

# UNIVERSITY OF KENTUCKY HAZARDOUS WASTE MANAGEMENT TRAINING MANUAL

## PURPOSE

This training material is based on regulations enforced by the US Environmental Protection Agency and Kentucky Division of Waste Management.

Responsibility for compliance with hazardous waste regulations begins with the individual researchers and employees who generate the waste material, and continues through the transportation and disposal process.



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## PART I - WASTE IDENTIFICATION

### What is a Waste?

The first step in the management of hazardous waste is to determine whether a material is a waste. A **waste** is generally defined as a material which is discarded including materials that are either spent or intended to be thrown away. Materials that are being used for their intended purpose or are otherwise still reusable are not considered waste. A waste can be a solid, liquid, semisolid or contained gaseous material.

### What is a Hazardous Waste?

After determining if a material meets the definition of a waste, those responsible for generating the waste must determine if the waste is a hazardous waste. In making a hazardous waste determination, if assistance is needed, the Environmental Management Department (EMD) can assist. A **hazardous waste** is a waste which:

- Falls into any of four specific listing descriptions (i.e., "Listed") and/or
- Exhibits any of four hazardous waste characteristics (i.e., "Characteristic").

## Listed Hazardous Waste

There are four different groups of listed hazardous waste which in total includes over 800 different substances:

F-Listed	P-Listed	U-Listed	K-Listed
<ul style="list-style-type: none"><li>• Waste originating from non-specific sources.</li></ul>	<ul style="list-style-type: none"><li>• Waste that is <u>acutely</u> toxic.</li></ul>	<ul style="list-style-type: none"><li>• Waste that is toxic.</li></ul>	<ul style="list-style-type: none"><li>• Waste originating from specific sources.</li></ul>

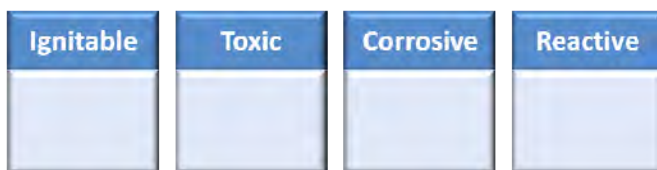
*P-Listed* waste is particularly noteworthy in that it is defined as acutely toxic and, therefore, there are significantly reduced accumulation thresholds for such waste (Refer to the discussion under *Satellite Accumulation Area* in Part III).

The individual chemicals (and their corresponding Chemical Abstract Numbers) that comprise the “P and U” lists may be found at [40 CFR Part 261.33](#).

It must be noted that in order to meet the criteria for a “P” or “U” listing, the waste material must not have ever been used for its intended purpose, for example, a common P or U listed waste consists of materials that have simply exceeded their expiration dates for usefulness.

## Characteristic Hazardous Waste

The four hazardous waste characteristics include the following:



Provided below are the definitions of each of the four characteristic classes along with examples of waste streams within each classification.

### **Ignitable Hazardous Waste:**



Liquid - Any liquid waste or liquid waste mixture having a flashpoint of 140° F (60° C) or lower. Examples include most spent non-halogenated solvents such as methanol, ethanol, acetone, xylene, toluene, benzene, and gasoline. Spent halogenated solvents such as methylene chloride, chloroform, and dichlorobenzene, generally have a flashpoint above 140° F and, therefore, are not ignitable.



Solid – Any solid waste that is capable of causing fire through friction or absorption of moisture or can undergo spontaneous chemical change resulting in persistent burning. Solids such as sodium or potassium metals, solid naphthalene, and nitrocellulose also fall into this category. Ignitable wastes should always be isolated from ignition sources.

