etched, and so must be disposed of as Hazardous Waste. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.

24. **Film.** X-ray film and unused black and white photographic paper contain silver and should not be thrown out as trash. In the Medical Center there is a collection point in the Imaging Sciences/Radiology department (G-4469) for used and unwanted film. If you are not located in the Medical Center, and unable to drop off films there, use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet to request a pickup. Please use the waste description “Used/unused X-Ray Film”, and use the weight of the film for the amount.

25. **Flammable Rags/Debris.** Fire safety code regulations require that rags that have been used with oil based paints and stains, flammable or toxic degreasers, or other flammable liquids must be stored in a metal container with a closed lid. These rags, along with materials used to clean up spills of flammable materials should be disposed of through the HWMU as flammable rags and debris. Please use the waste description “Debris - contaminated with oil based paints, stains and mineral spirits (WEIGHT OF MATERIAL)”, and use the weight of the debris/rags for the amount.

26. **Gas Cylinders.** Most of the large gas cylinders in use by the University of Rochester are returnable and refillable. Be sure that you follow the proper procedures to use them. Other types of cylinders are not returnable and must be handled by the HWMU for proper disposal. Lecture bottles, which usually contain material that is very dangerous, are very expensive to dispose of, and have to be sent to a licensed disposal company. Other types of non-returnable cylinders that must be properly disposed of are propane cylinders, MAPP gas cylinders, and calibration gas cylinders. Use the Chematix system to generate and print a Hazardous Waste waste card for each cylinder, and generate and submit a pickup worksheet to request a pickup. . Please use the weight of the cylinder and its' contents for the amount. See Figure 8.



Figure 8 - Gas Cylinders and Lecture Bottles

27. **Germicides.** Antibacterial cleaning products, biocides, germicides and other water treatment chemicals are designed to clean, disinfect, and kill unwanted organisms. Most of these are extremely toxic and should be handled with extreme care. Read the instructions and MSDS carefully before using. Unused/unwanted material should be disposed of through the HWMU. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.

28. **Hand Cleaners/Sanitizers.** Many hand cleaning and sanitizing products today are designed to kill germs and bacteria. They contain alcohol and/or antibacterial agents. Partial or unused containers should be disposed of through the HWMU. Use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet to request a pickup. Please use the waste description for "Hand Sanitizer", and use the weight of the material for the amount. If you have a number of aerosol cans of the hand sanitizer, you can group them together in a bag or box, and generate one waste card for that bag/box, with the weight of all the containers as the amount.

29. **Hydrofluoric Acid Solutions.** Hydrofluoric Acid (HF) is one of the strongest and most corrosive acids known. Therefore, special safety precautions are necessary when using this chemical. HF is used in a variety of applications here at the University including glass etching,

etching circuit boards, cleaning concrete and masonry, and as a laboratory reagent. Anyone using HF should implement the following safety measures. Most importantly, **do not assume that dilute solutions do not require special precautions.** Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and to generate and submit a pickup worksheet to request a pickup.

A. Read the Material Safety Data Sheet (MSDS) for the product that contains Hydrofluoric Acid. Be sure it is the MSDS for the specific formula that you are using. Call the manufacturer/supplier for additional information if necessary.

B. Be sure that you are using personal protective equipment that has been shown to effectively protect against Hydrofluoric Acid exposure. Always double check your personal protective equipment before each use of HF. A pinhole in a glove or a leaky container can cause an accident that you really want to avoid at all costs. HF is packaged in plastic containers because it will destroy glass or metal ones. However, even these plastic containers will degrade over time as the plasticizers leach out. Be very careful handling older containers, as the plastic can become brittle and crack or shatter.

C. Before using Hydrofluoric Acid, be sure that you have a clear idea of what you will do in the event of a skin exposure or eye exposure. Hydrofluoric Acid burns penetrate deeply into the skin and muscle tissue, and cannot be treated by simply flushing the area with water. **First aid and medical treatment for HF exposures are very specific and critical.** The special and destructive nature of the reaction of the fluoride ion with the calcium found in human bones and tissues requires immediate, often heroic measures to save digits, limbs, and even lives. In the event of an exposure, flush the area with large amounts of water, apply liberal amounts of a calcium containing product such as calcium gluconate, and **go IMMEDIATELY to the emergency room** and inform them that you have been exposed to Hydrofluoric Acid.

30. **Iodine Solutions.** Betadine. Unused product must be disposed of as Hazardous Waste. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.

