



Carleton

Hazardous Waste Management Plan

Department of Environmental Health and Safety

Updated: 9/18/2023

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Introduction

Environmental Health and Safety (EHS) is responsible for developing and implementing proper management practices for all aspects of the handling, storage, and disposal of chemical wastes generated at Carleton College. Our goal is to manage chemical wastes in a safe and environmentally sound manner that complies with all applicable federal, state, and local regulations.

Roles and Responsibilities

Managing hazardous waste is an important responsibility. Improperly managing hazardous waste containers can have serious consequences, leading to injuries, fires, or death. There are also criminal and civil penalties that can result from violations. The maximum penalties for EPA waste violations are over \$70,000 per violation per day.

In addition to potential citations, fines, and imprisonment, improper waste disposal can result in national media attention and damage Carleton's reputation.

You can be personally liable for "willfully and knowingly" violating these regulations.

Directors and Department Chairs

Responsibilities include:

- Implementing the program in their areas and departments.
- Ensuring compliance within their disciplines, labs, areas, and shops.

Environmental Health and Safety

Responsibilities include:

- Assisting college faculty and staff with the implementation and compliance of the Hazardous Waste Management Plan (HWMP), including but not limited to training, hazardous waste determinations and classifications, oversight of hazardous waste disposal, sampling and analysis, compliance audits, and assisting with corrective actions when necessary.
- Providing initial and refresher hazardous waste training as necessary.
- Maintaining a hazardous waste manifest master file.
- Maintaining a liaison with the appropriate regulatory authorities (EPA, State of Minnesota, Rice County), including submitting information to regulators as required.
- Ensuring that a contract exists with qualified and adequately licensed hazardous waste disposal contractor(s) at all times. EHS will perform due diligence and inspections (physical and/or desktop) of hazardous waste disposal contractors and associated facilities to ensure regulatory compliance.
- Coordinating transport schedules with waste disposal contractors for all hazardous waste pickups.

Faculty and Staff

Responsibilities include:

- Knowledge and understanding of steps needed to maintain compliance.
- Reducing hazardous waste quantities by reducing, reusing, recycling, and prudent procurement practices.
- Maintaining proper storage and management of all generated wastes (hazardous, non-hazardous, and universal).
- Ensure waste containers are appropriately labeled and in good repair.

- Provide secondary containment, ensuring hazardous wastes or other regulated wastes are not stored outside or in unapproved locations.
- Consistently know each waste container's contents and prevent mixing incompatible wastes that could create dangerous reactions.
- Completing required paperwork/notification to notify EHS that they need waste pickup services.

When Is Hazardous Waste Regulated?

Hazardous waste is regulated from the moment it is generated inside the lab unit until it reaches its final destination for disposal or treatment at an offsite facility.

What Is Hazardous Waste?

Hazardous waste is a solid, liquid, or gaseous material that displays either a "Hazardous Characteristic" or is specifically "listed" as hazardous waste.

Characteristic wastes are not explicitly listed by their chemical name but are regulated as hazardous wastes because they exhibit one or more hazardous characteristics. These four characteristics are **Ignitability, Corrosivity, Reactivity, and Toxicity.**

The **Ignitability** characteristic applies to wastes that are:

- Liquids with a flash point less than 140° F
- Solids capable of spontaneous combustion under normal temperature and pressure
- Oxidizing materials
- Ignitable compressed gasses
- Examples include ethanol, sodium nitrate, hydrogen gas, xylene, and acetone

The **Corrosivity** characteristic applies to wastes that are:

- Aqueous solutions with a pH less than or equal to 2 or greater than or equal to 12.5
- This does not apply to solid or non-aqueous materials
- Examples include hydrochloric acid, nitric acid, and sodium hydroxide solutions

The **Reactivity** characteristic applies to wastes that are:

- Materials that react violently or generate toxic fumes when mixed with water
- Cyanide or sulfide-bearing wastes that evolve toxic fumes when mixed with acids or bases
- Materials that are generally unstable or explosive
- Examples include sodium metal, reactive sulfides, potassium cyanide, and picric acid

The **Toxicity** Characteristic applies to wastes that are:

- The potential to contaminate groundwater if improperly disposed of
- These materials are regulated as hazardous waste due to their potential to leach out specific toxic substances in a landfill
- On the list of 40 contaminants, including certain heavy metals, pesticides, and organic compounds (table below)

EPA HW No.	Contaminant	Level (mg/L)
D004	Arsenic	5.0
D005	Barium	100.0
D006	Cadmium	1.0
D007	Chromium	5.0
D008	Lead	5.0
D009	Mercury	0.2
D010	Selenium	1.0
D011	Silver	5.0
D012	Endrin	0.02
D013	Lindane	0.4
D014	Methoxychlor	10.0
D015	Toxaphene	0.5
D016	2,4-D	10.0
D017	2,4,5-TP Silvex	1.0
D018	Benzene	0.5
D019	Carbon tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0
D022	Chloroform	6.0
D023	o-Cresol	200.0

EPA HW No.	Contaminant	Level (mg/L)
D024	m-Cresol	200.0
D026	Cresol	200.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D031	Heptachlor	0.008
D025	p-Cresol	200.0
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D035	Methyl ethyl ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D039	Tetrachloroethylene	0.7
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D043	Vinyl chloride	0.2

What Is a Listed Hazardous Waste?

Unused or unopened chemicals will meet the definition of a listed hazardous waste if they appear on one of two lists. The **U-list** contains materials that are hazardous due to their toxicity. The **P-list** contains materials that are hazardous because they are acutely toxic. These lists only apply to unused materials with one of the listed chemicals as their sole active ingredient. The list also applies to spill cleanups of these unused materials. The complete U and P lists are included in Appendix A and B of this manual.

Additionally, specific used or spent solvents can be regulated as hazardous waste if they appear on the **F-list**. This list is included in Appendix C of this manual.

Hazardous Chemical Waste Determination

A hazardous waste determination must be performed in the lab before removing the waste. It is best practice to update the hazardous waste determination whenever a new waste is first added to a container. EHS staff assumes responsibility for picking up all the waste chemicals for your laboratory and making the final hazardous waste determination.

Essential Rules for Managing Hazardous Chemical Materials

- When possible, seek ways to minimize the quantity of waste generated inside the laboratory.
- Only use appropriate containers to store waste materials. HDPE plastic is preferred, but confirm chemical compatibility before use.
- Store chemical waste in a designated Satellite Accumulation Area (SAA).
- Properly label all waste containers.
- Keep waste containers closed.
- Contact EHS for pickup.

Waste Minimization


Federal and state regulations require Carleton to develop and implement a Waste Minimization Strategy. Ways to help reduce the volume of chemical waste generated on campus include but are not limited to the following:

- Practice the concept of Source Reduction by ordering the smallest chemical materials required for your use.
- Keep an inventory of chemicals in your lab.
- Share surplus chemicals with other labs.
- Purchase mercury-free instruments.
- Substitute hazardous chemicals with non-hazardous chemicals whenever possible.
- Reduce the scale of laboratory experiments to reduce the volume of waste produced whenever possible.

Storing Waste in the Lab (Satellite Accumulation Areas)


Each location on campus where hazardous waste is generated and stored is a Satellite Accumulation Area (SAA). There are specific requirements for managing chemical wastes within these areas.

First, post the following sign at all Satellite Accumulation Areas in your space. Hard copies can be requested from EHS. The sign shown below was updated in 2022.



Satellite Accumulation Area Requirements


- Lids must be properly closed.
- DO NOT fill containers to the top. Max fill = 90%
- Each container **MUST** have a waste label appropriately filled out.
- All compatible containers must reside in a secondary containment.
- All incompatible containers must reside in separate secondary containment.
(e.g. combustibles separated from oxidizers, acids separated from bases)
- Do not stack containers.