## Toxic Hazardous Waste:



Any waste which contains concentrations of certain constituents in excess of regulatory limits is a toxic hazardous waste. The 40 constituents that must be considered when evaluating a waste for potential toxic concentrations include eight heavy metals, six pesticides and 26 solvents and other organics:

Pesticides	Metals	Organics	
Endrin	Arsenic	Chloroform	Methyl ethyl ketone
Lindane	Barium	o-Cresol	Nitrobenzene
Methoxychlor	Cadmium	m-Cresol	Pentachlorophenol
Toxaphene	Chromium	p-Cresol	Pyridine
2,4-D	Lead	Cresol (total)	Tetrachloroethylene
2,4,5 TP Silvex	Mercury	1,4-Dichlorobenzene	Benzene
	Selenium	1,2-Dichloroethane	Trichloroethylene
	Silver	1,1-Dichloroethylene	Carbon Tetrachloride
		2,4-Dinitrotoluene	2,4,5-Trichlorophenol
		Heptachlor	Chlordane
		Hexachlorobenzene	2,4,6-Trichlorophenol
		Hexachlorobutadiene	Chlorobenzene
		Hezachloroethane	Vinyl Chloride

### **Corrosive Hazardous Waste:**



Any waste liquids or waste liquid mixtures having a pH less than or equal to 2 or greater than or equal to 12.5. Examples include hydrochloric acid, phosphoric acid, sulfuric acid, sodium hydroxide, and corrosive cleaning agents. Dilution of acids or bases with water to eliminate the corrosive characteristic is not an acceptable practice. Acids and bases can be neutralized as part of an experiment, but that process must be a written step in the experimental procedure.

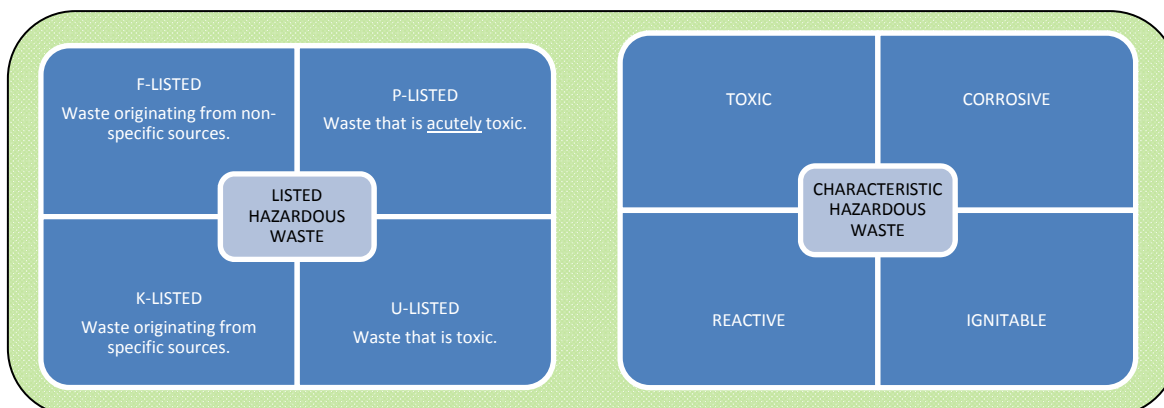
In addition, liquids or liquid mixtures having a pH less than 5.5 or greater than 11.5 are not permitted to be disposed of via sink drains or other wastewater conveyances. Disposal of such liquids is specifically prohibited by the University's wastewater discharge permit.

### **Reactive Hazardous Waste:**



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.

## THE HAZARDOUS WASTE UNIVERSE



If your waste falls into either the *listed* or *characteristic* categories it must be treated as a hazardous waste. Hazardous waste **cannot** be disposed of by pouring down a drain or by throwing in the general trash. 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 down the sink or in the trash may cause environmental harm and can also create an unacceptable risk to human health.

However, there may occasionally be a waste generated that does not meet the listing or characteristic criteria for a hazardous waste and that the generator, based on their knowledge, believes to be safe for drain or trash disposal. These situations can be evaluated on a case by case basis by the EMD and a written determination will be provided to the generator. Under no circumstances may any waste material be drain-disposed without having received prior approval.

## PART II - WASTE ACCUMULATION AND STORAGE AREAS



The University's Environmental Quality Management Center (EQMC) is permitted by the state and by the federal governments to store and to treat hazardous waste generated by the University. The EQMC receives all of the hazardous waste generated on the main

campus and some received from off-campus University operations such as the Livestock Disease Diagnostic Center (LDDC), the Center for Applied Energy Research (CAER) and the research farms.

