

Hazardous Waste On-line Class

Successful completion of this on-line course will satisfy the University's requirement for hazardous waste training. After you are finished studying the course material below, proceed to the on-line registration and test.

A PDF version is available, [Hazardous Waste On-line Class](#), and it is the best format to print the course or to download the course material to your computer.

The following guidelines are based on regulations enforced by the EPA and state Department of Environmental Regulation and must be implemented to avoid violations. These agencies perform frequent unannounced inspections of University of Kentucky laboratories and work areas that can lead to monetary and possibly criminal sanctions.

1. WHAT IS A WASTE MATERIAL?

A material which is spent, cannot be reused or recycled and is ready to be thrown away. Materials that are still good or reusable are not considered waste. If you know of another lab that may need the material please attempt recycling before labeling it as waste.

2. WHAT IS A HAZARDOUS WASTE?

A waste as defined above which meets one or more of the following definitions or is otherwise dangerous to human health and safety or the environment:

FLAMMABLE/IGNITABLE: Any liquid or liquid mixture having a flashpoint of 140 degrees F, 60 degrees C, or lower. This includes most non-halogenated solvents such as Methanol, Ethanol, Acetone, Xylene, Toluene, Benzene, Gasoline etc. Flammable solids such as Sodium or Potassium metals, solid Naphthalene, Nitrocellulose etc. also fall into this category. Halogenated solvents such as Methylene Chloride, Chloroform, Dichlorobenzene etc. generally have a flashpoint above 140 degrees F and therefore are not flammable, but are toxic. Flashpoint values and other physical properties can be found in the Material Safety Data Sheet or in chemical reference literature such as a Merck Index. Flammable materials should always be isolated from ignition sources.



TOXIC: Any material which by the nature of its active ingredients is

considered to be a poison, carcinogen, mutagen, reproductive hazard or is capable of causing harm to human health and safety, or the environment. This is a large class of chemicals with over 800 substances specifically regulated by the EPA. Most pure reagent chemicals are included in this category which is quantified by LD50 or lethal dose values.



CORROSIVE: Any liquid or mixture of liquids having a pH of less than 2 or more than 12.5 is corrosive and must be treated as hazardous waste. The pH may be determined by use of a calibrated meter, pH paper or pH sticks. Liquids with a pH between 2 and 12.5 are not considered corrosive and may be disposed of as normal waste provided they don't exhibit any other hazardous characteristics such as toxicity, ignitability etc. Liquids with separate layers should be mixed by inverting the container several times to ensure the pH reading is representative of the entire contents and not just the top layer.



REACTIVE: Any material which is unstable, explosive, shock sensitive, water or air reactive, a strong oxidizer, or an organic peroxide. Cyanide and sulfide bearing materials are also reactive and may produce toxic, deadly gases when mixed with acids. Reactives should be handled with extreme care.

If your waste falls into any of the above categories it must be treated as hazardous waste.

It **cannot** be disposed of by pouring it down a drain or by throwing it in the trash.

A hazardous waste disposal ticket must be filled out and submitted. There are significant fines and penalties involved when hazardous waste is disposed of illegally. In addition to the legal ramifications please realize that toxic wastes disposed of down the sink or in the trash may end up either in the Kentucky River or in one of the underground aquifers which supply the areas drinking water. The primary reason hazardous waste laws were established was to protect ground and

drinking water supplies from toxic contamination.



MANAGEMENT OF HAZARDOUS WASTE IN YOUR AREA

3. LABELING OF WASTE CONTAINERS

All hazardous waste containers must be labeled "HAZARDOUS WASTE" at the time when the first drop of waste is poured into the container. Descriptions such as "WASTE" or "ACETONE WASTE" are **not** acceptable.



The chemical names of the substances in the container must be listed on the container. When labeling the waste be specific, i.e. list Xylene, Acetone, Toluene etc. instead of Non-Halogenated Solvents. Do not use abbreviations, chemical formulas or trade names as these may be confusing to HMM staff or others in the lab. Hazardous waste labels are available from our office at no charge. Laboratory tape is acceptable if marked as specified above. Proper labeling will eliminate the problem of identifying unknown chemicals and wastes. Unknowns are difficult to dispose of requiring extensive analysis.

