



# ENVIRONMENTAL & OCCUPATIONAL HEALTH & SAFETY Programs & Policies — *HAZARDOUS MATERIALS MANAGEMENT PLAN*

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## INTRODUCTION

This plan was drafted based on the following assumptions:

1. State and federal law governs the handling and disposal of hazardous materials; Youngstown State University (YSU) must comply with these regulations.
2. Youngstown State University needs to find the most cost-effective strategy to create a system that encourages research and academics while at the same time ensures that hazardous materials are handled safely and disposed of in accordance with the regulations.
3. Other laws, such as worker and community right-to-know legislation as well as CFATS, should be addressed as an integral part of the hazardous materials management plan because the safe handling and use of hazardous materials requires the complete knowledge of these materials.
4. The plan will be reviewed and updated annually to reflect changes in local, state and federal laws.
5. While the YSU Office of Environmental Occupational Health and Safety will have primary responsibility for overseeing this plan; successful implementation of the plan rests largely with Campus departments, laboratories, shops and their employees.



## TRACKING HAZARDOUS MATERIALS

Title III of the Superfund Amendments and Re-authorization Act (SARA) of 1986, also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), requires any facility that stores any Extremely Hazardous Substance in a quantity that exceeds the threshold planning quantity (TPQ) to appoint an emergency coordinator and notify the State Emergency Response Commission (SERC) that they are subject to the provisions of this law. There are over 1,100 chemicals on the CERCLA/SARA List -- some have TPQ's as low as 10 pounds. EPCRA requires each affected facility to keep an up to date inventory of all chemicals stored on site and to make it available to the Local Emergency Planning Committee (LEPC) and the local fire department. Spills or releases of hazardous substances in excess of the reportable quantity (RQ) must be reported to the appropriate authorities. Some RQ's are as low as one pound.

OSHA's Hazard Communication Standard/Globally Harmonized System for Classification and Labeling of Chemicals, also known as the "worker right-to-know" standard, requires each employer to provide information to employees regarding chemical hazards in the workplace and to keep an inventory of chemicals in each work place. This information is provided by labels and safety data sheets (SDSs) and is conveyed to the employee through proper training.

In order to stay in compliance with these regulations, YSU must maintain an inventory of all chemicals and hazardous substances stored and used on Campus. The Office of Environmental Occupational Health and Safety (EHOS) will maintain a computer inventory of all chemicals on Campus. A software package, the [www.chemicalsafety.com](http://www.chemicalsafety.com) system, currently holds an inventory of most chemicals stored on Campus. This inventory must be kept up to date; therefore, individuals purchasing or acquiring chemicals for use on Campus must **notify EOHS prior to ordering or bringing on Campus any new chemicals or hazardous materials**. This procedure will:

- **All chemicals order must be submitted through ECUBE using account 701115.**
- **All chemical orders must be shipped to the Chemical Management Center, 124 Lincoln Avenue, One University Plaza, Youngstown, OH 44555.**
- Allow EOHS or the designated departmental person to check the chemical inventory to see if the chemical is already in stock at another location on Campus in order to eliminate duplicate purchases and encourage the cost effective sharing of chemicals. (Some individuals may choose not to share, and they will not be forced to do so. However, it is in the best interest of this institution to minimize the amount of hazardous materials on site.)
- promote cost savings by purchasing common chemicals in bulk quantities for the entire Campus;
- provide chemical users and purchasing agents with shared information on the cost, quality, and availability of products supplied by various vendors;
- allow EOHS to track each chemical brought on Campus and assure compliance with the SARA annual reporting requirements;
- permit EOHS to make certain that an SDS for each newly purchased or acquired chemical is received and made available to employees, thus assuring compliance with the Hazard Communication Standard;
- allow EOHS to provide emergency responders with reliable information during a spill or release episode and ensure accurate release reporting to the proper authorities;
- hold each chemical purchaser/user accountable for the proper use, storage, and disposal of chemicals;



- minimize the generation of waste and unknowns; and
- prompt chemical users to properly dispose of wastes through EOH

The Chemical Management Center will be notified when a chemical or hazardous material is needed and will check to see if the chemical is available on Campus. The

CMC will also check to see if the chemical is on the "P-List" or "acute hazardous waste" list. If the chemical appears on the list, an attempt should be made to find a less hazardous substitute. When the chemical arrives on Campus, the CMC will place a YSU bar code label on the chemical container(s), and all relevant information (chemical name, quantity, owner, location, etc.) will be logged into the Campus CHEMICAL DATABASE system. The CMC will ensure that a Safety Data Sheet is placed in the SDS book for the receiving department or lab.

The SDS should provide complete information on the product including the necessary safe handling procedures. The SDS will also provide valuable information for determining the proper waste category of any unused chemical. YSU must ensure that SDSs are available for each material on Campus. Each employee must be trained in hazard communications and have access to a list of chemicals used in their work area and an SDS for each chemical on this list. This practice is a direct link with OSHA's worker right-to-know requirements and is a good waste management practice.

When a chemical container is empty, the user will notify the CMC of the bar code number on the container, and the container will be logged as consumed on the CHEMICAL DATABASE system. Identification of an abandoned chemical will be simplified by tracing the bar code number. Likewise, if the chemical user declares the chemical as a waste, the container and its contents will be tracked by the bar code number. EOHS will then properly redistribute, recycle, neutralize or dispose of any unused chemicals.

An annual inventory is conducted for each department using bar code numbers on each container. The computerized inventory is updated, and the new list is provided to the LEPC and the local fire department as required by EPCRA.



## CHEMICAL HYGIENE AND HAZARD COMMUNICATION STANDARD

Under the Occupational Safety and Health Administration's (OSHA's) Occupational Exposure to Hazardous Chemicals in Laboratories Standard (29 CFR 1910.1450), a Chemical Hygiene Plan (CHP) is in place in all labs on Campus. The CHP is the heart of the standard that covers most industrial, clinical and academic labs. Each laboratory must comply with the standard if it uses containers small enough for one person to handle and doesn't produce large amounts of chemical substances for commercial use. The standard also applies to labs that use a variety of chemical procedures or a variety of hazardous chemicals in relatively small amounts, but does not produce chemicals for consumers.

