

1 • Identification of Hazardous Chemical Waste

OBJECTIVES

Do you know how to do the following? If you do, skip ahead to *Minimization of Hazardous Waste* section. If you do not, continue on in this section.

- Determine whether a material must be considered a hazardous chemical waste by using the *Radiological-Chemical-Biological Hierarchy*, the *Non-Hazardous Waste List*, and the *Empty Container Decision Tree*.
- Correctly fill out a *Stanford Hazardous Waste Label*.
- Determine the correct hazard category.

OVERVIEW

In order to properly manage hazardous chemical waste you must first learn the various identification steps, in order to:

1. Determine if a material is now as a waste.
2. Know if your waste is a chemical waste.
3. Determine if it is hazardous.
4. Get information about the specific hazard category and identify it in order to complete a hazardous waste label.

The identification section of this training introduces you to resource materials that will help make these determinations.

RECOGNIZING WASTES

Remember that the requirements described in this guide do not apply until a material becomes a waste. A waste is defined as a material that has no intended use or reuse.

After you have determined that you have generated waste, use the *Radiological-Chemical-Biological-Waste Hierarchy* to identify the regulations that govern waste management. Use the *Non-Hazardous Waste List* and the *Empty Container Decision Tree* to identify what must be regarded as hazardous.

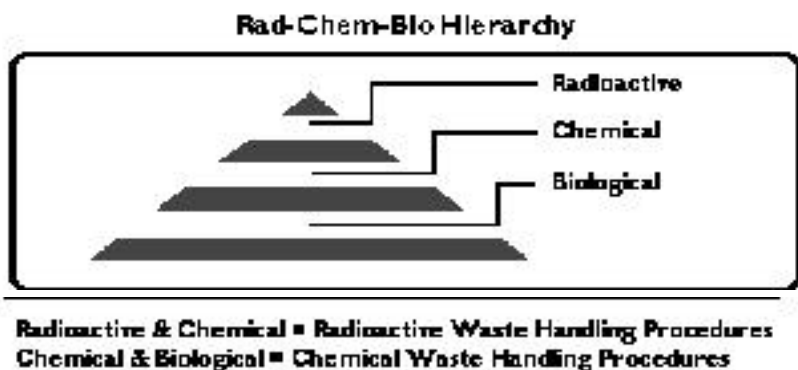
Handling Mixed Waste

A mixed waste is one that contains radiological or biological waste in addition to the chemical waste. Mixed wastes must be handled differently. There is a hierarchy of mixed wastes that determines that radiological properties, when present, are the most important factors in determining waste handling; chemical properties are the second most important factors for

determining waste handling and biological properties are third. This reference guide is for the management of pure chemical waste only.

If a substance is a mixture of radiological and chemical materials, it must be handled as a radiological waste, call 5-7520 or 5-7529 for instructions.

If a substance is a mixture of chemical and biological material it must be managed through Stanford's Chemical Waste Program, call 5-7520 or 5-7529 for instructions.



Non-Hazardous Waste List

California state law mandates that any waste chemical or hazardous material is a hazardous waste unless it meets a set of criteria. EH&S evaluates wastes to determine if they meet the criteria.

If a chemical waste is determined by EH&S to be a non-hazardous waste it is added to the *Non-Hazardous Waste List*. If you are using a chemical that is on the list, you can dispose of it as described. All chemicals not on this list must be regarded as hazardous and be managed and disposed of as hazardous chemical waste.