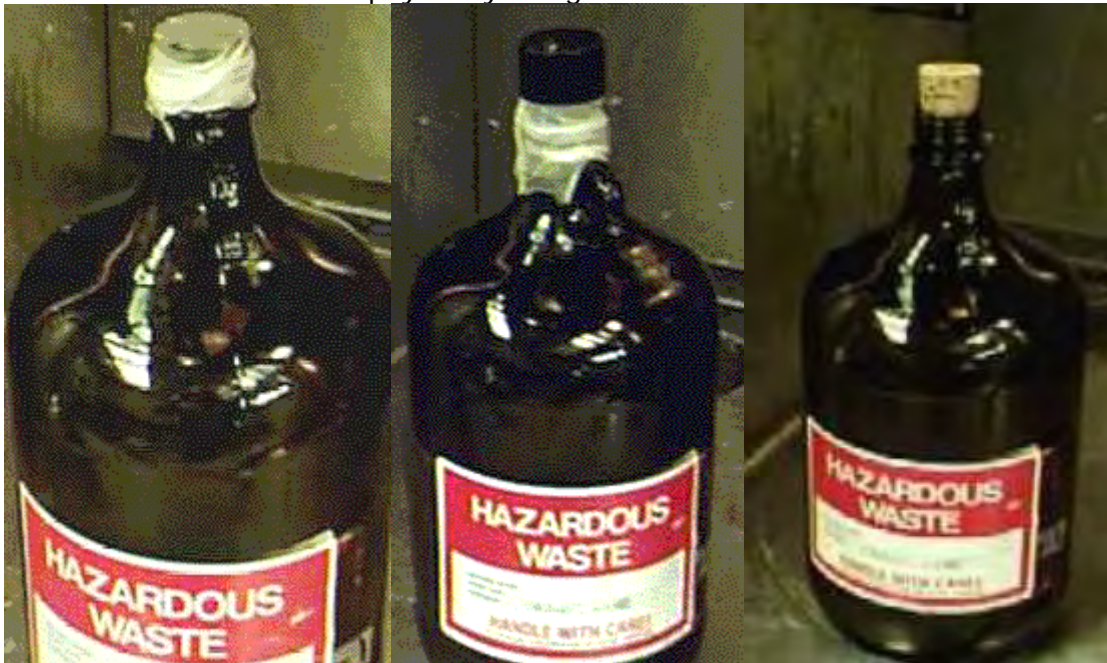
4. PROPER CONTAINERS

Generally the best containers for hazardous waste storage are the ones they were received in such as 4 liter reagent bottles. Other containers such as 5 gallon jugs are acceptable if the container and any residue left inside are compatible with the new waste material. Four (4) liter bottles and 5 gallon carboys are available at no charge from our warehouse. The larger the container the better provided it can be filled within a reasonable time and does not present a storage hazard at your location. Please fill the containers to within one or two inches of the top before requesting disposal. This will aid the University in reducing waste, cutting costs and also speed up removal of wastes from your lab.



5. PROPER LIDS FOR CONTAINERS

All containers must have a secure, tight, non leaking lid. Cracked or leaking lids sealed with parafilm can not be picked up. Lids must be left securely on containers at all times unless waste is physically being added to the container.



UNDER NO CIRCUMSTANCES SHOULD A FUNNEL EVER BE LEFT IN AN UNATTENDED CONTAINER.



Funnels in containers, improper labeling and waste containers with no lids are the three most common violations cited by inspectors and have led to costly fines in the past.

6. **STORAGE, COMPATIBILITY AND SAFETY**

At no time should more than **55** gallons of waste accumulate in an area prior to pickup. If this happens call our office immediately to arrange for removal. Chemicals or wastes should never be stored in or around drains or sinks. Waste must be stored in a secure place, always under the control of lab personnel.



Waste stored outside your area can be kept in a locked room nearby but never left in a hallway.