The YSU Chemical Hygiene Plan includes written steps that outline how employees will be protected from overexposure to hazardous chemicals. The Environmental Occupational Health and Safety Director is designated as the chemical hygiene officer (CHO). The CHO must ensure the plan is adequate and that everyone understands and follows it. Training is the key element, and employees must understand which chemicals are dangerous, how chemicals affect them, how much and what kind of exposure is harmful, how to protect themselves from overexposure, what to do if they are overexposed, decontamination procedures, the correct way to dispose of hazardous chemicals, use and maintenance of fume hoods and other protective equipment, and which operations require prior approval.

In addition to training, the CHP includes a provision for medical attention for employees whenever:

1. an event takes place such as a leak, a spill or an explosion that might overexpose employees to a hazardous chemical;
2. an employee shows symptoms of overexposure to a hazardous chemical; or
3. tests indicate a dangerous level of a hazardous chemical in the laboratory atmosphere.

Training must be provided BEFORE a new employee starts working with hazardous materials, and whenever a new chemical is introduced into the lab. Training must be documented, and records of this training must be kept. The Office of Environmental Occupational Health and Safety will maintain the training records for each individual department. In addition to training and recordkeeping for employees, all safety equipment, including fume hoods, safety showers and eyewash stations, must be inspected and tested with each inspection documented.

## STORAGE OF CHEMICALS

The purchase of acid storage cabinets or plastic tubs with tight-fitting lids to segregate acids from bases is recommended. In areas where flammable materials are stored, NFPA (National Fire Protection Association) approved flammable storage cabinets should be installed and used. As a general rule, chemical storage inside a fume hood should be limited.



## EXHAUST/FUME HOODS

Exhaust hoods are to be routinely inspected at least once every six months by lab personnel or EOHS and maintained by Facilities as needed. Each department is responsible for maintaining a log of what chemicals are used in a given fume hood. Each time a new or different chemical is used in a fume hood, the chemical must be listed on the log. The information should include the person's name and chemical(s) they are using. If a chemical already appears on the log, it does not have to be entered again unless a different person is using it.

Maintenance personnel must be informed about potential hazards they may face. Based on information in the logs, if the potential for exposure to hazardous conditions is high, the department will be responsible for funding an outside contractor to perform maintenance on the hood. When a maintenance request is sent to Facilities, all chemicals and apparatus will be removed from the hood area to ensure that maintenance workers have a safe work environment. If any special precautions or personal protective equipment are necessary due to the nature of chemicals or other residue inside the hood, the EOHS should be notified for confirmation of safe work practices and to supply the necessary PPE and/or environmental monitoring.

## WASTE COLLECTION AT SATELLITE LOCATIONS

Large generators and small generators of hazardous waste may accumulate up to 55 gallons of hazardous waste or one quart of acutely hazardous waste (p-listed) [found at 40 CFR 261.33(e)] in containers at or near any point of generation without a permit and without being subject to the time and waste quantity limits or the accumulation requirements of 40 CFR 262.34 of this rule, provided the generator complies with the following from 40 CFR 265.

171. If a container holding hazardous waste is not in good condition, or if it begins to leak, the owner must transfer the hazardous waste to a container in good condition.

172. The owner must use a container made of or lined with materials that will not react with, and are otherwise compatible with, the hazardous waste to be stored.

173. A container holding hazardous waste must always be closed during storage, except when it is necessary to add or remove waste. The container must not be opened, handled, or stored in a manner that may rupture the container or cause it to leak.

The owner must mark the containers either with the words "HAZARDOUS WASTE" or "ACUTELY HAZARDOUS WASTE", as applicable, or with other words that identify the contents of the containers.



EOHS must prepare and maintain a log book or similar documentation, which lists the hazardous wastes it has generated for each calendar month by date, EPA hazardous waste number and quantity. The log must be current and contain monthly data for at least 11 consecutive calendar months, if appropriate. The log must also note which of the listed wastes have been removed from accumulation for either on-site or off-site treatment, storage, or disposal.

The intent of this rule is to ensure that YSU handles its wastes appropriately based on the volume produced in any one month. YSU generally does not exceed the normal hazardous waste limits for a small quantity generator, but has exceeded the limit of one kilogram of acutely hazardous waste in a given month, which then puts YSU into the large quantity generator status.

Each lab is required to log the volume and concentration of each addition of chemical waste to a waste container. Containers of wastes that are not hazardous by law should be labeled simply "waste" followed by the chemical name or chemical class. This procedure is intended to ensure that all containers in the lab have their contents properly and clearly labeled. Hazardous wastes must be clearly labeled as such. The more information available as to the contents of hazardous waste containers, the better. Wastes should be segregated whenever possible. For guidelines on waste segregation, see the following section.



## PACKAGING AND LABELING OF WASTES FOR COLLECTION BY EOHS

Labeling is required of **all** chemical containers except when chemicals are transferred to portable containers by employees for their immediate use. The chemicals in the portable containers must be used up during the day or before the employee leaves the lab.

The following requirements are to ensure compliance with the law, minimize the generation of unknowns, and reduce the costs for analysis and final disposal of wastes:

1. Waste containers must be labeled clearly with the words "HAZARDOUS WASTE" or "ACUTE HAZARDOUS WASTE" as appropriate, or the substance name with the word "waste" (such as: "waste toluene"). IN ALL CASES, LABEL THE CONTENTS OF THE CONTAINER WITH THE CHEMICAL NAME OR MIXTURE AND ANY CONTAMINANTS.
2. Contents of each waste container must be known and listed on the label, including the concentration of each chemical/contaminant. This information is paramount for a waste containing any of the toxic contaminants listed in Table 1 of 40 CFR 261.24, "Maximum Concentration of Contaminants for the Toxicity Characteristic." Table 1 is shown on page 21. If the concentration of a toxic contaminant in the waste exceeds the "Regulatory Level" (in mg/l) listed in this table, then the waste is a hazardous waste. The characteristic of toxicity is determined using the "Toxicity Characteristic Leaching Procedure" (TCLP) method. The TCLP test reflects only the leachable quantity of the contaminant. The total amount of contaminant in the waste should also be listed.
3. Always use a sturdy receptacle to contain your waste. If possible, keep wastes in their original container. Plastic milk jugs and soda bottles or containers without lids are not acceptable. EOHS will try to provide an appropriate waste container if you don't have one. Containers that will not react with the contents should always be used (i.e., don't put acids in metal cans). Optimize the container size with the amount of waste (i.e., don't place 20 g or 20 ml of waste in a 2.5 liter bottle).
4. Leave two inches of head space in liquid containers. Do not fill bottles to the top.
5. Segregate SOLVENT wastes into three separate containers:
  - a. Halogenated (i.e. chloroform).
  - b. Water miscible, non-halogenated (i.e. acetone, alcohols)
  - c. Non-water miscible, non-halogenated (i.e. hexane)
6. Do not mix inorganic wastes with organic wastes
7. Do not mix heavy-metal wastes with organic wastes
8. **NEVER** mix mercury compounds with ANY other wastes.





9. Segregate acid waste from base waste unless you are neutralizing the material. Do not mix either acids or bases with solvents.
10. Do not accept wastes from outside parties for disposal through YSU.
11. All containers of hazardous waste must be dated on the day that EOHS is notified of the requests for the pickup. This date will be the accumulation start time. Hazardous wastes in excess of 55 gallons or acutely hazardous wastes in excess of one kilogram from satellite accumulation sites must be dated and transported to the EOHS Hazardous Waste Storage Area within three days from the time the material is generated.

## **GUIDELINES FOR THE COLLECTION OF HAZARDOUS MATERIALS FOR DISPOSAL BY EOHS**

Telephone or email the Office of Environmental, Health and Safety (330-941-3700) to arrange for the collection of hazardous waste or of chemicals that are no longer wanted. Be prepared to give your name, phone number, department, and the type, quantity and location of the waste(s). EOHS will collect wastes on Campus as soon as possible after notification.

A meeting will be arranged to help you sort useful materials from waste materials, if needed. Materials that may be useful to someone else on Campus will go to the chemical storage area. Chemicals having no use will be declared waste.

Upon arrival at the storage facility, wastes will be logged into the waste inventory to comply with the time and quantity accumulation limits. Hazardous waste in solid form will be separated for lab packs, and liquids will be either poured into drums for bulk shipment or separated into lab packs. The Hazardous Waste Storage Area is located in the Chemical Management Center.

**A third party vendor is used to ship the waste offsite for treatment and/or disposal.**



## GENERATOR STATUS

A "**large generator**" is one who generates:

- greater than 1 kilogram (2.2 pounds) of acute hazardous waste;
- greater than 100 kilograms (220 pounds) of any residue, contaminated soil, waste or other debris resulting from a discharge into or on any land or water of acute hazardous waste; or
- greater than 1000 kilograms (2200 pounds) of hazardous waste in any calendar month.

A "**small generator**" is one who generates between 100 kilograms (220 pounds) and 1,000 kilograms (2,200 pounds) of hazardous waste in any calendar month. A small generator cannot exceed 1 kilogram (2.2 pounds) of acute hazardous waste.

A "**conditionally exempt small quantity generator**" or "conditionally exempt generator" is one who generates no more than 100 kilograms (220 pounds) of hazardous waste in a calendar month. If a conditionally exempt small quantity generator accumulates more than 1000 kilograms (2,200 pounds) of hazardous waste at any time, all of those wastes are subject to regulation as if they were generated and accumulated by a small generator.

Large generators may accumulate hazardous waste on-site for up to 90 days without a permit, regardless of the quantity of hazardous waste accumulated. For a generator who is classified as a large generator by virtue of their accumulation of acute hazardous waste, the 90 day period for accumulation of the acute hazardous waste begins at any time when these accumulated wastes meet the applicable limits described above.

If the total amount of hazardous waste accumulated on-site does not exceed 6,000 kilograms (13,200 pounds), small generators may accumulate hazardous waste for up to 180 days.



## DISPOSAL COSTS

Most disposal costs will be paid out of the Office of Environmental Occupational Health and Safety budget with the exception of containers of unknown materials which enter the waste stream. In a past example, a one-liter container of unknown material cost over \$800 to analyze and identify before it could be properly disposed. **EOHS will NOT accept unknowns for free disposal.** Unknown materials will be accepted with the understanding that the department or research program responsible for the unknown will be billed for the testing necessary to characterize the waste. However, the generator may independently make arrangements to have the material analyzed. This policy is necessary to ensure that the costs of analyses do not overrun the disposal budget and that those who generate the unknowns bear the financial burden for failure to follow the hazard communications program and/or the chemical hygiene plan.

Proposals for research grants must contain funding provisions for disposal of any hazardous wastes generated during that project. The projects will be billed for any hazardous waste disposal.



## POLICY ON DISPOSAL OF CHEMICALS BY MEANS OTHER THAN SHIPMENT OR DONATION

### *Waste to the landfill:*

Only non-hazardous solid wastes are accepted for landfill disposal. Landfills will not accept liquids or solutions of chemicals. Disposal of small quantities of organic or biochemicals that are equivalent to food products or food additives are allowed. The Safety Data Sheet (SDS) for each product often provides guidance on disposal practices. **Any inert empty chemical container may be thrown in the trash after it has been emptied and rinsed; however, be sure to notify the CMC or EOHS of the bar code number on the container so the CHEMICAL DATABASE System can be updated. If the container held an acute hazardous chemical (listed in 40 CFR 261.33), it is considered to be empty if:**

- a) The container or inner liner has been triple rinsed using a solvent capable of removing the commercial chemical product or manufacturing chemical intermediate;
- b) The container or inner liner has been cleaned by another method that has been shown in the scientific literature, or by tests conducted by the generator, to achieve equivalent removal; or
- c) In the case of a container, the inner liner that prevented contact of the commercial chemical product or manufacturing chemical intermediate with the container, has been removed.