### On-Campus Areas

Besides the operations at the EQMC, there are only two types of hazardous waste accumulation and storage areas managed at the University's main campus. These areas and a brief description of each are listed below:

**Satellite Accumulation Areas (SAA):** These areas are individual research, clinical and teaching laboratories/classrooms, hospital patient care areas, hospital and clinic pharmacies or other rooms on the main campus in which hazardous waste generation occurs. The hazardous waste containers in a *Satellite Accumulation Area* must always remain at or near the point of generation (i.e., at or near the bench-top or within the room itself) and must be under the control of the operator of the process generating the waste at all times until they are ready for pick up by personnel of the EMD (**Figure 1**).

At no time may more than 55 gallons of hazardous waste or 1 quart of acute hazardous waste (i.e., "P-Listed") accumulate in a *Satellite Accumulation Area* prior to pickup by EMD personnel or movement of the waste container to a proper storage area. Any waste in excess of the 55-gallons or 1 quart limits must be removed from the *Satellite Accumulation Area* within 3 calendar days. Therefore, once the threshold is reached, move the waste container to the accepted storage area in your department if the department has a designated waste storage area (Chemistry, LDDC, or CAER only) or contact EMD immediately.



**Figure 1. General Campus-Wide Hazardous Waste Movement**



**Less Than 90-day Storage Area:** The only such storage area on the University's main campus that falls into this classification is located in the Chemistry-Physics (Chem-Phys) building storeroom. There is no regulatory limit on the overall amount of waste that can be stored here as long as no waste remains within the area for greater than 90 days (**Figure 2**). Weekly inspections, specific storage requirements, emergency procedure availability, training, and recordkeeping requirements exist for these areas.



**Figure 2. Movement of Hazardous Waste Generated within the Chemistry/Physics Building**  
(Waste Moved from Satellite Accumulation Area by Trained Chem-Phys Personnel Only and Waste Moved from Less Than 90-Day Storage Area by EMD Personnel Only)

### Off-Campus Areas

There are two types of hazardous waste accumulation and storage areas managed at off-campus locations and include:

**Conditionally Exempt Small Quantity Generator (CESQG):** This off-campus location generates less than 100 kg (220 lbs) of hazardous waste or 1 kg (2.2 lbs) of acute hazardous waste on a monthly basis. There is no limit on the length of time material may be stored at an exempt area as long as the total quantity does not exceed 1,000 kg (2,200 lbs) of hazardous waste or 1 kg (2.2 lbs) of acute hazardous waste. Should any of these quantities be exceeded at any time the facility registration must be amended to reflect the higher quantity status as a Small Quantity Generator (SQG) or a Large Quantity Generator (LQG) as appropriate. The North Farm is registered in this category.



**Figure 3. Movement of Hazardous Waste at the North Farm**  
(Waste Moved from Conditionally Exempt Accumulation Area by EMD Personnel Only)

**Small Quantity Generator (SQG):** These areas generate between 100 kg (220 lbs) and 1,000 kg (2,200 lbs) of hazardous waste and less the 1 kg (2.2 lbs) of acute hazardous waste on a monthly basis. Wastes may be stored in these areas for up to **180 days** as long as the total quantity does not exceed 6,000 kg (13,228 lbs) at any time. Should any of these quantities be exceeded at any time the facility registration must be amended to reflect the higher quantity status as an LQG. The CAER, and the LDDC are registered as Small Quantity Generators. Weekly inspections, emergency procedures availability, specific storage requirements, training, and recordkeeping requirements exist for the 180-day storage areas. Wastes shipped from these locations to a permitted facility (such as the EQMC) must be shipped using a Hazardous Waste Manifest. The CAER and the LDDC also operate numerous *Satellite Accumulation Areas* at their facilities.