31. **Latex Paint.** (syn: latex, vinyl, acrylic, crylic). Water-based paints or Latex paints typically do not meet the RCRA definition of Hazardous Waste. These paints will be consolidated into a non-hazardous paint drum to be shipped out for non-RCRA disposal. Cans that contain completely dried out or hardened latex paint can be thrown in the trash. Cans with liquid must be disposed of with the HWMU. While most latex paint is non-regulated, **some older latex paints may contain regulated metals including chromium, mercury, barium, lead or cadmium.** These paints must be picked up by the HWMU to be disposed of separately from the regular latex paint. Use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet to request a pickup. If you have a number of cans of paint, you can group all the cans together, and generate one waste card for the group, with the weight of the cans and their contents as the amount.

32. **Lead Aprons/Lead Metal/Lead X-ray Film Foil.** Any item containing lead must be disposed of as Hazardous Waste. Use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet to request a pickup. If you have a number of aprons/vests, you can generate one waste card for the entire group, with the weight of the aprons/vests as the amount. Please use the waste description "Lead X-Ray Apron".

33. **Lead Paint Chips/Debris.** Lead paint removal must be done by a licensed contractor/employee, and the debris must be disposed of as Hazardous Waste. Use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet to request a pickup. Please use the weight description "Debris - Lead Paint Chips (WEIGHT OF MATERIAL)", and the weight of the material as the amount.

34. **Mercury.** **Never place mercury-containing items in regular trash, red bags, or sharps shelters.** Mercury can be found in industrial, laboratory and patient thermometers; mercury switches in thermostats, batteries, mercury vacuum pumps and manometers.

Mercury spills are difficult to clean up. If you are unsure of how to clean up the spill, go to the EH&S website at <https://www.safety.rochester.edu/labsafety/mercuryspill.html>, or contact EH&S at 275-3241 for assistance. Locate the spilled mercury by using a flashlight directed at a low, glancing angle along the floor. Herd the mercury into a single ball by using a 3x5 card. Pick up the mercury by manipulating it with a card, sucking it up with a disposable syringe, or by using the sticky side of a piece of tape. Place the mercury and the other broken and contaminated items in a heavy duty plastic bag (not red bag) or other sealable container. Label the container with “Hazardous Waste” and “Mercury Spill Debris”, or “Broken Mercury Thermometer”. The amount of waste for a broken mercury thermometer is 25 grams. For disposal, use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup. See Figure 9.



Figure 9 - Sealed Plastic Bag Containing Mercury Spill Debris

In patient care units, (Reference Nursing Procedures and Policies Manual, section 12.10 Disposal of Mercury), that use mercury thermometers, a sealable plastic container that is large enough to hold an unbroken mercury thermometer will be placed in the soiled utility room. The container will be labeled with “Hazardous Waste Mercury”. Broken, used or unwanted mercury thermometers will be placed in this container. If a thermometer has been used by a patient in an isolation room, it must be disinfected first. For disposal, fill out a Hazardous Waste tag, and call the HWMU at 275-2056 to request a pickup.

If a mercury spill occurs in a carpeted area, call University Security at x13. They will secure the area and initiate the appropriate spill response. Because the mercury in carpeting is almost impossible to properly clean up, it is likely that the contaminated carpeting will have to be removed. Mercury can also be found in drain pipes. Piping contaminated with mercury must be managed as a Hazardous Waste. Facilities plumbing personnel should take proper precautions when working on drain pipes. Contaminated pipes must be cut into 3’ or smaller lengths so they can be fit into barrels for disposal. The ends of contaminated pipes must be sealed to prevent the

spread of mercury contamination into other areas. For disposal, use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.

35. **Oily Rags/Debris.** Rags that are contaminated with grease and oil only should be separated from those rags that have been used with chemical degreasers. Fire safety code regulations require that these rags be stored in a metal container with a closed lid because of the risk of spontaneous combustion. These rags, along with oil filters and materials used to clean up oil spills should be disposed of through the HWMU. The materials should be placed in a heavy duty, non-leaking plastic bag and placed in one of the collection barrels located in the medical center autoclave area or at 612 Wilson Blvd. River Campus and other off-site facilities personnel can drop off their material at the HWMU building. If this is not possible, they must use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup. Please use the waste description “Debris - rags and assorted debris contaminated with oils, grease and lubricants (WEIGHT OF MATERIAL)”, with the weight of the material in each container as the amount.

36. **Pacemaker Batteries.** Are usually lithium batteries. Make sure they have been disinfected. If they cannot be returned to the manufacturer, use the Chematix system to generate and print a Hazardous Waste waste card for each item, and generate and submit a pickup worksheet to request a pickup. If you have multiple items, you can group them together in a bag or box, and generate one waste card for the container, with the weight of the material as the amount.