If you are not sure if the material you are disposing of is a "non hazardous solid waste" or if the container meets the definition of "empty," call EOHS for guidance.

### *Sink*

Sink disposal of chemicals is highly discouraged at YSU but guidelines are given below.

The YSU Chemical Hygiene Plan contain further guidelines for disposal of chemicals. Contact EOHS if you need assistance.

### ***Sink Drain Disposal Guidelines:***

#### ***General Prohibitions***

Gasoline, benzene, ethers, carbides, xylene, perchlorates, oils and naphtha or any halogenated solvents or other like substance must be collected for hazardous waste disposal by means other than the sink drain. Any chemical that is an acute hazardous waste as found on the "P-list" or any non-water miscible, flammable or explosive chemical shall not be disposed of in the city sewer except in de minimis amounts. For purposes of this section, de minimis is defined as the residue left in a container after the container is emptied by normal means such as pouring or pumping. Under no circumstances should a de minimis or residue amount of the above materials exceed 10 ml at any one time. The intent of this section is to preclude dumping a number of small containers of these materials in an attempt to avoid generating a waste. Instead, every effort should be made to reasonably collect these materials for shipment as a hazardous waste. The allowance of de minimis amounts enables us to wash containers that have held prohibited waste without regard to the minimal contents left in them.



## ***Acids and Bases***

Acids and bases should be neutralized to a pH above 2.0 or below 12.5 whenever possible. Materials with a pH outside the above limits are legally defined as a hazardous waste. However, it is advisable to neutralize them to a pH between 4 and 10 to avoid corrosion of pipes. After pH adjustment, acids and bases may be disposed of in the sink drain. Extremely small amounts of concentrated acid or base may be poured directly into the drain with copious amounts of water. Before doing this, make sure that a reaction leading to splash or excess fumes will not occur.

## ***Aqueous Metals Solutions***

No aqueous metal solutions should be disposed of in the sink.

## ***Alcohols, Acetones and Non-stench Aldehydes***



Alcohols, acetones and other water-miscible materials may be disposed of in the sink drain provided they are diluted by least 20 to 1 with water at the time of disposal. This procedure is necessary to insure that a flammable or explosive atmosphere is not generated.

### ***Liquid Nutrient Solutions***

Liquid nutrient solutions may be disposed of in the sink drain.

### ***Carcinogenic, Mutagenic, or Other BioHazardous Chemicals***

These chemicals shall not be poured down the drain.

### ***Evaporation into the Atmosphere:***

Evaporation of chemicals is NOT an approved method of disposal. Evaporation is often a major route of loss of a chemical in its normal use or application; however, in these situations, prudent practices should be used to ensure personnel and environmental protection.

### ***Consumption in a Normal Use or Application:***

Some chemicals, when used in a normal and accepted manner, are consumed in a way that does not provide a retrievable product or waste. The above policies are not intended to restrict this normal consumption unless there is an obvious personnel or environmental hazard.

## **WASTE MINIMIZATION**

The Resource Conservation and Recovery Act requires that each generator of hazardous waste have a waste minimization plan in effect before wastes are shipped from the site. Each department shall be responsible, with help from the Office of Environmental, Health and Safety, to develop a waste minimization plan and to reduce the generation of hazardous wastes to a level as low as possible. Any capital investments needed for extra equipment such as small stills, a change in the types of chemicals for experiments, or a conversion to micro scale equipment should be planned for in each department's budget.

In June of 1990, the EPA published the **GUIDES TO POLLUTION PREVENTION IN RESEARCH AND EDUCATIONAL INSTITUTIONS**. Many of the recommendations have already been discussed, but the following should be included in each waste minimization plan:

1. Appoint and train one person from each department to oversee the hazardous materials management plan and right-to-know.



2. Eliminate the need for chromic acid washing of glassware, either by using disposable plastic glassware or cleaning glassware with specialty detergents.
3. Purchase laboratory chemicals, paints and other maintenance chemicals in the minimum quantity required. This will reduce generation of surplus materials requiring disposal.
4. Establish a tracking system for listed chemicals from purchase to disposal. This will reduce duplicate purchases and minimize the waste generated from old, partially used containers that age on laboratory shelves. YSU's Chemical Inventory Management System (CHEMICAL DATABASE) will improve inventory control. Each chemical container is labeled with a unique bar code label to allow for efficient tracking.
5. Encourage and promote sharing of bulk and surplus chemicals.
6. Provide routine audits for each laboratory, focusing on unusable reagent accumulation and unlabeled containers.
7. Increase the use of instrumentation (versus chemical experimentation) in undergraduate course work.