**Figure 4. Movement of Hazardous Waste at CAER and LDDC**  
(Waste Moved from Satellite Accumulation Area by Trained CAER or LDDC Personnel Only and from Less Than 180-Day Storage Area by EMD Personnel Only)

## Training

All four waste accumulation/storage areas described above are subject to routine audits and inspections by regulatory authorities who may conduct audits unannounced at any time they wish. Facility personnel working in a 90-day storage area and those engaged in hazardous waste management at a *Small Quantity Generator* or *Large Quantity Generator* location are required by state and federal regulations to be trained annually. Likewise, it is the policy of the University to require all persons operating *Satellite Accumulation Areas* also complete initial and annual refresher training for hazardous waste management. This hazardous waste training is available through scheduled classes or is available on line at <http://ehs.uky.edu/classes.html>. It is important to note that the University's waste pick-up and tracking system, referred to as **E-Trax**, will not allow a person to complete a waste pick-up request unless their training is up to date. Both initial and annual training will be required of all persons engaged in the management of hazardous waste.



**The University's web-based  
state-of-the-art waste  
management tracking system!**

## PART III - MANAGEMENT OF HAZARDOUS WASTE IN YOUR AREA

### Labeling and Dating of Waste Containers

*Satellite Accumulation Areas:* Each and every hazardous waste container must be labeled with the words “Hazardous Waste” when the first drop of waste is poured into the container. **Figure 5** provides an example of a label available through EMD that meets this requirement and provides a pocket in which to place other information including the eventual waste disposal card described in Part IV of this manual. Additionally, during its use it is strongly recommended that the generator keep a running label the contents of the container. When labeling the waste be specific (i.e., “Xylene”, “Acetone”, “Toluene”, etc.) instead of using generalities such as “Non-Halogenated Solvents”. Do not use abbreviations, chemical formulas, or trade names. This information will assist in the event of emergency activities and also will be needed when the waste card is prepared. Descriptions such as “Waste” or “Acetone Waste” in and of themselves are not acceptable but may be included as supplemental information. **No date should be placed on the label during the period the container is being used.**

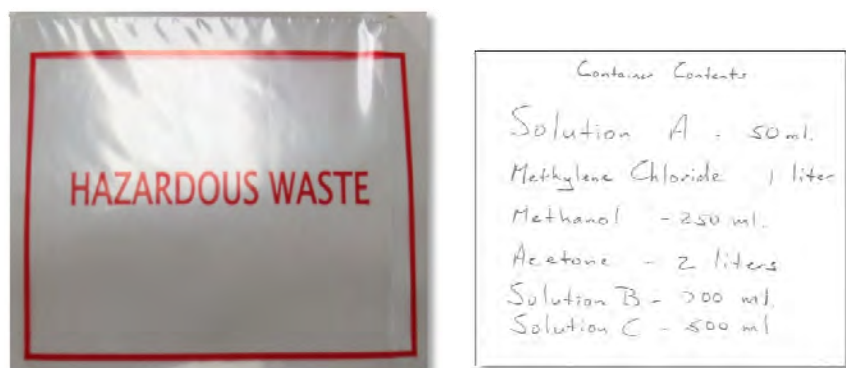
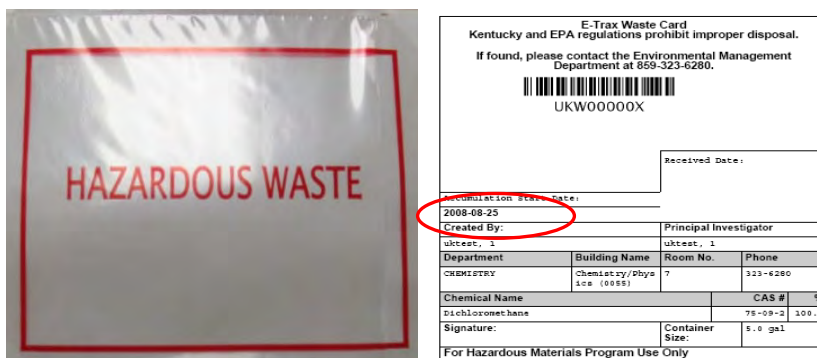


Figure 5. Example of Proper Labeling to be Used While Filling Container

*Less Than 90-Day and Small Quantity Generator Accumulation Areas:* Hazardous waste containers within the 90-day accumulation area at the Chemistry storeroom and the SQG accumulation area at CAER and LDDC must be labeled with "Hazardous Waste" and also must have the date clearly shown on the container when it was moved into these areas (i.e., the "Accumulation Start Date on the waste pick-up card).