HAZARDOUS WASTE	Correct labeling	Incorrect labeling
Contents: (No Formulas or Abbreviations) Xylene (50 mL), Hexane (1L), Acetone (2.5 L)	<ul style="list-style-type: none">• Hazardous Waste Label• Content names spelled out (e.g. Ethanol, not EtOH)• Hazards identified• Location, user, and contact information listed• Date when container is full	<ul style="list-style-type: none">• No Hazardous Waste Label• No contents named• No hazards identified
HAZARDS (CHECK THE HAZARDS THAT BEST DESCRIBE THE CONTENTS OF THE CONTAINER) <input type="checkbox"/> LETHAL <input checked="" type="checkbox"/> FLAMMABLE <input type="checkbox"/> TOXIC <input type="checkbox"/> CORROSIVE <input type="checkbox"/> REACTIVE <input type="checkbox"/> OXIDIZER OTHER: _____		
DATE CONTAINER WHEN FULL OR READY FOR PICKUP _____, _____, _____ MANAGER: Kevin Dolge TEL: 507-222-4902		

Need waste picked up?

Scan here →



Notify EH&S at x4902 or kdolge@carleton.edu **immediately** when containers are full.



Satellite Accumulation Area Requirements

A maximum of 55 gallons of hazardous waste may be stored within any Satellite Accumulation Area. In the case of acutely toxic chemical waste (P-list, Appendix B), a maximum of one quart of liquid or one kilogram of solid may be accumulated at a time. Some common P-list chemicals are sodium azide, osmium tetroxide, and sodium cyanide. Once either limit is reached, EHS must remove the material from your laboratory within three calendar days.

Storage Limits

Hazardous waste containers may be stored in a Satellite Accumulation Area for up to one year from the day waste was first placed into the container as long as the accumulation limits of 55 gallons, or 1 quart of acute waste, are not exceeded.

The location of the Satellite Accumulation Area must be at or near the point where the waste is generated. Waste must not be generated in one room and taken to another for storage.

Container Management in SAAs

Waste containers stored in a Satellite Accumulation Area must be:

- In good condition
- Compatible with the waste being stored
- Kept closed at all times except when filling
- Labeled with a hazardous chemical waste label (Example given in SAA sign above)
- Stored inside secondary containment bins (provided by EHS for no charge)
- Waste must always remain in the lab
- Never store waste in PUBLIC AREAS (such as hallways)

Waste Containers



- Waste containers must be compatible with the waste being generated. Check solvent compatibility charts for the material of the container or contact EHS.
- Waste containers should not be filled with more than 90% of the container's total volume.

Properly Labeling Waste Containers

HAZARDOUS WASTE			
Contents: (No Formulas or Abbreviations)			
Xylene (50 mL), Hexane (1L), Acetone (2.5 L)			
HAZARDS (CHECK THE HAZARD THAT BEST DESCRIBES THE CONTENTS OF THE CONTAINER)			
<input checked="" type="checkbox"/> FLAMMABLE	<input type="checkbox"/> TOXIC	<input type="checkbox"/> CORROSIVE	<input type="checkbox"/> LETHAL
<input type="checkbox"/> OXIDIZER	<input type="checkbox"/> REACTIVE		
OTHER: _____			
DATE CONTAINER WHEN FULL OR READY FOR PICKUP			
____/____/____	BLD. Anderson	DEPT. Chem	RM 233
MANAGER: Kevin Dolge		TEL. 507-222-4902	

- All waste containers must have a Carleton hazardous waste label affixed when waste is first placed into the container.
- Except for the pickup date, all label sections must be completed when waste is first added to a container. Percentages and additional constituents can be added later.
- Don't use chemical symbols, abbreviations, or codes for waste identification.
- Contents should give enough information to determine the constituent's concentration.
- Use a pencil to complete the label if the generated waste dissolves ink.

Why Is Labeling So Important?

- EHS staff members need this information to manage the material safely.
- EHS staff members consolidate the contents of applicable waste streams each week. We cannot perform this task safely without knowing precisely what is in each container.
- Environmental laws require the generator to label chemical waste materials.
- Chemical constituents must be known to allow us to dispose of chemicals with minimal cost and environmental impact.



Drain Disposal

Hazardous chemicals must never be poured down the drain as a disposal method. Contact the chemical hygiene officer (CHO) of EHS if you have questions about drain disposal.

Disposal by Evaporation

Hazardous chemicals cannot be disposed of via evaporation to 'empty' the container.

Waste Streams with Special Procedures

Unknown Materials

Unknown waste materials must be managed and labeled as hazardous waste until testing is performed by EHS staff. Containers of unknown materials must be labeled with a Carleton waste label.