## **LIST OF ATTACHMENTS**

I. YSU Hazardous Waste Contingency Plan

II. TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) LIST

III. LIST OF CHEMICALS WHICH MUST BE CHECKED BY CHEMICAL MANAGEMENT CENTERS PRIOR TO ACQUIRING CHEMICALS





# ATTACHMENT I

YSU HAZARDOUS WASTE CONTINGENCY PLAN ATTACHMENT II



## ATTACHMENT II

### MAXIMUM CONCENTRATION OF CONTAMINANTS FOR THE TOXICITY CHARACTERISTIC

EPA#	Contaminant	CAS No.	Regulatory Level (mg/l)
D004	Arsenic	7440-39-3	5.0
D005	Barium	7440-39-3	100.0
D018	Benzene	71-43-2	0.5
D006	Cadmium	7440-43-9	1.0
D019	Carbon tetrachloride	56-23-5	0.5
D020	Chlordane	57-74-9	0.03
D021	Chlorobenzene	108-90-7	100.0
D022	Chloroform	67-66-3	6.0
D007	Chromium	7440-47-3	5.0
D023	o-Cresol	95-48-7	200.0
D024	m-Cresol	108-39-4	200.0
D025	p-Cresol	106-44-5	200.0
D026	Cresol		200.0
D016	2,4-D	94-75-7	10.0
D027	1,4-Dichlorobenzene	106-46-7	7.5
D028	1,2-Dichloroethane	107-06-2	0.5
D029	1,1-Dichloroethylene	75-35-4	0.7
D030	2,4-Dinitrotoluene	121-14-2	0.13
D012	Endrin	72-20-8	0.02
D031	Heptachlor (and its epoxide)	76-44-8	0.008
D032	Hexachlorobenzene	118-74-1	0.13
D033	Hexachlorobutadiene	87-68-3	0.5
D034	Hexachloroethane	67-72-1	3.0
D008	Lead	7439-92-1	5.0
D013	Lindane	58-89-9	0.4
D009	Mercury	7439-97-6	0.2
D014	Methoxychlor	72-43-5	10.0
D035	Methyl ethyl ketone	78-93-3	200.0
D036	Nitrobenzene	98-95-3	2.0
D037	Pentachlorophenol	87-86-5	100.0
D038	Pyridine	110-86-1	35.0
D010	Selenium	7782-49-2	1.0
D011	Silver	7440-22-4	5.0
D039	Tetrachloroethylene	127-18-4	0.7
D015	Toxaphene	8001-35-2	0.5
D040	Trichloroethylene	79-01-6	0.5
D041	2,4,5-Trichlorophenol	95-95-4	400.0
D042	2,4,6-Trichlorophenol	88-06-2	2.0
D017	2,4,5-TP (Silvex)	93-72-1	1.0
D043	Vinyl chloride	75-01-4	0.2



## ATTACHMENT III

### LIST OF CHEMICALS THAT MUST BE CHECKED BY CHEMICAL MANAGEMENT CENTER (CMC) PRIOR TO ACQUIRING CHEMICALS

This list includes materials that become "acutely hazardous wastes" (P-List) under the Environmental Protection Agency (EPA) and State of Ohio disposal regulations. YSU has expanded the original list to include synonyms. Acutely hazardous wastes are derived from materials that are extremely hazardous to humans and the environment according to EPA and, therefore, are strictly regulated. Because of this, YSU attempts to substitute less hazardous materials when possible. The Chemical Management Centers (CMCs) must check this list whenever a chemical is being acquired whether through a purchase or acceptance of a gift. If the material appears on this list, the proposed user is asked to consider a less hazardous chemical if one is available and will serve the same purpose.

The storage limit for acute hazardous wastes is 1 kg (2.2 lbs.); once this storage quantity has been exceeded, YSU must ship all wastes in accumulation off Campus within 90 days. Therefore, users must be aware that they are using a material from the list and be aware of the hazards and restrictions. After a container that has held one of these materials has been emptied by conventional means (i.e., poured or pumped empty), it must be triple rinsed before the container is discarded. The residual material is not considered a hazardous waste but rather de minimis.

(acetoxymethyl)benzene

1-(4'-hydroxy-3'-coumarinyl)-1-phenyl-3-butanone

1-(o-Chlorophenyl)thiourea

1-1-(3,4-dihydroxyphenyl)-2-methylaminoethanol

1-Acetyl-2-thiourea

adrenalin

1-amino-4-chlorobenzene

1-amino-4-nitrobenzene

1-bromo-2-propanone

1-methyl hydrazine

1-phenyl-2-thiourea

1-phenylthiourea

1-propen-3-ol

1-propenol-3

1-propyne-3-ol

10,11-dimethystrychnine

1,1-dimethyl-2-phenylethanamine

1,2-Benzenediol, 4-(1-hydroxy-2-(methylamino)ethyl)-

1,2-propyleneimine

1,2,3-propanetriol, trinitrate

1,2,3-propanetriyl nitrate

1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-dimethanonaphthalene

1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-endo,exo-

1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,endo-1,4,5,8- dimethanonaphthalene

1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-endo,endo- 1,2,3,4,10,10-

Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,exo-1,4,5,8- dimethanonaphthalene

2-(ethylthio)-ethanethiol S-ester with O,o-diethyl phosphorothioate

2-chloro-1-ethanal

2-chloroacetaldehyde monomer

2-hydroxy-2-methylpropionitrile



2-methyl-2-(methylthio)propionaldehyde oxime  
2-methyl-2-(methylthio)propionaldehyde-O-(methylcarbamoyl) oxime 2-  
methyl-2-(methylthio)propanal-O-((methylamino)carbonyl)oxime  
2-methylazacyclopropane 2-  
Methylaziridine  
2-methylethylenimine  
2-Methylactonitrile  
2-methylthio-acetaldehyde-O-(methylcarbamoyl)-oxim(German) 2-  
phenyl-tert-butylamine  
2-propen-1-ol  
2-propen-1-one 2-  
propenal  
2-propenyl alcohol 2-  
propyn-1-ol  
2- propynyl alcohol  
2,3-dimethoxystrychnine  
2,4-dinitro-6-cyclohexylphenol 2,4-  
Dinitrophenol  
2,4-Dinitrophenol  
2,4-Dithiobiuret  
2,4,6-trinitro-ammonium salt  
3(2H)-Isoxazoione, 5-(aminomethyl)-  
3-(1'-phenyl-2'-acetylethyl)-4-hydroxycoumarin  
3-(alpha-Acetylbenzyl)-4-hydrocoumarin and salts, conc. > .3% 3-(alpha-phenyl-beta-acetylethyl)-4-hydroxycoumarin  
3- chloropropanenitrile 3-  
chloropropanonitrile 3-  
Chloropropionitrile 3-  
hydroxypropene  
3-propynol  
3-thiabutan-2-one  
3- thiosemicarbazide  
3,3-Dimethyl-1-(methylthio)-2-butanone, O-[(methylamino)carbonyl] oxime  
3,4-dihydroxy-alpha-((methylamino)methyl)benzyl alcohol 4-  
aAminopyridine  
4- chloroaniline  
4-chlorobenzeneamine 4-  
chlorophenylamine  
4-hydroxy-3-(3-oxo-1-phenylbutyl)-2H-1-benzopyran-2-one 4-  
nitraniline  
4-nitrobenzenamine  
4- Pyridinamine  
4,6-Dinitro-o-cresol and salts 4,6-  
dinitro-o-cyclohexylphenol 4,6-  
Dinitro-o-cyclohexylphenol 5-  
(Aminomethyl)-3-isoxazolol