37. **Paint Rags.** Rags used with latex paint are not hazardous and can be thrown in the trash. Rags used with oil base paints and stains are considered to be a flammable hazard and may also be subject to spontaneous combustion. Fire safety code regulations require that they be collected and stored in a metal container with a closed lid and disposed of through the HWMU. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup. Please use the waste description “Debris - contaminated with oil based paints, stains and mineral spirits (WEIGHT OF MATERIAL)”, and the weight of the debris/rags for the amount.

38. **Paint Thinner.** (see Used Paint Thinner).

39. **Parts Degreasers/Washers.** There are several types of solvents used for degreasing. Carefully review the MSDS for the material prior to use. Flammable or combustible degreasers must not be used near a source of ignition. Many “safety solvents” are actually halogenated solvents such as methylene chloride or 1,1,1-trichloroethane (methyl chloroform). These are only “safe” because they are not flammable. They are toxic. When depleted, the spent/used solvent must be collected as Hazardous Waste in a properly labeled container. Spent/used citrus or biodegradable degreasers must also be collected for disposal through the HWMU because the oil and grease that it contains must not be disposed of into the Sanitary Sewer. Collect separately from the other flammable or toxic degreasers in a properly labeled container. As with all degreasers, allow for adequate ventilation. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.

40. **Pesticides.** Can only be used and applied by licensed personnel. Unused/unwanted material must be disposed of as Hazardous Waste. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.

41. **Pharmaceutical Wastes.** Certain drugs, such as nicotine-containing compounds are RCRA P-listed hazardous materials. It is therefore necessary to treat the empty containers as Hazardous Waste. The SMH Pharmacy and other patient care personnel will place the drug containers in the properly designated and labeled plastic containers that have been provided to them. Full, partial, and empty IV bags and their related tubing will be placed into plastic ziplock bags, and then placed into the blue RX containers. Baxter pump and other similar units used by

the imaging/radiology department are not considered to be syringes, and must be placed into the blue RX containers. As of August 14, 2001, federal policy exempted nitroglycerine formulations for hospital use. Epinephrine syringes are also exempt. Certain products such as Merthiolate and thimerosal contain mercury (D009), Coumadin/Warfarin (P001). Unused and expired pharmaceuticals may be shipped to reverse distributors as product, instead of waste. If certain drugs are RCRA listed materials, if they exhibit hazardous material characteristics (flammable, corrosive, reactive), if they contain thimerosal as a preservative, and they cannot be sent to a reverse distributor, they must be handled as Hazardous Waste. Opened/unused bottles of cough syrup or expired bottles that contain more than 24% alcohol and that cannot be sent to a reverse distributor must be handled as Hazardous Waste. Opened/unused inhalers that cannot be sent to a reverse distributor, and partially full or empty inhalers must be handled as Hazardous Waste. Controlled substances must be disposed of using the proper pharmacy procedures.

42. **Photographic Chemicals.** All used and unused photographic chemicals should be disposed of as Hazardous Waste. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup. Used photographic fixer solutions contain silver and should never be put down the drain. Unless your developing machine has a silver recovery unit attached to the drain hose, you must collect the used fixer solution and have it picked up by the HWMU for silver recovery. Use the waste description "Used Photo Fixer". See Figure 10.



Figure 10 - Properly Labeled Plastic Container for the Collection and Transport of Used Photo Fixer

43. **Refrigerants.** The use and disposal of many chlorofluorocarbons (CFC's) are regulated by the EPA and New York State. Intentional venting of CFC's is prohibited. Items that contain refrigerants such as refrigerators, freezers, drinking fountains, air conditioners, dehumidifiers, and centrifuges have to be properly decommissioned before they can be disposed of. Oil contaminated by CFC's must be managed as Hazardous Waste unless the CFC's have been recovered to an acceptable level. This oil can be recycled, but must be collected separately from other used oil. See Figure 14. CFC's designated for recycling do not have to be managed as

Hazardous Waste. However if the CFC's are unable to be recycled, they must be labeled as "Hazardous Waste" and turned in to the HWMU for proper disposal. All recovery units used by the University must be registered with the EPA and properly maintained. The University employs certified professionals to both decommission and repair items containing CFC's. All regulated activities involving CFC's must be performed by certified technicians. Complete and accurate records must be kept of CFC related activities including technician certification, CFC purchase, use, and disposition as well as equipment maintenance. Technical or legal questions regarding CFC use and management should be directed to the refrigeration professionals within Facilities Operations or through EH&S. Medical Center Facilities maintains collection barrels at their HVAC shops at G-4959 and at 7-7500.