Please write the word "unknown" on the label, provide any available information about the material, and check the appropriate hazard boxes for any known or suspected hazards.

Peroxide-Forming Chemicals

Hazard Definition:

Peroxide-forming chemicals are materials that can form shock-sensitive and explosive peroxide crystals. When triggered by friction or shock, the peroxides will explode. Peroxide-forming chemicals include solids, liquids, and gasses. These chemicals may also be flammable or reactive, so other SOPs will likely apply to their use in the laboratory. The safety data sheet (SDS) and label for peroxide-forming chemicals may or may not include the following hazard statement: 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS: they may form explosive peroxides. Contact EHS before ordering/purchasing inhibitor-free peroxide-forming solvents.

Storage:

Peroxides form after exposure to air. The rate of peroxide formation depends on the specific chemical, the amount of air exposure, and whether the chemical contains an inhibitor to slow peroxide formation. Therefore, potential peroxide-forming chemicals must be entered into the laboratory chemical inventory and assigned an expiration date based on the storage limitations for the chemical class (see class descriptions below). Peroxide-forming chemicals should be stored away from light and heat with tightly secured caps and labeled with dates of receipt and opening.

Classes of Peroxide-Forming Chemicals:

Peroxide formers fall into three classes. Class A peroxide-forming chemicals can form explosive levels of peroxides while sitting on the shelf. These chemicals should be tested before use or disposed of through the chemical waste system three months after opening or at the expiration date on the container if unopened. Contact EHS if crystals are present or if the solvent is discolored.

Table of Class A peroxide-forming chemicals:

Butadiene (liquid monomer)	Isopropyl ether	Sodium amide (sodamide)
Chloroprene (liquid monomer)	Potassium amide	Tetrafluoroethylene (liquid monomer)
Divinyl ether	Potassium metal	Vinylidene chloride

Class B peroxide formers are only a hazard if the peroxides are concentrated, which may happen upon evaporation or distillation of the solvent. These materials should be disposed of 1 year after opening or at the expiration date on the container if unopened.

Table of Class B peroxide-forming chemicals:

Acetal	Diethylene glycol	dimethyl ether (diglyme)
4-Methyl-2-pentanol	Acetaldehyde	Diethyl ether (ether)
2-Pentanol	Benzyl alcohol	Dioxanes
4-Penten-1-ol	2-Butanol	Ethylene glycol ether acetates (glyme)
1-Phenylethanol	Cumene	Decahydronaphthalene (decalin)
2-Phenylethanol	Cyclohexanol	Methyl isobutyl ketone
Tetrahydrofuran (THF)	Cyclohexene	Diacetylene (butadiene, gas)
Tetrahydronaphthalene (tetralin)	2-Cyclohexen-1-ol	Methylacetylene (gas)
Vinyl ethers	2-Hexanol	3-Methyl-1-butanol
Other secondary alcohols	4-Heptanol	Methyl cyclopentane
Dicyclopentadiene	Furan	

Class C peroxide formers may auto-polymerize as a result of peroxide formation. These materials should be disposed of 1 year after opening or at the expiration date on the container if unopened.

Table of Class C peroxide-forming chemicals:

Acrylic acid	Chlorotrifluoroethylene (gas)	Vinylacetylene (gas)
Acrylonitrile	Methyl methacrylate	Vinyladiene chloride
Butadiene (gas)	Styrene Vinyl chloride (gas)	Chlorobutadiene
Tetrafluoroethylene (gas)	Vinyl pyridine	Chloroprene
Vinyl acetate		

Testing for Peroxides:

Test all uninhibited peroxide-forming chemicals before each use. Inhibited peroxide-forming chemicals beyond their expiration date must also be tested for peroxides. Contact EHS immediately, and do not disturb containers if they appear to have peroxide crystals around the cap or solid crystals inside the bottle.

Waste Oil

Waste oil should be collected in a proper waste container for collection by EHS staff. Containers can be labeled with a Non-Hazardous Waste label available from EHS. These oils are commonly found in vacuum pumps and other laboratory equipment. If the oils are contaminated with metal or other specific chemicals, please include this information on the chemical waste label.