The *Non-Hazardous Waste List* can be found on the EH&S Web Pages. The URL is

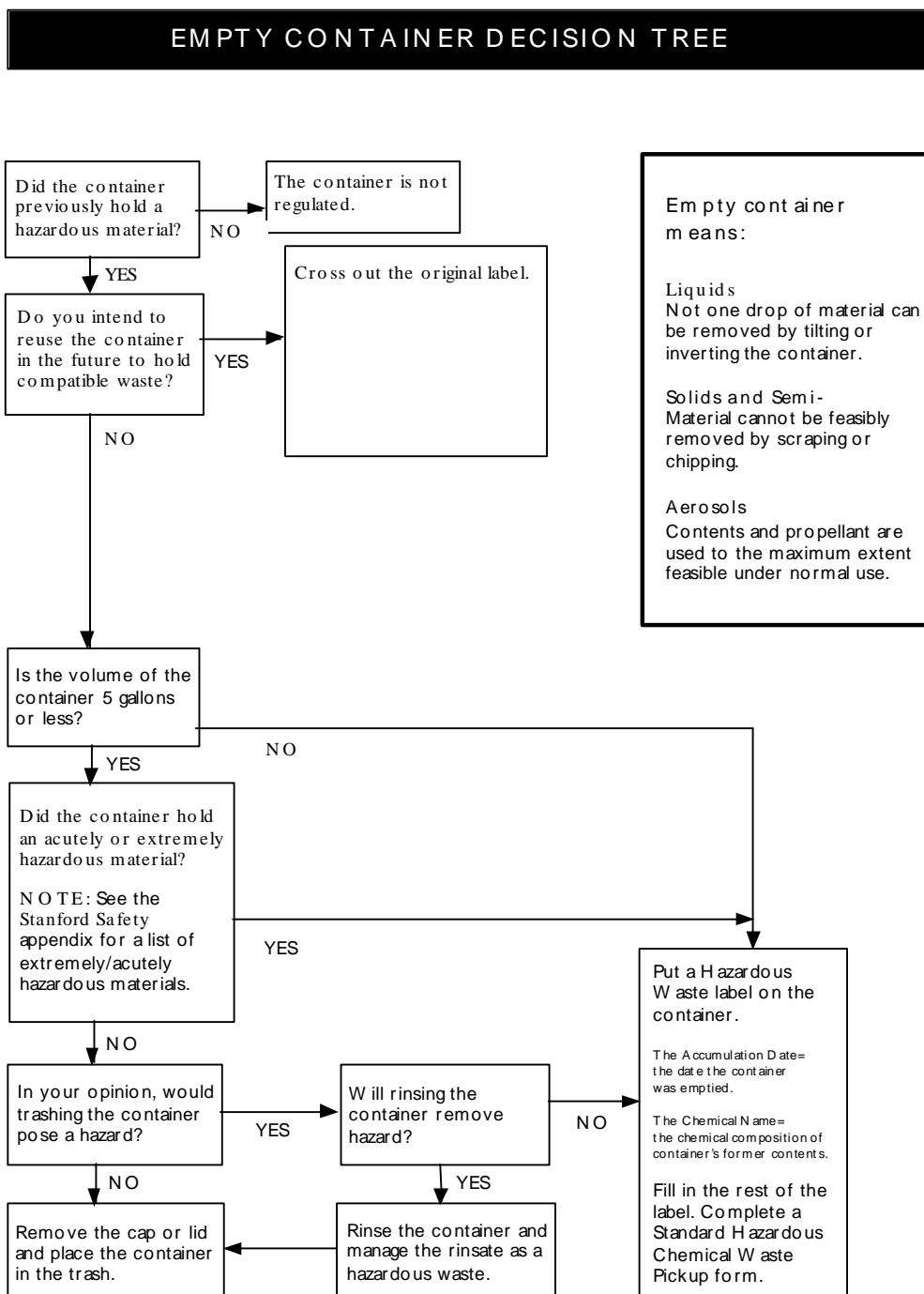
<http://www.stanford.edu/dept/EHS/prod/enviro/waste/nohaz.html>

The *Non-Hazardous Waste List* will be updated as more chemicals and concentrations are tested. EH&S cannot afford to evaluate all chemical wastes that are generated by campus laboratories. However, if you generate 10 gallons or more per month of a waste that you suspect should not be treated as hazardous, call EH&S (5-7520) to request that an evaluation be conducted.