44. **Solvent-Base Paint, Stains.** (syn: alkyd, oil-based, urethane, polyurethane, epoxy, or varnish). Solvent based paints will typically contain flammable organic solvents such as acetone, methyl ethyl ketone (MEK), toluene, petroleum distillates, or xylene. These paints typically meet the RCRA characteristic of ignitability (D001) and must be disposed of as RCRA wastes. Solvent based paints must be stored in a flammable storage area or cabinet. Cans containing dried out paint or liquid paint must be disposed of through the HWMU. Empty cans can be thrown in the trash. Use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet to request a pickup. If you have multiple containers, you can group them together and generate one waste card for the entire group. Use the waste description "Oil based paint" or "Oil based stains" with the weight of the material as the amount.

45. **Transformers/Power Supplies.** Scientific equipment such as electron microscopes, X-ray machines and others requiring high voltage and power are often equipped with their own transformer(s). Transformers manufactured after 1976 are usually filled with silicone or mineral oil. Prior to 1976, polychlorinated biphenyls (PCB's) were often used. All oils must be disposed of in an environmentally sound manner. When disposing of PCB's the stakes are even higher in that the laws governing its transport, use and disposal are among the strictest found in environmental regulation. All questions regarding the dismantling and/or disposal of transformers and other oil-bearing components of a power supply must be directed to either the HWMU or to Central Utilities before anyone changes the oil or tries to dismantle the device. The only exception to this is for power supplies that are being serviced under contract by a qualified service technician or manufacturer's representative. The oil may have to be tested by a certified lab.

46. **Used Lamps.** All fluorescent light bulbs, ultraviolet bulbs, microscope bulbs, and high intensity discharge bulbs contain mercury and must be collected for recycling. Incandescent, halogen, and LED bulbs do not contain mercury, and can be thrown in the trash. In the Medical Center there is a collection area at the autoclave loading dock. Laboratories and research areas who have small microscope bulbs and UV lamps should use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet to request a pickup. If you have more than one item, you can group them together and generate one waste card for the entire group. To find the appropriate waste description, enter the keyword "bulb" and "contains" in the search function. River Campus facilities personnel are responsible for transporting their bulbs to the HWMU building. All Facilities personnel who accumulate and store bulbs are responsible for meeting the regulatory requirements for packaging and labeling.

A. Requirements of the Universal Waste Rule for Managing Used Lamps.

(1) Used lamps must be managed in a manner that minimizes the chances of breaking. (See section B. below).

(2) Used lamps must be collected in structurally sound containers. A proper container is typically an empty, intact box that similar lamps were received in.

(3) Used lamp containers must be managed in a manner that preserves the integrity of the container.

(4) When lamps are not being added or removed from the container, it must be kept closed.

(5) The collection containers must bear the markings “Universal Waste-Used Lamps For Recycling, Accumulation Start Date _____” and with the date that the first bulb was placed in the box. See Figure 11.

(6) All used lamps must be shipped from University premises within one year of the accumulation start date on the used lamp collection container.

(7) Broken bulbs are required to be treated as Hazardous Waste. They should be separated from the intact bulbs in containers labeled “Hazardous Waste – Broken Fluorescent Bulbs”.



Figure 11 - Properly Labeled and Closed Boxes of Used Fluorescent Light Bulbs for Recycling

B. University Requirements and Practical Tips for Packing and Shipping Used Lamps.

(1) Before lamps can be shipped they must be packaged per USDOT and vendor requirements.

(2) University F&S O&M groups are expected to make their best efforts to pack the lamps in accordance with these requirements the first time so that double handling is minimized.

(3) Choose an empty lamp box for the same type of lamp that is being disposed.

(4) Only same-type and length lamps may be placed in the same outer container unless special arrangements have been made with HWMU.

(5) Do not tape lamps together. All taped together lamps must be separated from each other prior to being placed in the container or the vendor assesses a surcharge.

(6) Ensure that there is no debris in the box and that it is structurally sound and capable of being closed. Do not reuse the cardboard dividers that come in a box of new bulbs. Remove and throw them out, as they make it difficult to completely fill a lamp box and actually increase the chances of lamp breakage.

(7) Completely fill a lamp box with used lamps prior to offering it for disposal whenever possible. Partially filled lamp boxes will collapse when stacked on a shipping pallet and create needless double handling and potential excess lamp breakage.

(8) Tape the lamp box shut, or otherwise close the container in a manner appropriate for that container type.

- (9) Take the container to the area(s) designated by your facility manager.
- (10) Keep the storage area in an orderly manner and free of clutter. Remember that state and federal inspectors review Universal Waste storage areas and processes during regular compliance inspections.
- (11) HWMU will palletize and ensure all used lamp containers meet USDOT and vendor requirements prior to shipment.