**E-Trax Waste Card**  
Kentucky and EPA regulations prohibit improper disposal.  
If found, please contact the Environmental Management Department at 859-323-6280.

UKW00000X

Received Date: \_\_\_\_\_

Accumulation Start Date: 2008-08-25

Created By: \_\_\_\_\_ Principal Investigator: \_\_\_\_\_

Department	Building Name	Room No.	Phone
CHEMISTRY	Chemistry/Phys ice (0055)	7	323-6280

Chemical Name	CAS #	%
Dichloromethane	75-09-2	100.0

Signature: \_\_\_\_\_ Container Size: 5.0 gal

For Hazardous Materials Program Use Only

**Figure 6. Example of Proper Labeling to be Used After Container has been Filled  
(Insert the printed E-Trax Waste Card into the Hazardous Waste Sleeve)**

The chemical names of substances in the container must be listed on the container or readily available. This information will assist in the event of emergency activities and also will be needed when the waste card is prepared. When labeling the waste be specific (i.e., "Xylene", "Acetone", "Toluene", etc.) instead of using generalities such as "Non-Halogenated Solvents." Do not use abbreviations, chemical formulas or trade names. Descriptions such as "WASTE" or "ACETONE WASTE" in and of themselves are not acceptable but may be included as supplemental information. Hazardous waste labels are available from EMD at no charge. Laboratory tape is acceptable if marked as specified above. Proper labeling will eliminate the problem of identifying unknown chemicals and wastes.

## Hazardous Waste Containers

The best containers for hazardous waste are the original ones the materials came in. If the original container cannot be used then a compatible container in good condition is acceptable. Containers such as 5-gallon plastic jugs and 4-liter glass bottles are acceptable if the container and any residue left inside are compatible with the new waste material. Four-liter bottles and 5-gallon carboys are available at no charge from EMD. Larger containers are better if they can be filled within a reasonable time and does not present a storage hazard at your location. Please fill the containers to within 1 or 2 inches from the top before requesting disposal. This will aid the University in reducing waste, cutting costs and also speed up removal of wastes from your location.

## Proper Lids for Containers

All containers must have a secure, tight fitting, non-leaking lid. Containers used for HPLC solvents should have a small hole drilled in the lid and the tubing inserted into the hole. When the container is full the lid must be exchanged with a proper lid. Cracked or leaking lids sealed with parafilm are a deviation from storage requirements and must be changed immediately when found and prior to pick up by EMD. Corks placed into containers are also not considered secure and must not be used. Lids must be secure on containers at all times unless waste is physically being added to the container.



Figure 7. Examples of Improper Container Capping

### Storage, Compatibility and Safety

Hazardous waste should never be stored in or around drains or sinks. If it is unavoidable for the waste container to be near a drain then a spill tray should be used. The best places to accumulate wastes are inside or under fume hoods or inside an appropriate safety cabinet.

For *Satellite Accumulation Areas* waste must be stored in a secure place, near the point of generation and always under the control of trained personnel. Waste must never be left in a hallway or any other area where it could endanger personnel or facility safety or the environment. This area should be kept clean and inspected for spills on a daily basis.



Figure 8. Examples of Improper Container Locations

You should not store incompatible wastes or chemicals in the same area. The items below are some examples of incompatible wastes that may react violently if mixed. These examples would apply if the chemicals were in pure form so in low concentrations the combinations may or may not present a safety hazard. This list is by no means all-inclusive so check with appropriate staff, MSDSs, or other applicable literature before mixing. Be aware of any heat generation or vapors released that may damage the container. These conditions would indicate incompatible mixing and must be avoided.

**Incompatible Materials Table**

<b>Cyanides</b>	Are not Compatible With	<b>Acids</b>
<b>Sulfides</b>	Are not Compatible With	<b>Acids</b>
<b>Oxidizers</b>	Are not Compatible With	<b>Organics or Flammables</b>
<b>Strong Acids</b>	Are not Compatible With	<b>Bases</b>
<b>Hydrazine</b>	Is not Compatible With	<b>Oxidizers</b>
<b>Strong Acids or Bases</b>	Are not Compatible With	<b>Flammables</b>
<b>Acids</b>	Are not Compatible With	<b>Chlorine Compounds</b>
<b>Water or Air Reactives</b>	Are not Compatible With	<b>Most Everything</b>

Flammable/ignitable waste must be separated from ignition sources at all times. Aisle clearance for all waste storage and accumulation areas must be maintained such that in the event of an emergency, there is access to the material.