This area should be kept clean and inspected for spills on a daily basis. The best places to accumulate wastes are inside or under fume hoods or inside an appropriate safety cabinet. You should not store incompatible wastes or chemicals in the same area. The items below are examples of some potentially incompatible wastes which may react violently if mixed. These examples would apply if the chemicals were in pure form, in low concentrations the combinations may or may not present a safety hazard. This list is by no means all-inclusive so check with the Principal Investigator, MSDS or other applicable literature before mixing.

Incompatibles

CYANIDES AND ACIDS

SULFIDES AND ACIDS

OXIDIZERS AND ORGANICS OR FLAMMABLES

STRONG ACIDS AND BASES

HYDRAZINE AND OXIDIZERS

STRONG ACIDS OR BASES AND FLAMMABLES

ACIDS AND CHLORINE COMPOUNDS

WATER OR AIR REACTIVES AND MOST EVERYTHING



Whenever possible do not mix halogenated (chlorinated) wastes with non-halogenated wastes. **PCB's, Dioxin, Mercury**, and heavy metal bearing wastes in general, should not be mixed with other types of wastes if possible. This will help decrease the volume and toxicity of the wastes your lab generates as mandated by state and federal regulations. Radioactive and Biological materials fall under different sets of guidelines and should not be mixed or stored with chemical wastes if possible.



7. DISPOSAL OF HAZARDOUS WASTE AND CHEMICALS

To dispose of any hazardous waste you must completely fill out a hazardous waste ticket for each container.

Mail or fax the top (white) copy of the ticket to the HMM office. Attach the yellow copy of the ticket **securely** to each container. A sturdy piece of lab tape works best; and, if possible, do not place the ticket over the manufacturer's label.

HAZARDOUS WASTE DISPOSAL/PROFILE
 Environmental Quality Management Center
 Department of Hazardous Materials Management
 330 Cooper Dr. 0490 Phone 323-6280 or 323-5005
 Complete this form for each container of Hazardous Waste
 All constituents must be identified
 Securely tape the yellow and pink copies to the container
 and mail the white copy to the above address

NAME John Doe DATE 03/15/01
 DEPT. Pharmacy BLDG. Pharmacy ROOM 747 PHONE 8-1003
 List all constituents in the container, total must equal 100%
 Chemical Names Only (No Abbreviations or Formulas)

<u>Xylenes</u>	<u>50</u>	%
<u>Acetone</u>	<u>25</u>	%
<u>Nitromethane</u>	<u>25</u>	%
_____	_____	%
_____	_____	%
_____	_____	%
_____	_____	%
Total		100 %

pH (Required on all spent, waste liquids) 7.0
 Size of container 4Ltr Type of container Glass
 Amount of waste in container 4Ltrs

Waste Characteristics (Circle all that apply)
 Flammable _____ Corrosive _____ Toxic _____ Reactive _____
 Biological _____ Radioactive _____ Animal Carcasses _____
 Special Notes _____

Ticket
Nº 133652

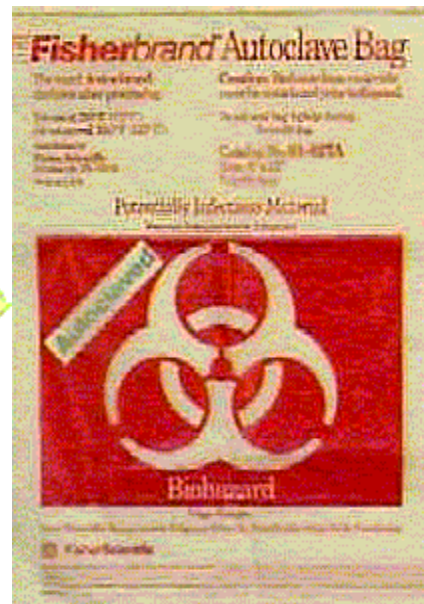
If you prefer to hand deliver tickets the HMM facility is located between the Ag. Science greenhouses and the Garrigus Building. The waste tickets must be filled out by the person/s who actually generate the waste. Staff, without knowledge of the material in the container, should not fill out the ticket.