Gas Producing Waste Streams

Several common laboratory chemical mixtures produce gas and must be stored carefully to prevent pressurizing or exploding containers.

Aqua regia is a mixture of concentrated Nitric Acid (HNO_3) and Hydrochloric Acid (HCl)

Piranha solution is a mixture of Sulfuric Acid (H_2SO_4) and Hydrogen Peroxide (H_2O_2)

Contact EHS before making, using, and storing these solutions.

Mixed Waste

Mixed waste is a material that is both chemical hazardous waste and radioactive. These types of waste can be extremely expensive to dispose of. Always contact EHS before generating these waste streams to discuss the disposal options and any charges your lab may incur. Uranyl Nitrate is a commonly purchased reagent classified as a mixed waste since it is both radioactive and an oxidizer. Another common example of mixed waste is any mixture of a long-lived isotope with a flammable solvent or other material that meets the definition of hazardous waste.

Clean Broken Glass Containers



Some laboratories use broken glassware collection boxes. Use these boxes to dispose of clean glass only, with no odors, no needles, and no chemical debris. Refer to the Empty Containers section for information on how to dispose of empty chemical bottles.

Broken Glass Container Disposal Process:

- Use a sturdy, small cardboard box to collect.
- Tape the bottom of the box before use.
- Once filled, close the inner liner if you have one.
- Check the weight of the box when it is half full. It will not be removed if it is more than 40 pounds.
- Replace the lid (or close the box) and tape it closed.
- Indicate CLEAN BROKEN GLASS for RECYCLING on the outer box.
- Move the box to a location within the lab close to the trash.

Custodial Services will remove the box during their evening rounds. If the box is not removed within 2-3 days, place a request for pickup through the Facilities Management Work Order System.

Compressed Gas Cylinders

In general, compressed gas cylinders are the property of the vendor that delivers and replaces these units for the laboratory. Compressed gas cylinders must be returned to the vendor when empty or no longer needed. Compressed gas cylinders must be adequately secured to benches or walls with appropriate strapping at all times while being stored or in use. All compressed gas cylinders must be clearly labeled with the contents.

Compressed Gas Lecture bottles



Lecture bottles (small compressed gasses) are purchased through chemical supply vendors (such as Sigma Aldrich and Matheson). EHS recommends that researchers attempt to purchase lecture bottles from vendors who accept partially full or empty containers when they are no longer needed in the lab. Airgas offers returnable lecture bottles in many common gasses through their 'Saf-T-Cyl' program.

The disposal of lecture bottles is extremely expensive. If the vendor or supplier does not accept an unwanted lecture bottle, contact EHS to arrange disposal. Empty bottles should be clearly labeled with the words "empty." Unwanted lecture bottles should be removed from the laboratory when no longer needed, as they present a genuine concern for long-term storage and management.

HPLC Waste

Chemical hazardous waste that is generated from laboratory equipment, such as HPLC units, should be collected as follows:

- Collect in a compatible container
- Label with a hazardous waste label
- Clearly identify constituents on the label and indicate associated hazards
- Place the container in a secondary containment bin
- Caps for HPLC waste containers should connect directly to the waste tubing and be able to tip over without leaking

Disposal of Chemically Contaminated Needles and Syringes

Dispose of all chemically contaminated needles, syringes, and razor blades as biohazard sharps. Sharps should be collected in a suitable plastic container labeled as containing sharps with a securely closing lid. Containers should not be overfilled to the point that the lid does not close. Full containers can be collected by EHS and will be disposed of as biohazardous sharps.

Student-generated medical needles and syringes are the responsibility of the student. The Student Health and Counseling Center (SHAC) recommends that students purchase containers designed to hold needles from their pharmacy. Alternatively, sturdy plastic containers with a screw-on lid can be used if labeled "Do not recycle: Household sharps." Empty laundry detergent containers are an example of a suitable container. Full containers should be disposed of at the Rice County Solid Waste Facility outside Dundas. The Minnesota Pollution Control Agency has a helpful guide on disposing of household sharps: [link](#).

DEA Controlled Substances Disposal

General Information:

The purchase, use, storage, and disposal of controlled substances are regulated by the United States Drug Enforcement Administration (DEA). Detailed information about controlled substances can be found online at the DEA Diversion website (<https://deadiversion.usdoj.gov/>).