5- Norbornene-2,3-dimethanol,1,4,5,6,7,7-hexachloro, cyclic sulfite  
6- cyclohexyl-2,4-dinitrophenol  
7- Oxabicyclo[2,2,1]heptane-2,3-dicarboxylic acid  
Acetaldehyde, chloro-  
Acetamide, N-(aminothioxomethyl)-  
Acetamide, 2-fluoro-  
acetic acid, phenylmercury deriv.  
Acetic acid, fluoro-, sodium salt  
Acetimidic acid, N-[(methylcarbamoxy)oxy]thio-, methyl ester  
acetone cyanohydrin (DOT)  
acetyl bromide  
acetyl methyl bromide  
acquinite acraaldehyde  
Acrolein acrylaldehyde  
acrylic aldehyde  
adenodis  
adnephrine  
adrenal  
adrenalin-medihaler  
adrenamine adrenan  
adrenapax adrenasol  
adrenatrate  
adrenohorma  
adrenutol  
adrine  
AIP  
al-phos  
aldecarb  
Aldicarb  
aldrex  
aldrex 30  
Aldrin  
aldrite  
aldrosol  
allyl aldehyde  
allyl al  
Allyl alcohol  
allylic alcohol  
alpha, alpha-dimethylphenethylamine alpha,  
alpha-dimethylbenzeethanamine alpha, alpha-  
dimethyl-beta-phenylethanamine alpha-  
chlorotoluene  
alpha-hydroxyisobutyronitrile  
alpha-Naphthylthiorea alpha-  
phenylthiourea



altox  
aluminum monophosphide  
Aluminum phosphide ambush  
aminoethylene  
ammonium metavanadate (DOT)  
Ammonium picrate (R)  
Ammonium vanadate  
anginine  
aqualine  
arsenate  
arsenic acid anhydride  
arsenic trioxide arsenic  
pentoxide arsenic  
sesquioxide arsenic  
oxide  
arsenic acid  
arsenic trihydride  
arsenic hydride  
Arsenic (V) oxide  
Arsenic acid  
Arsenic (III) oxide  
arseniuretted hydrogen  
arsenous acid anhydride  
arsenous oxide  
arsenous oxide anhydride  
arsenous hydride arsenous  
anhydride Arsine, diethyl  
asmatane mist  
asthma meter mist  
astmahalin  
athrombine-K  
azacyclopropane  
azide  
azirane  
Aziridine  
azium  
azofix red GG salt  
azoic diazo component 37 b-  
chloropropionitrile balmadren  
barium dicyanide  
Barium cyanide  
BCME  
BCME  
Benzenamine, 4-nitro-  
Benzenamine, 4-chloro-



Benzene, (chloromethyl)  
Benzenethiol  
benzyl chloride  
Benzyl chloride (see Benzene, chloromethyl)  
bernarenin  
beryllium  
Beryllium dust  
beryllium-9  
biocide  
biorenine  
Bis(chloromethyl)ether  
bis(chloromethyl)ether bis-  
cme  
BIS-CME  
bladan blasting  
gelatin blue-ox  
bosmin  
brevirenin  
bromo methyl methyl ketone  
bromo-2-propanone  
Bromoacetone  
bronkaid mist  
brucine alkaloid  
Brucine brumin  
C.F.S.  
C.I. developer 17  
C.I. 37035  
C.I. 77938  
Calcium cyanide  
calcyanide  
CMCphene, octachloro-  
Carbamimidoseleonic acid  
carbanolate  
carbon oxychloride  
carbon disulfide  
carbon nitride carbon  
nitride ion carbon  
sulfide Carbon  
bisulfide carbonic  
dichloride carbonyl  
chloride Carbonyl  
chloride celphide  
celphos



celphos  
chelafrin  
chinorta  
chlorocyan  
Chlorine cyanide  
chloro(chloromethoxy)methane  
chloro(chloromethoxy)methane chlorocyan

chloroformyl chloride  
chlorophenylmethane  
compound 118  
compound 42  
compuond no. 1080  
Copper cyanides corax  
corisol  
coumadin  
coumafene  
crolean crude  
arsenic  
CSF-giftweizen  
cupricin  
cuprous cyanide  
cyanide anion cyanide  
of potassium cyanide of  
sodium  
Cyanides (soluble cyanide salts)  
cyanobrik  
cyanoethane  
cyanogas cyanogen  
gas cyanogen  
chloride Cyanogen  
cyanogran cymag  
d-con  
delicia  
delicia  
desiccant L-10  
dethmore detia  
gas ex-B detia  
gas ex-B  
developer P  
DFP  
diarsenic pentoxide





diarsenic trioxide  
diazo fast red GG  
dichlordimethyl ether (DOT)  
dichlordimethylaether(German)  
dichlorodimethyl ether (DOT)  
dichloromethyl ether  
dichloromethyl ether  
Dichlorophenylarsine dicyanogen  
Dieldrin  
diethyl paraoxon

Diethyl-p-nitrophenyl phosphate  
diethyl-S-(2-ethioethyl)thiophosphate  
Diethylarsine  
diflupyl  
difluorophate  
dihydro-1H-aziridine  
dihydroazirene  
diisopropoxyphosphoryl fluoride  
diisopropyl fluorophosphate  
diisopropyl fluorophosphate  
diisopropyl phosphorofluoridate  
diisopropyl phosphofluoridate  
Diisopropyl fluorophosphate  
diisopropylfluorophosphoric acid ester  
dimethanonaphthalene dimethanonaphthalene  
Dimethoate  
dimethoxy strychnine (DOT)  
dimethyl-1,1'-dichloroether  
dimethyl-1,1'-dichloroether  
dimethylenimine  
Dimethylnitrosamine  
dimethylnitrosoamine  
dinex  
dinitro-o-cyclohexylphen  
dinitrocyclohexylphenol  
dinitrocyclohexylphenol  
Dinoseb  
diphosgene Diphosphoramide,  
octamethyl Disufoton  
dithallium trioxide  
dithallium sulfate