### Inspections

While it is the policy of the University to routinely evaluate all waste storage and accumulation areas, documented weekly inspections are required for the **Chemistry-Physics Building Chemical Storeroom, LDDC, and CAER** due to their designation as storage areas or registered generators. Personnel working in *Satellite Accumulation Areas* should check the containers daily to insure they are properly closed, incompatible segregation is occurring, drains are properly protected, the containers are under control of the lab personnel, full containers have been properly dated and are in the process of being removed, and the thresholds of 55 gallons hazardous waste or 1 quart acute hazardous waste are not being reached.

Documented weekly inspections of the storage areas at Chemical-Physics Building, LDDC, and CAER should follow the inspection checklist for the area. These inspections must include the date and time of inspection, the person performing the inspection, and any deficiencies noted along with documentation of corrective actions taken.

## PART IV - DISPOSAL OF HAZARDOUS WASTE AND OTHER WASTE MATERIALS

Filled containers may only be moved from *Satellite Accumulation Areas* to designated storage areas by trained personnel. In most campus locations this move is from the *Satellite Accumulation Area* to the EQMC by EMD personnel. For the Chemistry Department, LDDC, and CAER the filled containers may be moved from the *Satellite Accumulation Area* to the designated storage area by trained personnel within the department.

To have containers removed by EMD you must complete a hazardous waste card for each container. **Figure 9** provides a copy of an *E-Trax* generated waste card that can be placed into the pocket of the Hazardous Waste label described in Part III of this manual. The required date (highlighted below) is automatically printed on the Waste Card.

E-Trax Waste Card			
Kentucky and EPA regulations prohibit improper disposal.			
If found, please contact the Environmental Management Department at 859-323-6280.			
			
UKW00000X			
Received Date:			
Accumulation Start Date:			
2008-08-25			
Created By:		Principal Investigator	
uktest, 1		uktest, 1	
Department	Building Name	Room No.	Phone
CHEMISTRY	Chemistry/Physics (0055)	7	323-6280
Chemical Name		CAS #	%
Dichloromethane		75-09-2	100.0
Signature:		Container Size:	5.0 gal
For Hazardous Materials Program Use Only			

**Figure 9. Example of Properly Completed Waste Card**  
(To be inserted into the Hazardous Waste Sleeve affixed to the container)

The trained individual(s) who actually generated the waste must complete the waste cards. Untrained staff or individuals without knowledge of the material in the container should not fill out the card. Abbreviations, trade names and chemical formulas are not acceptable. After the waste card is received electronically by EMD through the *E-Trax* system EMD personnel will pick up the waste usually within five working days. **A**



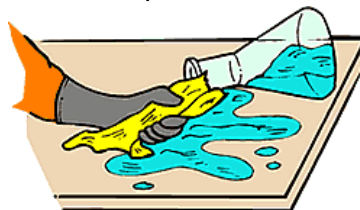
**WASTE CARD PROPERLY DATED MUST BE ON EACH CONTAINER PRIOR TO PICK-UP BY EMD.** The generator is responsible to insure the waste is properly labeled, closed, and dated for pick up.

Hazardous Waste Manifests (EQMC, LDDC, and CAER Only)

Hazardous wastes shipped from the EQMC, LDDC or the CAER, must be shipped on a Uniform Hazardous Waste Manifest. This document indicates the disposal facility that will receive the waste, the transporter, and the proper shipping name/description of the waste being shipped. The generator must sign the manifest, the transporter representative must sign the manifest and a copy with the two signatures must be maintained at the generator's facility. The receiving facility then signs the manifest when the waste is received and returns a copy of the manifest to the generator. The signed copy from the receiving facility must be received no longer than 45 days from the date of shipment for EQMC operations and 60 days for LDDC and CAER operations or notification is required to be made to the Kentucky Division of Waste Management. EMD personnel will assist the generators in manifest follow-up should the situation arise. The manifests for all waste shipments must be maintained and readily retrievable at the generator's facility for **three years**.