Tickets should be filled out as completely as possible with all information typed or legible. Abbreviations, trade names and chemical formulas are not acceptable. Once the top, white copy is received it will be entered in the computer tracking system and HMM personnel will come to remove the waste. Waste can not be picked up without a completed ticket. If the waste is not acceptable for pickup and transportation the generator will be responsible for correcting the problem.

Some chemicals, such as neutralized acids and bases, sugars, buffers, starches, filter media etc. can be disposed of in the regular trash or down the sink. Always contact the HMM office (323-6280 or 323-5005) prior to disposal so we may check your specific situation for compliance with applicable laws.

8. BIOHAZARDOUS WASTE

Biohazardous waste is defined as: Human or animal tissue or fluids that are contaminated or may be contaminated with pathogenic organisms. Sharps and contaminated medical equipment such as tubing, IV bags etc. may also be classified as biohazards by Bloodborne Pathogen definitions when being disposed of.



Check with your area safety officer or this office if you have questions. Biohazardous waste should be kept separate from chemical waste and must always be placed in an appropriate container marked with a biohazard symbol.



It **must not** be disposed of with the regular garbage. Areas outside the Medical Center shall submit a waste ticket as described above and mark the ticket as biohazardous. Autoclaved or otherwise sterilized biohazardous waste may be disposed of in the regular trash provided the item is clearly marked as having been autoclaved. [Biohazard Autoclave Bags \(Fact Sheet\)](#) Check with your Principal Investigator for proper sterilization procedures as well as reviewing the [Biohazard and Sharps \(Fact Sheet\)](#).

9. RADIOACTIVE WASTES

Anyone working with radioactive isotopes and or scintillation counting experiments must attend training classes given by the Radiation Safety office. Their phone number is 323-6777. Mixed wastes, i.e. both chemical and radioactive such as used scintillation media will be disposed of via a Radiation Safety disposal ticket.



After the ticket is processed by Radiation Safety it will be forwarded to our office for pick up. Chemical and radioactive wastes should be kept separate whenever possible due to the extreme difficulty in finding a disposal site that will accept the mixture.

10. CHEMICAL SPILL PROCEDURES

Small spills of known materials should be immediately cleaned up by personnel in the labs or work areas. Materials such as towels, spill pads etc. used to clean up the spill may become hazardous waste during the clean up and require special disposal. Please call to check on this before disposing of clean up materials. Most spills are best suited to clean up with spill pillows, acid/base neutralizing kits or granulated clay products such as oil dry and kitty litter.

These products are available from chemical supply companies and are a convenient thing to have on hand. Make sure to wear safety goggles, proper gloves and other appropriate protective gear when handling a spill just as you would during normal handling of that chemical. If the spill is a mixture always wear protective equipment appropriate for the most hazardous of the chemicals involved.

For **large spills** the Hazardous Materials Management office should be **immediately notified** by calling (859) 323-6280 or contacting an HMM staff member.

John Q. Lowry	Director	323-5728	jqlowry@email.uky.edu
Brian Butler	Specialist	323-5005	bbutl1@email.uky.edu
Mike Blackard	Specialist	257-7375	mblac0@email.uky.edu
Kevin Gaff	Specialist	257-7373	klgaff2@email.uky.edu
Lee Faulkner	Sr. Specialist	257-7373	ljfaul2@email.uky.edu
Peggy Quisenberry	Admin. Assistant	323-6280	pquisenb@email.uky.edu

After hours, on weekends or during holidays contact the University of Kentucky Police Department at (859) 257-1616. They will contact the HMM staff, who will respond appropriately.

If the spill or release involves a dangerous or potentially dangerous material: evacuate the immediate area, shut all doors and windows if possible and call 911 from any campus phone. Stay on the line until told to hang up by the dispatcher. Persons involved with the spill should remain in the area at a safe distance to provide responders with information on the materials and processes involved.