dithallium(1+)sulfate  
dithiocarbonic anhydride  
Dithiopyrophosphoric acid, tetraethyl ester  
DMN  
DMNA  
DN dust No.12  
DN dry mix No.1  
DNOCHP  
dowspray 17  
drenamist  
drinox  
dry mix No.  
duromine  
dyflos  
dylephrin  
dyspne-inhal E  
600  
eastern states duocide  
eccothal  
EI  
Endosulfan  
Endothall  
Endrin  
ENT 27,093  
ENT 15,949  
ENT 50,324  
ENT 16,087  
ENT 157  
ENT 24,042  
epifrin epinephran  
epitrate  
esphygmogenina  
ester 25  
ethanedinitrile  
Ethenamine, N-methyl-N-nitroso  
ether cyanatus  
ethyl p-nitrophenyl ethylphosphate ethyl  
paraoxon  
ethyl tetraphosphate  
Ethyl cyanide ethylene  
aldehyde  
ethylene imine, inhibited (DOT)



ethylenimine  
ethylimine  
ethynylcarbinol  
ethynylmethanol  
eticol  
exadrin  
explosive D  
Famphur  
fast red 2G salt fast  
red base GG  
floropryl  
fluophosphoric acid, diisopropyl ester  
Fluorine  
fluoroacetamide  
Fluoroacetamide  
fluoroacetic acid amide  
Fluoroacetic acid, sodium salt  
fluorodiisopropyl phosphate  
fluoroethanoic acid  
fluorokil 100  
fluoropryl  
fluostigmine  
fosfakol  
fulminate of mercury  
Fulminic acid, mercury (II) salt (R,T)  
fumitoxin  
fussol  
glonoin  
glucinum  
glycerol, nitric acid triester glycerol trinitrate  
glyceryl trinitrate  
glyceryl nitrate  
glycirenane granutox  
GTN  
haemostasin  
HC 2072  
hektalin  
hemisine  
hemostasin  
Heptachlor  
HET  
HETP



hexachlorohexahydro-endo-exo-dimethanonaphthalene  
Hexachlorohexahydro-exo,exo-dimethanonaphthalene Hexaethyl  
tetraphosphate  
HHDN  
HTP  
Hydrazine, methyl  
Hydrazinecarbothioamide  
hydrazomethane hydrocyanic  
ether  
hydrocyanic acid, potassium salt  
hydrocyanic acid, sodium salt  
Hydrocyanic acid  
hydrogen arsenide  
hydrogen cyanide  
Hydrogen phosphide  
hypernephren hyporenin  
intranefrin  
iso-cyanatomethane Isocyanic  
acid, methyl ester isocyanide  
isodemeton  
isofluorophate  
isopropyl phosphoro fluoridate  
isopropyl fluophosphate  
kazoe  
kidoline  
kilrat  
klavi kordal kumader  
lannate  
levorenin  
lipopill liqua-  
tox lonamin  
lyophrin  
M7-giftkoerner  
magnacide H medihaler-  
epi megatox  
mercuriphenyl acetate  
mercury fulminate  
Mercury, (acetate-O)phenyl-  
mesomile  
metanephrin  
Methane, oxybis(chloro)  
Methane, tetranitro- (R)



Methanethiol, trichloro-  
methomyl  
methyl N[(methylamino)carbonyl]oxy ethanimido] methyl  
O-(methylcarbamoyl)  
methyl isocyanate  
methyl-N-[methylcarbamoyl]oxy] thioacetimidate  
methylethylenimine  
methylhydrazine  
methyllarterenol  
methylvinylnitrosoamine MG  
18570  
MG 18370  
mintacol  
miotisal A  
miotisal  
mirapront  
MMH  
monobromoacetone  
monochloroacetaldehyde  
monofluoroacetamide  
monomethyl hydrazine  
mous-con  
mucidrina  
MVNA  
myocon  
myosthenine mytrate  
N-aminothiorea  
N-methyl-N-nitroso-ethenylamine N-  
methyl-N-nitrosomethanamine N-  
methyl-N-nitrosovinylamine  
N-nitrosodimethylamine  
N-nitrosomethylvinylamine  
N-Phenylthiourea  
N-[[[(methylamino)carbonyl]oxy]ethanimido]thioc acid, methyl ester naphtoelan  
red GG base  
navron  
NCI-00044  
NCI-C02017  
NCI-C02039  
NCI-C04591  
NCI-C06360  
NCI-C06462  
NCI-C08640



NCI-C54988  
NCI-C55947  
NCI-C60219  
NCI-C60786  
NCI-CC55947  
NDMA  
neoglaucit  
nephridine  
NG  
nickel tetracarbonyl  
Nickel cyanide  
Nickel carbonyl  
Nicotine and salts  
nialaline  
niglycon niong  
nitrazol CF extra  
Nitric oxide  
nitriacetoneitrile  
nitrite-TDC nitrite  
nitro-span  
nitrogen peroxide, liquid (DOT)  
nitrogen monoxide  
Nitrogen (II) oxide  
Nitrogen (IV) oxide  
Nitrogen dioxide  
Nitroglycerin (R)  
nitroglycerol  
nitroglyn  
nitrol  
nitrolingual  
nitrolowe  
nitronet  
Nitrong  
nitrosodimethylamine  
nitrostat  
NK-843  
NMVA  
N,N-Dimethylnitrosamine  
NSC 8819  
NSC 3072 NTG  
nudrin  
obeline picrate