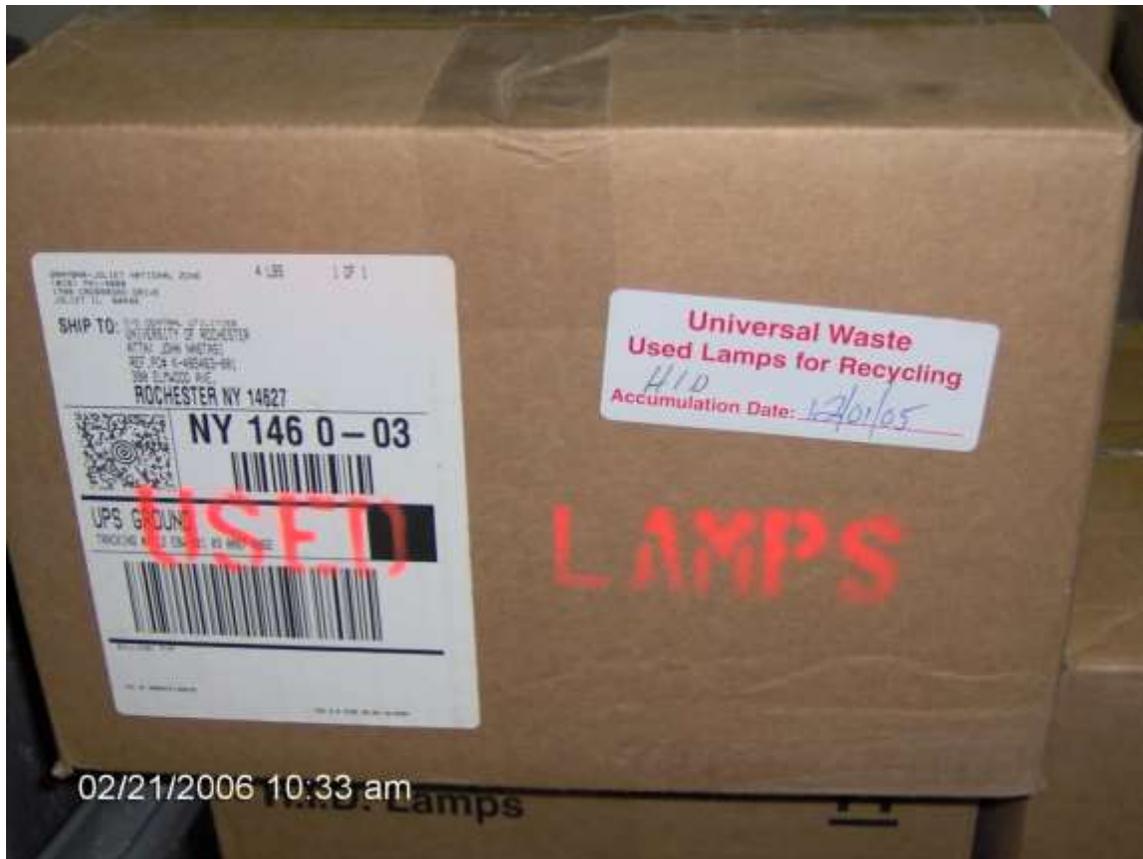


Figure 12 - Properly Labeled and Closed Box of Used Fluorescent Light Bulbs for Recycling

47. **Used Oil.** (Reference 6 NYCRR Subparts 360-14 and 374-2). Used oil must be collected for recycling. This includes motor oil, pump oil, compressor oil, mineral oil, silicone oil, and cutting oil. For laboratories and medical center facilities areas, used oil containers should be less than 55 gallons in size. The use of containers that are 55 gallons or larger require specific permission of the HWMU. Facilities areas should contact the HWMU directly when an oil pickup is necessary. Used oil collected at 612 Wilson Blvd. is managed independently by the Facilities Auto Shop. At this location, used automotive oil and filters are collected for disposal. All other used oil (i.e. from laboratories) is also collected by the HWMU. Used oil containers must be labeled "Used Oil". Laboratories should use the Chematix system to generate and print a Hazardous Waste waste card, and generate and submit a pickup worksheet. Please use the waste description "Used Oil" for uncontaminated used oil. Oil for recycling must not be contaminated by degreasers, solvents (halogenated or non-halogenated), PCB's, or refrigerants (CFC's). Any contaminated oil must be handled separately as a Hazardous Waste. If the used oil is contaminated, indicate what the contaminating material is, and what the amount or percentage is on the waste card. Medical Center Facilities has used oil collection barrels at B-1250, B-9905, B-11309A, and 7-7501. See Figures 13 and 14.