## PART V - CHEMICAL SPILL AND EMERGENCY PROCEDURES

Trained personnel in laboratory or work areas should immediately clean up small spills of known materials. Spill clean-up debris should be placed in a compatible container, properly labeled and closed, and an E-Trax waste card affixed and notification sent to EMD for pick-up. Spill pillows, spill pads, acid/base-neutralizing kits, and granulated clay products (oil dry and/or kitty litter) are best for spill clean-ups. Safety goggles, proper gloves and other appropriate personal protective equipment should be worn when handling a spill. All personnel should be knowledgeable in the specific departmental emergency procedures. These procedures must address:



- Preventing spilled material from entering drain and water systems.
- How to turn off any automatic discharge systems if appropriate.
- Identification of appropriate personal protective equipment.
- Understanding of how to activate emergency alarms.
- Emergency evacuation procedures.
- Location of emergency equipment.
- Procedures to summons emergency response personnel.

For larger spills the EMD office should be notified immediately at 323-6280.



After hours, weekend, or during holidays contact University of Kentucky Police Department at 257-UKPD (8573) from any campus phone or at #8573 from a cell phone. They will contact the on-call EMD staff, who will respond appropriately. Through its on-call program, EMD maintains around-the-clock availability to respond to spills.

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 or either of the numbers listed above. Stay on the line with the dispatcher until told to hang up.

Persons involved with the spill should remain in the area at a safe distance to provide responders with information on materials and processes involved.

## PART VI - HAZARDOUS WASTE MINIMIZATION

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

Some general examples of waste minimization techniques are:

**Substitution** – The best way to minimize hazardous waste is to replace toxic or other hazardous materials with less toxic or non-hazardous substances. An example of substitution includes using Alconox instead of sulfuric/chromic acid glass cleaner and replacing mercury thermometers with less hazardous alcohol thermometers or those with plastic coatings less likely to break when dropped.

**Recycling/Redistribution** – Chemicals that are like new or unopened can often be redistributed to other labs or works areas saving disposal costs for the University and new product costs for the recipient. To add or receive reagent chemicals from the University's redistribution program visit EMD's Chemical Redistribution WebPages at: <http://ehs.uky.edu/hmm/chemrecycle.html> or call EMD at (859) 332-5005.



Figure 10. View of Chemical Redistribution Area at EQMC

**Ordering and Procurement Practices** – Order only what you will need based on the shelf life of chemical and quantities required. A significant percentage of waste disposed by the University consists of old, unused reagent chemicals.

**MicroChemistry** – Use small-scale chemistry instead of traditional methods to reduce the amount of chemicals used in laboratory experiments.

**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. Keep in mind that the residue generated from the re - distillation process is hazardous waste. Should you determine that this process may be applicable to your location, contact EMD to assist and review the plans in order to insure proper management of the materials.

**In-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 EMD prior to performing in-laboratory destruction to confirm the process is safe and meets regulatory requirements. An example would be neutralizing strong acids or bases as the last step in an experiment.

**Mercury Thermometer Exchange** – Mercury has been identified as a waste minimization priority by EPA. The EMD has implemented a mercury thermometer exchange program to help eliminate mercury and its associated risks from university laboratories. EMD will exchange a mercury thermometer for a non-mercury thermometer upon request and at no charge to the receiving department. The non-mercury thermometers meet accuracy standards established by the National Institute of Standards and Technology (NIST). See our web page <http://ehs.uky.edu/em/> for more details on the mercury thermometer exchange program.

## PART VII – UNIVERSAL WASTES

Federal and State agencies also regulate other wastes the University generates under less stringent guidelines set up to encourage recycling and reduce illegal disposal. The wastes falling under this category are noted as *Universal Wastes* and include batteries, spent fluorescent lamps (lights), pesticides and certain mercury-containing equipment. If you have questions concerning the proper handling, storage and management of any of these wastes contact EMD at 257-3129. Please be reminded that it is illegal to leave these or any waste at the EQMC facility or loading dock without an EMD representative present.