Lists of Controlled Substances:

If you are unsure whether or not the substance(s) you have is regulated as a controlled substance, refer to the online lists on the DEA website. Five scheduled lists of controlled substances can be viewed by schedule or alphabetically.

Disposal Procedures:

DEA regulations require registrants to use a licensed 'reverse distributor' for disposal. Please contact EHS if you need additional information/assistance.

Empty Containers

Most empty chemical containers must be "triplet rinsed" before defacing the bottle's label and then following the college's recycling/disposal protocol. Below are two exceptions:

- Empty containers that hold EPA-defined acutely toxic (P-Listed) chemicals must be managed as hazardous waste and given to EHS for disposal. DO NOT TRIPLE RINSE these containers.
- Empty containers that should not or cannot be "triple rinsed" with water should also be collected as chemical waste. Some reasons to not "triple rinse" a bottle for disposal will be if the chemical is reactive (water-reactive chemicals if residual chemical remains, like sodium metal), odiferous (smelly, like thiols/mercaptans), or impervious (water will not do anything to remove the contents such as hydrophobic oils or organosilanes). Empty containers of odiferous materials should be placed into a bag and stored inside a fume hood until EHS collects them for disposal.

Refrigerants in Equipment

Many types of laboratory equipment contain refrigerants. Refrigerators and freezers do not need to have the freon removed before being sent for recycling. If the equipment contains refrigerants but is not a refrigerator or freezer, contact EHS. The refrigerant may need to be removed before the equipment can be sent for recycling.


Non-Hazardous Waste Disposal

Many chemical reagents and products do not meet the definition of hazardous waste. EHS can also collect these materials for proper disposal along with your other chemical waste streams.

Universal Waste

Universal waste is a subcategory of hazardous wastes covering aerosols, batteries, lamps, pesticides, and equipment that contains mercury. Universal waste at Carleton College is collected by facilities or EHS and brought to the universal waste central accumulation area. See below for the specifics of each type of waste. The subcategory of universal waste was created to ease the regulatory burden of generating these forms of hazardous waste. However, there are still requirements for labeling and accumulating universal waste.

The universal waste or universal waste container must be clearly marked with a universal waste label. The label must list the contents of the container, the date that universal waste was first added, and the shipper's identity. An example label below shows the required information. Universal waste must not be accumulated for more than one year from the time that waste is first collected, so noting when the waste started accumulating on the label is essential. All universal waste containers should be closed when waste is not actively being added.

A purple rectangular label with the words "UNIVERSAL WASTE" in large, bold, white capital letters at the top. Below this, there is a white rectangular area containing five lines of text, each followed by a horizontal line for information entry: "CONTENTS", "ACCUMULATION START DATE", "SHIPPER", "ADDRESS", and "CITY, STATE, ZIP".

UNIVERSAL WASTE
CONTENTS _____
ACCUMULATION START DATE _____
SHIPPER _____
ADDRESS _____
CITY, STATE, ZIP _____

Aerosol Cans

Do not place aerosol cans in regular trash cans. Aerosol cans are collected, stored in the universal waste collection area, and then recycled. Contact EHS if you have aerosol cans to be collected.

Battery Recycling

In general, small, common household batteries can be deposited in battery recycling bins around campus. EHS can collect larger lead-acid batteries or other batteries for recycling. Batteries should be separated by type-alkaline, lead-acid, lithium-ion, etc.-or grouped together according to the battery recycling vendor. It is recommended that exposed battery terminals are covered before disposal. A battery that shows evidence of damage, leakage, or puncture should be contained in a closed, structurally sound, and compatible container.

Lamps

Lamps that contain mercury, such as fluorescent, metal halide, high-intensity discharge (HID), etc., are collected as universal waste and sent for recycling. Other light bulbs, like LEDs, may also be collected for electronic recycling but are not considered universal waste.

Pesticides

Pesticides may be considered universal waste if they have been recalled or banned from use. If any pesticides need disposal, contact EHS.

Mercury-Containing Items

Mercury-containing items such as thermometers, thermostat switches, and manometers must be collected for proper disposal and not placed in the regular trash. Mercury devices that are leaking or broken should be cleaned by a trained individual, with the mercury then disposed of as hazardous waste.