Figure 13 - Properly Labeled 30 Gallon Plastic Barrel for Used Oil Collection and Recycling

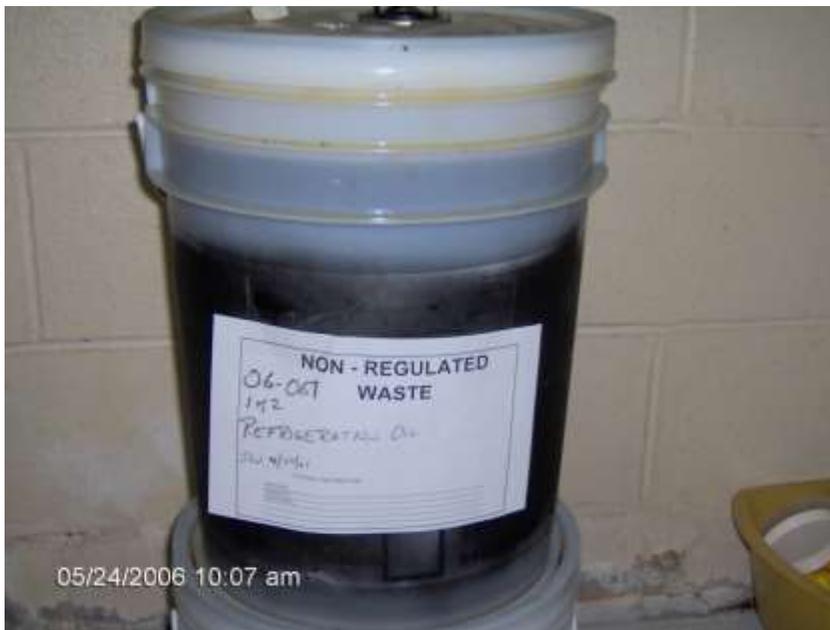


Figure 14 - Properly Labeled 5 Gallon Pail Containing Used Oil Contaminated With Refrigerants

48. **Used Paint Thinner.** Used paint thinner is a Hazardous Waste (flammable liquid), and must be collected in a properly labeled, chemically compatible container. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.
49. **Water Treatment Chemicals.** See germicides.

Section VII: Asbestos. See University EH&S Website.

Section VIII: Contractors/Project Management.

Prior to the commencement of a project, areas are to be checked for Hazardous Materials. Environmental Health and Safety and the Hazardous Waste Management Unit should be contacted as soon as possible if there are questions concerning hazardous materials. Often testing can take up to two or three weeks. Also, due to limited staffing, other priorities at the University may not make immediate response possible. Therefore, in order to avoid potential delays, contact EH& S and HWMU as soon as possible.

Disposal of hazardous materials that were on-site prior to the project are the responsibility of the University. All shipments of Hazardous Waste are to be coordinated through the HWMU. This responsibility cannot be delegated. Hazardous materials brought on site by the contractor remain the contractor's responsibility. No hazardous materials are to be left behind by the contractor after the completion of a project, or thrown into any University dumpster. It is the responsibility of the project manager to ensure that the contractors comply with these requirements.

Use of hazardous materials during projects should be minimized to the fullest extent practical and all prudent steps taken to minimize exposure of either staff or the environment. Specification of non-hazardous components for renovated spaces and new buildings should be the practice. For example, non-mercury containing thermostats or non-mercury containing switches should be installed whenever older units are being replaced.

Section IX: Lime Filled Neutralization Crocks.

Plumbing codes require the installation of lime filled sumps or crocks in the effluent (drain) plumbing systems of buildings where it is possible that laboratory wastes may be poured down the drain. These lime filled crocks have been installed to serve as a safety net to protect the University from liabilities or citations from the Monroe County Sewer District should any individual improperly drain a hazardous material. Pollutants, such as heavy metals have a tendency to precipitate out into the lime, and over time it is possible for the material in these crocks to accumulate enough pollutants to be considered as Hazardous Waste.

Prior to servicing a lime filled crock, contact the Hazardous Waste Management Unit at 275-2056 so that a determination can be made as to what type of sample(s) may need to be taken for testing. HWMU will work with the plumber or contractor to obtain a sample for testing. Test results can usually be obtained within five or six working days.

Should it be necessary to clean the tank out before test results are obtained, the material must be placed in leak-proof containers. Plastic, Department of Transportation certified 55 gallon drums are preferred. These drums must not be filled in a location for which there is no way to remove them (elevators). If there is no elevator service in that area, collect the waste in 5-gallon plastic pails.

Testing will consist of a TCLP extraction and test for volatiles, semi-volatiles, RCRA metals, PAH's, and PCB's. In addition, ignitability, corrosivity, reactivity, and a paint filter test will be performed. This testing will typically cost around \$1,000 per sample. Prior to taking samples to the testing lab, the HWMU representative will take the sample to the Radiation Safety office to have the material scanned for radioactivity.