Empty Container Decision Tree

Chemical waste materials must be handled as hazardous unless they are on the *Non-Hazardous Waste List*. Used hazardous materials containers are an exception, however. They have their own resource for hazard determinations, which is the *Empty Container Decision Tree*.

To properly use the *Empty Container Decision Tree*, the container must be truly empty. Not a drop of liquid, nor any solid residue that could be scraped out, may be present.



HAZARDOUS WASTE LABEL

All hazardous chemical waste must be properly labeled. Most of Stanford's regulatory citations for waste are due to absent or incorrectly filled out labels. The labels have instructions on the back. Always attach completed labels to primary waste containers, never to secondary containers.

Instructions for each point on these labels follow below. Hazardous Waste labels can be ordered from EH&S, or produced in your department. They must contain the words, "Hazardous Waste" and the information requested in items 1 through 5 as shown to the right.

HAZARDOUS WASTE STANFORD UNIVERSITY Instructions on Reverse Side	
1 ACCUMULATION DATE Date waste first generated: mo. day year	
2 GENERATOR INFORMATION Name _____ Phone _____ Dept. _____ Bldg. _____ Room _____ (Waste Location)	
3 CHEMICAL NAME(S) if a mixture, list ALL chemicals and concentrations/ volume %. Use full chemical names - no formulas or abbreviations. _____ % conc or ppm _____ _____ _____	
4 PHYSICAL STATE (check one) <input type="checkbox"/> Solid <input type="checkbox"/> Liquid <input type="checkbox"/> Solid/Liquid <input type="checkbox"/> Gas	5 HAZARD CATEGORY (check primary hazard) <input type="checkbox"/> Corrosive <input type="checkbox"/> Flammable <input type="checkbox"/> Oxidizer <input type="checkbox"/> Air/Water reactive <input type="checkbox"/> Toxic
6 DATE MOVED TO WAA mo. day year	
For EH&S Use Only Trans ID # _____ Bldg/Rm _____	

HOW TO FILL OUT THE LABEL

- 1 Accumulation Date**

The accumulation date tracks compliance with regulations on disposal time limits. Fill in the month, day and year.

The regulations define accumulation date as:

 - the date that a NEW container receives a drop of a CHEMICAL WASTE, or
 - the date that a HAZARDOUS MATERIALS container is emptied (check the Empty Container Decision Tree to determine if it needs to be managed as hazardous waste), or
 - the date that YOU DECIDE original containers of stock chemicals are no longer needed in your laboratory.

This means the accumulation date is always "today's date," the date you make a determination or decision.
- 2 Generator Info**

This section defines the person who produced waste material. The information you provide can be used to track the waste back to you from a disposal site if there are problems with it later. You must provide the exact location (bldg./room) where the waste was generated. Do not use the location of your office unless the waste is generated in your office.
- 3 Chemical Name**

In the first column, list the chemical name of each constituent; write the name in full, do not use formulas or abbreviations. A brand name may be used, but you must have a MSDS for the material available in your lab. List all known constituents, including water if the waste is aqueous. (In the past you may have excluded non-hazardous constituents, however, for full compliance they do need to be listed.)

In the second column, labeled “% conc. or ppm,” indicate by some means the relative concentrations of the listed constituents. There are many ways to meet the requirements of this section of the label. All methods must fully detail 100% of the constituents in the container.

Given below are three approaches, which you may use to track the contents of your waste container while it is being filled. Another standard method for describing the waste can be developed in your lab to meet your needs; some discussion, particularly when mixtures of waste are combined, may be needed.