**Batteries:** Many spent batteries such as Lithium-Ion, Nickel-Cadmium (Ni-Cd), Nickel-Metal Hydride (NiMH), and lead acid are classified as Universal Wastes and should be recycled. Alkaline batteries (AA, AAA, C, D, 9V, calculator batteries, etc.) are not hazardous and therefore do not qualify as universal waste. Contact the Environmental Management Department for more detailed information.

**Fluorescent Lamps:** All spent fluorescent lamps, except those with green end caps, contain mercury in such amounts that they exhibit a hazardous waste toxicity characteristic. As with spent batteries, state and federal regulations allow them to be managed as a Universal Waste and must be recycled. However, if the lamps are broken during removal they must be managed as hazardous waste and require labeling and containerization as appropriate. Lamps with green end caps may be placed in the normal garbage whether broken or intact. Contact your supervisor, building operator or EMD for disposal options or consult the *Management of Fluorescent Lighting Wastes Fact Sheet* at <http://ehs.uky.edu/hmm/light.html>.

In addition to the hazardous constituents in the fluorescent lamps, spent light ballasts also require special consideration because they may contain PCBs. Leaking ballast must be kept separate and containerized immediately.

**Compact Fluorescent Bulbs:** Each bulb contains a very small amount of mercury (less than 5 mg which is roughly equivalent to the tip of a ball-point pen). Research has also shown that no adverse effects are expected from occasional exposure

to broken CFL's. However, as a matter of good practice and to minimize any risks the spent CFL should be brought to the EQMC for disposal

**Pesticides:** Waste pesticides can also qualify as Universal Wastes if they have been recalled or come from stocks of unused products gathered as part of a waste pesticide collection program.

**Mercury-Containing Equipment:** This category includes devices, items, or articles that contain varying amounts of elemental mercury integral to its function. Some commonly recognized devices are thermostats, barometers, manometers, temperature and pressure gauges, and mercury switches, such as light switches in automobiles.

Universal Wastes must be labeled as such with a Universal Waste label (available from EMD), the container dated when material is placed into it, and may not be accumulated for longer than one year. When a container is filled, an E-Trax Waste Card should be affixed to the container and an electronic pick-up request submitted to EMD via E-Trax.

## PART VIII – OTHER WASTES

**Used Oil:** This group of waste includes any oil that has been used and no longer satisfactory for its intended use (i.e., used motor oil or vacuum pump oil). This material must be segregated into proper containers and labeled with the words “Used Oil”.

**Non-Regulated Waste:** This group of wastes do not fall into either the listed or characteristic hazardous waste categories but may still possess dangerous qualities (i.e., spent ethidium bromide and formalin). These wastes must still be managed by the EMD for proper disposal. These materials must be labeled with a “Non-Regulated Waste” label, E-Trax Waste Cards affixed, and an electronic waste pickup request submitted to EMD via E-Trax.



The University, as part of its operations, may generate other wastes that are biohazardous or radioactive. Biohazardous wastes must be managed in accordance with guidelines established through the office of Biosafety, <http://ehs.uky.edu/biosafety/>. Radioactive materials must be managed according to guidelines established through the office of Radiation Safety, <http://ehs.uky.edu/radiation/>.



## PART IX - SUMMARY

Please keep this document with your other training materials for future reference. The hazardous waste training certificate should be displayed in your laboratory or kept with your training files. No one may handle or prepare hazardous waste for disposal unless they have taken this training. To review the most vital points in this presentation:

- ✓ Never throw hazardous waste in the garbage or pour waste down drain.
- ✓ All hazardous waste must be labeled as such immediately upon generation.
- ✓ Keep containers tightly sealed and never leave a funnel in an unattended container.
- ✓ Filled containers must be dated and moved to the appropriate storage area on a timely basis.
- ✓ Keep chemical, radioactive and biohazardous waste in separate containers.
- ✓ Do not mix incompatible chemicals or wastes together.
- ✓ Know what to do in case of a chemical/waste spill.
- ✓ Recycle or reduce the volume and toxicity of your wastes whenever possible.
- ✓ Training must be repeated annually

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