If testing reveals radioactive contamination, the Radiation Safety Office becomes responsible for the further testing, waste management, and disposal of the material. If there is no radioactive

contamination, the HWMU remains responsible. Even if testing shows that the material is not Hazardous Waste, the material is still subject to the Solid Waste rules. It must be properly managed and sent to a permitted landfill.

Typically, a waste profile is completed subject to the disposal facility's approval. Waste that fails the Paint Filter test cannot be sent untreated to a Solid Waste landfill. Steel drums cannot be placed into a dumpster for disposal regardless of the test results.

The conditions under which the lime-filled crocks are serviced are variable. Involve the Hazardous Waste Management Unit, 275-2056, as early as you can to make certain that the process is as glitch free as possible. Do not call the Asbestos Control Group for this service. Disposal and management governing contaminated limestone is subject to the rules governing chemical wastes, not asbestos. All fees associated with testing, containers, and disposal will be charged back to the generating facility. Also, be sure to consult with the Industrial Hygiene Unit for any OSHA requirements prior to commencing work.

Section X: Hazardous Waste Management for University Laboratories Located at Monroe Community Hospital.

The Medical Center operates two laboratories located at Monroe Community Hospital (MCH) in rooms C24 and C18 on the 4th floor of the Faith Building. One of the laboratories is the Phlebotomy laboratory is operated by Strong Memorial Hospital's Clinical Laboratories. The laboratory does not generate any chemical Hazardous Waste and does not expect to at any time in the future. The second laboratory is a research area occupied by the Psychiatry Department. This laboratory functions independently of MCH services and operations. This laboratory does generate chemical Hazardous Waste on occasion. The total Hazardous Waste generation at this laboratory is under 220 pounds of non-acutely toxic waste per calendar month and under 2.2 pounds a month of acutely toxic (P-listed) waste. Additionally, per Dixon Rollins of the Region 8 New York State Department of Environmental Conservation, we can consider this lab to be a separate "facility" from the rest of MCH since they are not owned/operated by MCH and do not service MCH functions. As such, the Psychiatry lab qualified for relaxed standards applicable to its Conditionally Exempt Small Quantity Generator status under the Hazardous Waste regulations.

Hazardous Waste generated at MCH is to be handled in a manner consistent with the protocols followed for the rest of the University of Rochester. Waste will be picked up from any University lab located at MCH, provided that laboratory does not provide services to MCH, or in any way contribute to the operations at MCH. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup. The Hazardous Waste technicians will make arrangements to transport the waste. Do not remove the waste from your immediate lab area or leave it in the hallway. Also, do not ask staff at MCH to remove the material.

The Hazardous Waste technicians will park the truck in a designated place in cooperation with MCH Security and shall announce themselves to Security upon arrival. At that point, they shall proceed to the laboratory to remove any chemical Hazardous Waste. All drums and shipping papers shall be used and prepared in accordance with NYSDEC and USDOT regulations. No waste that is generated as a result of MCH owned operations shall be picked up. These are the responsibility of MCH and cannot be brought back to the University.

Should more than 220 pounds of Hazardous Waste or 2.2 pounds or more of acutely toxic (P-listed) waste be generated in any calendar month, the waste will have to be picked up directly by a licenced Hazardous Waste hauler for shipment directly to a permitted disposal facility. Should this ever happen, it may be necessary to obtain an EPA ID number specific to the University labs located at MCH. This is a situation that should be avoided by reducing bulk purchases of chemicals, taking care of waste as it is generated and making every effort to reduce the generation of Hazardous Waste.

There will be no direct charge to the laboratories for waste disposal that results from laboratory operations. These will be allocated through the Medical School cost center in a manner consistent with the current policy for all Medical School laboratories and operations.

Section XI. Hazardous Waste Management for University Laboratories Located at the CVRI Building on Bailey Road.

This facility is currently a RCRA Conditionally Exempt Small Quantity Generator (CESQG). The total Hazardous Waste generation at this facility is under 220 pounds of non-acutely toxic waste per calendar month and under 2.2 pounds a month of acutely toxic (P-listed) waste.

Hazardous Waste generated at CVRI building is to be handled in a manner consistent with the protocols followed for the rest of the University of Rochester. Hazardous Waste will be picked up from all University laboratories located at the facility. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.. The Hazardous Waste technicians will make arrangements to pick up the wastes from the individual labs. Do not remove the waste from your immediate lab area or leave it in the hallway. At the present time, there will probably be one pickup date scheduled per month, but could be done more frequently based on demand.

The Regulated Medical Wastes generated by the facility are currently being picked up, transported, and disposed of by Stericycle. Universal Waste, Used Fluorescent Lamps, used oil and other Hazardous Waste items generated by the facility will be picked up, transported, and disposed of by the HWMU.