octalene seedrin  
Octamethylpyrophosphoramidate OMS-  
771  
O,O'-diisopropyl phosphoryl fluoride  
O,o-diethyl S[2-(ethylthio)ethyl]phosphorothiolate O,O-  
diethyl O-p-nitrophenyl phosphate  
O,O-diethyl phosphoric acid O-p-nitrophenyl ester O,O-Diethyl  
S[2-(ethylthio)ethyl] phosphoro-dithioate O,O-Diethyl O-  
pyrazinyl phosphorothioate  
O,O-diethyl-ethylthiomethyl-phosphorodithioate O,O-  
diethyl-S-(2-ethylthioethyl)phosphorothioate  
O,O-diethyl-S-ethyl-2-ethylmercaptophosphorothiolate O,O-  
diethyl-S-ethylmercaptomethyl dithiophosphonate O,O-diethyl-  
S-ethylthiomethyl thiothionophosphate  
O,O-diethyl-S-ethylthiomethyl dithiophosphonate  
O,O-diisopropyl fluorophosphate  
O,O-Dimethyl O-p-nitrophenyl phosphorothioate  
orthoarsenic acid  
orvinylcarbinol  
osium tetroxide  
Osium oxide  
osium(VIII)oxide  
osmic acid  
oxalic acid dinitrile  
oxalonitrile  
oxalyl cyanide  
oxybis (chloromethane)  
oxyparathion  
p-aminonitrobenzene p-  
chloraniline  
p-Chloroaniline p-  
nitraniline  
p-nitroaniline  
p-nitrophenyl diethylphosphate p-  
nitrophenylamine paranephrin  
paranitroaniline solid (DOT)  
paraoxon  
paraoxone  
Parathion  
paroxon  
perglottal  
pestox 101  
PF-3



phenol  
Phenol, 2,4-dinitro-6-methyl- Phenol,  
2-cyclohexyl-4,6-dinitro-  
Phenol, 2,4,6-trinitro-, ammonium salt (R)  
Phenol, 2,4-dinitro-6-(1-methylpropyl)-  
phenomercuric acetate  
phentermine  
phenyl mercaptan  
phenyl dichloroarsine (DOT)  
phenylarsinedichloride  
phenylarsonous dichloride  
phenylcarbamide  
phenylmercuric acetate  
phenylmercury acetate Phorate  
phorate-10G  
phosgene  
phosphacol  
phosphine  
phosphoric acid, diethyl 4-nitrophenyl ester  
Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl]ester  
phosphorofluoridic acid, diisopropyl ester  
Phosphorofluoroic acid, bis(1-methylethyl)-ester  
Phosphorothioic acid, O,O-dimethyl O-[p-((dimethylamino)-sulfonyl)phenyl]ester Phosphorothioic acid, O,O-  
diethyl O-pyrazinyl ester  
Phosphorothioic acid, O,O-diethyl O-(p-nitrophenyl) ester  
phosphorous trihydride  
phostoxin  
phosvin  
picratol  
picric acid ammonium salt  
Plumbane, tetraethyl- PNA  
po-systox Potassium cyanide  
Potassium silver cyanide  
primatene mist  
prop-2-en-1-al  
propanenitrile  
Propanenitrile, 2-hydroxy-2-methyl  
Propargyl alcohol  
propen-1-ol-3  
propenol propenyl  
alcohol propionic  
nitrile  
propionitrile





propylene aldehyde  
propylene imine, inhibited (DOT)  
prothromadin  
prussic acid  
prussite PTC  
PTU  
Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts  
Pyrophosphoric acid, tetraethyl ester  
rampart  
ratbane 1080  
rattengiftkonserve red  
2G base renagladin  
renaleptine renalina  
renoform  
renostyptin  
rodex  
rumetan  
S-methyl-N-[(methylcarbamoyl)oxy] thioacetimidate  
scurenaline  
Selenourea  
shell undrautted A shinnippon  
fast red GG base Silver cyanide

sindrenina  
SK-106N  
slimicide  
SN 46  
sodium fluoacetic acid sodium  
fluoacetate sodium  
flouroacetate sodium  
monofluoroacetate Sodium  
azide  
Sodium cyanide  
soladren solfarin  
soluglacid  
soup sphygmogenin  
strontium sulphide  
strontium monosulfide  
Strontium sulfide  
strychnine  
Strychnine, 2,3-dimethoxy-  
Strychnine-10-one, and salts  
strychnos  
stryptirenal



sulfuric acid, dithallium(1+)salt(8Cl, 9Cl)  
Sulfuric acid, thallium(I) salt sulphocarbonic  
anhydride supracapsulin  
supradin  
supranephrene  
supranephrene  
supranol  
suprarenin  
suprel  
surenin  
susphrine  
sympathin I  
T-1703  
takamina  
TEL  
temic temik  
G10  
tetraethyl lead  
Tetraethyldithiopyrophosphate  
Tetranitromethane (R) Tetraphosphoric acid,  
hexaethyl ester Thallic oxide  
thallium (3+) oxide  
thallium sesquioxide  
thallium oxide  
thallium peroxide  
thallium(1)sulfate (2:1)  
Thallium(I) selenite  
thallium(III) oxide thimet  
thioacetohydroxamate  
thioate  
thiocarbamylhydrazine  
Thiofanox  
thiol systox  
thioldemeton  
Thiomidodicarbonic diamide  
thiophenol thiosemicarbazide  
Thiourea, (2-chlorophenyl)-  
Thiourea, phenyl- Thiourea, 1-  
naphthalenyl- timet  
TL 869  
TL 337  
TL 69  
TL466  
TNG



TNM  
TNM  
tokamina tolyl  
chloride  
tonogen  
Toxaphene  
Trichloromethanethiol  
trinitrin  
trinitroglycerin  
trinitroglycerol  
TS 219  
TSC  
U 6324  
U-3886  
UC-21149  
USAF XR-19  
USAF RH-8  
USAF EK-1275  
USAF EK-1569  
vanadic acid, ammonium salt  
vanadic anhydride  
vanadium dust and fume  
Vanadium pentoxide  
vanadium(V) oxide  
vaponefrin  
vasoconstrictor  
vasodrine  
vasoton  
vasotonin  
vegfru  
vergfru foratox  
vinylcarbinol  
warfarin  
weed drench  
weeviltox  
white arsenic  
wilpo  
yanock  
yasoknock zinc  
dicyanide  
Zinc phosphide  
Zinc cyanide  
zinc-tox  
zotox