11. HAZARDOUS WASTE MINIMIZATION

Federal and state law requires that all generators of hazardous waste develop strategies to reduce both the volume and toxicity of their wastes. Our department will assist you with procedures to minimize the waste your area generates. Please call 323-5005 if you have any ideas on this subject or would like to schedule a waste minimization audit for your area.

Some general examples of waste minimization techniques are:

1. **Substitution** - Replacing toxic or other hazardous materials with less toxic or non-hazardous substances. This is the best way to minimize your hazardous waste responsibilities. Example: use Alconox instead of a sulfuric/chromic acid glass cleaner. Replace Mercury thermometers with less hazardous alcohol thermometers or those with plastic coatings less likely to break when dropped.
2. **Recycling/Redistribution** - Chemicals that are like new or unopened can often be redistributed to other labs or work areas saving disposal costs for UK and new product costs for UK and the recipient.



To add or receive reagent chemicals from the UK redistribution program call HMM at (859) 323-5005 or visit the HMM [Chemical Redistribution web page](#).

3. **Proper filling of waste containers** - Fill your waste containers to approximately 1 or 2 inches from the top, allowing for some expansion of volatiles during hot summer months. This will aid us in decreasing the volume and number of containers shipped off site each year.
4. **Ordering and Procurement Practices** - Order only what you will

need based on shelf life of the chemical and expected quantities required. A large percentage of toxic waste disposed of by the University is old, unused reagent chemicals.

5. **Micro Chemistry** - Use small-scale chemistry instead of traditional methods to reduce the amount of chemicals used in laboratory experiments.
6. **Redistilling** - Reclaim solvents through distillation processes in laboratories using large quantities of solvents. This is a good way to cut lab costs and drastically reduce the cost of purchasing new solvents.
7. **Laboratory Destruction** - Some chemicals can be neutralized or made exempt from hazardous waste regulations by treatment or alteration in the laboratory. This **must** be done as part of the experiment and in accordance with published, recognized methods. Contact our office prior to performing laboratory destruction to confirm the process is safe and meets regulatory requirements. An example of lab destruction would be neutralizing strong acids or bases as the last step in an experiment requiring or creating them.

12. Other Waste Materials

Federal and State agencies also regulate other waste materials the University of Kentucky generates under guidelines set up to encourage recycling. These materials include batteries; light ballasts, and spent fluorescent lights.

- o **Batteries:** All batteries, including small (AA, AAA, C, D, 9V, calculator batteries etc.) are now considered "Universal Wastes" and must be recycled.



Call for pickup and mailing options, or see the [battery fact sheet](#) for detailed information.

- o **Light Ballasts:** All ballasts, (including PCB and Non-PCB ballasts) are now considered to be hazardous waste and require labeling and containerization. The ballasts will be recycled by HMM. Call 323-5005 for segregation and pickup options. Leaking ballasts must be kept separate and containerized immediately.

- **Fluorescent Lights:** All spent fluorescent lights, except those with **green end caps**, are considered Universal Waste and must be recycled.

If the bulbs are broken during removal they are considered hazardous waste and require labeling and containerization.

Bulbs with **green end caps** may be placed in the normal garbage whether broken or intact.

Contact your supervisor, building operator or our office for disposal options. It is illegal to drop off fluorescent lights or any waste at the EQMC facility or loading dock without a representative there to accept it.

Please keep this document with your other training materials for future reference. The yellow hazardous waste training certificate should either be displayed in your lab (preferable) or kept with your training files. No one may handle or prepare hazardous waste for disposal unless they have attended this class. To review the most vital points in this outline:

1. Never throw hazardous waste in the garbage or pour it down the drain.
2. All hazardous waste must be labeled as such immediately upon generation.
3. Keep containers tightly sealed and never leave a funnel in an unattended container.
4. Keep chemical, radioactive and biohazardous waste separate whenever possible.
5. Do not mix incompatible chemicals or wastes together.
6. Know what to do in case of a chemical spill.

Recycle or reduce the volume and toxicity of your wastes when possible.

**Your cooperation in helping the University of Kentucky
comply with the hazardous waste regulations is sincerely
appreciated.**