Requesting a Chemical Waste Pickup

Contact EHS or fill out the waste pickup form on the chemical inventory software for chemical waste pickup. Access the waste pickup form on the chemical inventory software using your account or scan the QR code on the Satellite Accumulation Area sign.

Training Requirements

All employees who manage or handle hazardous or other regulated wastes must receive appropriate training. Refresher training will be completed as needed. This training may include the following:

- Overview of EPA and the State of Minnesota regulations
- Generator responsibilities
- Hazardous waste determination
- Waste classification, labeling, segregation, and storage requirements
- Spill cleanup procedures
- Waste disposal procedures

Common Federal & State Violations

Missing or incomplete labels and open containers are two of the most common violations in research laboratories. Waste containers must be closed at all times except when waste is being added. All containers must be labeled with a properly completed chemical waste label.



What Happens to All of Your Waste?

Most of the solvent waste generated at Carleton is blended with similar materials and is incinerated at an approved hazardous waste treatment facility. We also send many other waste streams for recycling. These recycled waste streams include mercury and mercury-containing equipment, rechargeable batteries, fluorescent light tubes, and lead.

Lab Closeout Procedures

See Appendix D for the Laboratory Move Manual. This manual was created as a guide for relocating chemicals, biological materials, radioactive materials, gas cylinders, and non-hazardous trash. The manual also includes a checklist to complete after the emptying of the lab is completed.

Revision Table

Date	Revision Type	Page numbers
June 2022	Program Creation - EH	All
November 2022	Program Editing - KD	All

Emergency Contacts

Ambulance/Fire Department/Police Department: 911

Note: No prefix numbers are required to dial 911 from a campus phone.

Carleton Campus Security: Ex: 4444 (from a campus phone), 507-222-4444

Carleton Facilities: Ex. 4133 (from a campus phone), 507-222-4133

To dial an outside number from a campus phone, dial 8 and then the desired number.

Northfield Hospital: 507-646-1000 (Available 24/7)

MN Poison Control: 1-800-222-1222 (Available 24/7)

River Valley Eye Professionals: 507-645-9202 (Doctor on call 24/7)

Northfield Urgent Care: 507-646-6701 (Call or visit the website for hours)

Allina Medical Clinic: 507-663-9000 (Call or visit the website for hours)

Abbreviations

EHS – Environmental Health and Safety

EPA – Environmental Protection Agency

EPA HW No. – Environmental Protection Agency Hazardous Waste Number

HWMP – Hazardous Waste Management Plan

EPA HW No. – Environmental Protection Agency Hazardous Waste Number

HDPE – High-Density Polyethylene

SAA – Satellite Accumulation Area

CHO – Chemical Hygiene Officer

SOP – Standard Operating Procedure

SDS – Safety Data Sheet

HNOC – Hazard Not Otherwise Classified

GHS – Globally Harmonized System

HPLC – High-Performance Liquid Chromatography

DEA – Drug Enforcement Administration

SHAC – Student Health and Counseling

Appendices

Appendix A: U List of Hazardous Wastes ([Link](#))

Appendix B: P List of Hazardous Wastes ([Link](#))

Appendix C: F List of Hazardous Wastes ([Link](#))

Appendix D: Laboratory Move Manual

Appendix A



Minnesota
Pollution
Control
Agency

U List of Hazardous Wastes

Waste/Hazardous waste #2.03 • February 2011

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Listed hazardous wastes

In Minnesota, a waste may be hazardous for one of these reasons:

- It displays a hazardous waste characteristic
- It is included in one of four lists of hazardous waste – the K, F, P, or U List
- It contains polychlorinated biphenyls (PCBs)

This document will discuss the U List of hazardous wastes.

For more information on the other lists, PCBs, or hazardous waste characteristics, see Minnesota Pollution Control Agency (MPCA) hazardous waste fact sheets #2.00, 2.01, 2.02, 2.04, 2.05, and 4.48a, available on the MPCA's [hazardous waste publications](http://www.pca.state.mn.us/waste/pubs/business.html) webpage, <http://www.pca.state.mn.us/waste/pubs/business.html>.