- Approach 1 When the primary container holds only one waste mixture, simply estimate the concentration of the constituents and put it right on the label.
- Approach 2 If you place various waste mixtures into one container, you may be able to accurately estimate the concentration of the final mixture simply by tracking which constituents are added to the container. To ensure that the estimation is reasonably accurate (to within a few percent) you should consider factors such as the number of researchers adding waste to the container, the length of time it takes to fill the container and the number of chemicals added to the container. Make a list of all the chemicals that you might add to the container (example given in Appendix D). Place a copy of this list on the container when you put a hazardous waste label (with sections 1,2,4 & 5 completed) on it. As you add waste to the container, place a check mark next to the names of the chemicals that you are adding. When the container is full or nearing the end of accumulation time, someone from the research group will have to estimate the final % concentration of the checked constituents and enter it onto the label.
- Approach 3 When approaches 1 and 2 will not accurately describe the waste, you can track the volume and percentages of each waste that is added to the container on a separate list, then use this information to complete the label. Attach a blank piece of paper to the container when you place a hazardous waste label (with sections 1,2,4 & 5 completed) on it. Each time you add waste to the container, write on the sheet the mass or volume and quantitative description of the waste. For example, an entry might read “400 ml of 60% chloroform / 40% methylene chloride” (example given in Appendix D). When the container is full or nearing the end of accumulation time, the research group will be able to calculate the concentration or volume of each constituent and enter it onto the hazardous waste label. Be sure to complete the attachment sheet each time waste is added; remember, an inspector will cite you for not completing the label if it is obvious that the volume of waste on the attachment sheet is less than in the container!

Regardless of the approach you use to track the contents of the container, there are several acceptable ways of expressing the waste concentration of the final mixture. The chart on the next page gives examples of 3 different ways to describe one waste. You may come up with your own method as long as you indicate 100% of the constituents in the container.

EXAMPLES OF HOW TO DESCRIBE CHEMICAL NAMES ON A LABEL		
CHEMICAL NAME	% CONC OR PPM	
Example #1		
Chloroform/Methylene Chloride	(60/40)	400 ml.
Acetonitrile/water	(90/10)	800 ml.
Zinc/water	(50 ppm)	600 ml.
80% Methanol	water remainder	2,200 ml.
Example #2		
Chloroform/Methylene Chloride	(60/40)	10%
Acetonitrile/water	(90/10)	20%
Zinc/water	(50 ppm)	600 ml.
80% Methanol	water remainder	55%
Example #3		
Chloroform		6%
Methylene Chloride		4%
Acetonitrile		18%
Zinc		7.5 ppm
Methanol		44%
water		28%

4 Physical State

Check only one. Information on physical state is legally required. The labels and forms need to be explicitly marked. Check solid/liquid if the waste is two phase.

5 Hazard Category

Check only one. Check the one that is the most hazardous, also known as the primary hazard. Use your best judgment, the Chemical Safety Database and the Determining the Primary Hazard Category sheet, or a Material Safety Data Sheet to decide on the hazard category. If no hazard can be clearly identified, check toxic.

6 Date Moved to WAA

Do not fill in. This section will be completed by the person who actually transports the waste to the WAA. It applies only to areas identified and posted as Waste Accumulation Areas.

ADDITIONAL SOURCES OF INFORMATION

Two important additional sources of information when identifying a waste in order to manage it correctly include consulting the waste generator as well as the *Chemical Safety Database*.

The Waste Generator

The waste generator is the person who created the waste material. The waste generator is responsible for hazardous waste determination.

Chemical Safety Database

The hazard category can be difficult to determine for accurate labeling. EH&S has created a resource that includes a listing of hazard classes for chemicals, known as the *Chemical Safety Database*. This database was created to assist you in identifying and segregating hazardous chemicals for accumulation. It:

- Allows searches of chemicals by name, Stanford ID number, Chemical Abstract Services (CAS) number or phonetic name.
- Lists physical properties, storage group and hazard class (primary hazard first).
- Is found on two campus electronic information services: Prism and Folio. Instructions on how to access these may be found in the *Stanford Safety Manual*.
- The database is especially useful for determining the appropriate hazard category for hazardous waste labels.