Should more than 220 pounds of Hazardous Waste or 2.2 pounds or more of acutely toxic (P-listed) waste be generated in any calendar month, the waste will have to be picked up directly by a licensed Hazardous Waste transporter for shipment directly to a permitted disposal facility. This is a situation that should be avoided by reducing bulk purchases of chemicals, taking care of waste as it is generated and making every effort to reduce the generation of Hazardous Waste. The facilities personnel must ensure that they do not accumulate large quantities of material (i.e. paint, boiler treatment chemicals, housekeeping supplies) that may suddenly become unwanted waste material. This could cause the facility to exceed the generation limits listed above.

Section XII. Hazardous Waste Management for University Laboratories Located at the Laboratory For Laser Energetics/Center for Optoelectronics and Imaging Building at 250 East River Road.

This facility considered to be part of the campus of the University of Rochester that is permitted as a RCRA Large Quantity Generator. Hazardous Waste generated at this facility is to be handled in a manner consistent with the protocols followed for the University of Rochester. Hazardous Waste will be picked up from all University laboratories located at the facility. The HWMU maintains a 90-day storage area in the shipping and receiving loading dock area. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup. The Hazardous Waste technicians will pick up the wastes from the cabinets on a weekly basis (usually Thursdays).

Section XIII. Hazardous Waste Management for University Facilities at:

- 1. Eastman Dental Center, 625 Elmwood Avenue.**
- 2. Goler House, 60 Goler House.**
- 3. Graduate Living Center/University Towers.**
- 4. River Road Complex/St. Agnes, 300 East River Road.**
- 5. Whipple Park Apartments.**
- 6. Mount Hope Properties.**

These facilities are considered to be part of the campus of the University of Rochester that is permitted as a RCRA Large Quantity Generator. Hazardous Waste generated at these facilities is to be handled in a manner consistent with the protocols followed for the University of Rochester. Hazardous Waste will be picked up from these facilities on an as needed basis.. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.

Section XIV. Hazardous Waste Management for University Facilities at:

- 1. Eastman School of Music, 25 Gibbs Street.**
- 2. Memorial Art Gallery, 500 University Avenue.**

These facilities are currently RCRA Conditionally Exempt Small Quantity Generators (CESQG). The total Hazardous Waste generation at each facility is under 220 pounds of non-acutely toxic waste per calendar month and under 2.2 pounds a month of acutely toxic (P-listed) waste.

Hazardous Waste generated at each facility is to be handled in a manner consistent with the protocols followed for the rest of the University of Rochester. Hazardous Waste will be picked up from these facilities on an as needed basis. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup. Should more than 220 pounds of Hazardous Waste or 2.2 pounds or more of acutely toxic (P-listed) waste be generated in any calendar month, the waste will have to be picked up directly by a licenced Hazardous Waste transporter for shipment directly to a permitted disposal facility. This is a situation that should be avoided by reducing bulk purchases of chemicals, taking care of waste as it is generated and making every effort to reduce the generation of Hazardous Waste. The facilities personnel must ensure that they do not accumulate large quantities of material (i.e. paint, boiler treatment chemicals, housekeeping supplies) that may suddenly become unwanted waste material. This could cause the facility to exceed the generation limits listed above.

Section XV. Hazardous Waste Management for University Dental/Medical Off-Site Offices Affiliated With:

- 1. Eastman Dental Center Community Dentistry Clinics – Highland Hospital, School #17, Sibley Bldg, Hillside, Smilemobiles**
- 2. Strong Health**
- 3. University Faculty Dental Practice Group**
- 4. University Faculty Medical Practice Group**
- 5. Strong Memorial Hospital**
- 6. Mount Hope Family Center**
- 7. Strong Behavioral Health**

These offices are currently RCRA Conditionally Exempt Small Quantity Generators (CESQG). The total Pharmaceutical and Hazardous Waste generation at each office is under 220 pounds of non-acutely toxic waste per calendar month and under 2.2 pounds a month of acutely toxic (P-listed) waste.

Hazardous Waste generated at each office is to be handled in a manner consistent with the protocols followed for the rest of the University of Rochester. Hazardous Waste will be picked up from these offices on an as needed basis. Use the Chematix system to generate and print a Hazardous Waste waste card for each container, and generate and submit a pickup worksheet to request a pickup.

Should more than 220 pounds of Hazardous Waste or 2.2 pounds or more of acutely toxic (P-listed) waste be generated in any calendar month, the waste will have to be picked up directly by a licensed Hazardous Waste transporter for shipment directly to a permitted disposal facility. This is a situation that should be avoided by reducing bulk purchases of chemicals, taking care of waste as it is generated and making every effort to reduce the generation of Hazardous Waste.

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