Explanation of U List

The U List regulates discarded commercial chemical products, manufacturing chemical intermediates, and off-specification commercial chemical products that contain certain ingredients, and any soil or debris contaminated by spills of those products or intermediates.

U List in Minnesota

The MPCA has adopted the federal U List of hazardous wastes, located in Chapter 40 of the Code of Federal Regulations (CFR), part 261.33, as amended. Because Minnesota adopted the federal list, changes made to the list by the U.S. Environmental Protection Agency (EPA) are implemented automatically in Minnesota.

Wastes mixed with listed waste

If a listed waste is mixed with any other waste, the entire mixture then takes on the listed waste's identity and requirements. Examples of listed mixtures include U-listed pharmaceuticals placed into a sharps container or U-listed pesticides mixed into other waste liquids. The resulting sharps container waste and liquids become regulated as U-listed wastes.

Reducing listed waste

Reducing the amount of listed hazardous waste you generate can lower your costs as well as make complying with the regulatory requirements easier. The Minnesota Technical Assistance Program (MnTAP) has staff and resources to help you assess alternate products and processes with a goal of reducing your listed waste generation. For contact information for MnTAP, see the *More information* section.

Sole active ingredient

A waste is regulated under the U List only if the ingredient contained in the list is the sole active ingredient of the product that became waste. *Active ingredients* are those that perform the function of the product, regardless of the concentration of those ingredients. Ingredients used in a product as preservatives, solvents, stabilizers, and adjuncts are not active ingredients unless that is the function of the product.

Examples

- Hydrofluoric acid is the sole active ingredient in some glass etching compounds. These compounds would be U listed as U134 hazardous wastes if disposed of without being used.
- Some rust-remover compounds, however, contain phosphoric and oxalic acids in addition to hydrofluoric acid as active ingredients. These compounds would not be U-listed wastes when disposed of, because the hydrofluoric acid was not the sole active ingredient.
- Finally, some cyanoacrylate adhesive compounds contain hydrofluoric acid as a stabilizer. These compounds would not be U-listed wastes when disposed of because the hydrofluoric acid was not an active ingredient.

Disposed of unused

A waste is only regulated under the U List if it is disposed of without being used for its intended purpose. Dilution or other preparation of the material for use is not considered *use*. *Use* is only the application or purpose that was intended or reasonable for the original compound.

For example, the glass etching compound referenced above would be U listed as U134 hazardous waste if disposed of before use – even if it was diluted or otherwise altered in preparation for use before being discarded. However, when discarded *after* being used to etch glass, it would no longer be a U-listed waste.

Waste not meeting U List definition may still be characteristic hazardous waste

Remember that even though a waste may not or may no longer meet the definition of the U List, it still may display one or more hazardous waste characteristics and therefore remain regulated as a hazardous waste. As an example, the used glass-etching compound above would still be a D002 corrosive hazardous waste if its pH after use is less than two.

For more information on hazardous waste characteristics, see MPCA hazardous waste fact sheet #2.04, *Characteristic Wastes*, available at <http://www.pca.state.mn.us/publications/w-hw2-04.pdf>.

All wastes having the generic name contained in the U List are regulated

Although a single Chemical Abstract Service (CAS) Registry Number accompanies each waste contained in the U List, the CAS Number is included only as an aid to identification and does not restrict the list to the unique chemical identified by that CAS Number. All wastes having the generic name contained in the U List are regulated, regardless of their specific CAS Numbers.

Reason for listing

Each waste on the U List is included for one or more of the following reasons identified by the capitalized letters in parentheses following the generic name:

- Corrosive (C)
- Ignitable (I)
- Reactive (R)
- Toxic (T)

Listing-specific information

Many wastes on the U List have additional listing-specific information associated with them, including special definitions and possible exemptions. This information is referenced in this document by the numbers in superscript following the reason for listing. Explanation of the numbers is given on page 18.

Although the MPCA has included the most common particulars in this guidance, the EPA may have issued additional interpretation not contained in this document.

Waste codes

A four-character hazardous waste code is assigned to each waste on the list. Use this code for annual reporting and manifesting of hazardous wastes.

The list is organized alphabetically by the listed generic name. Remember that many chemical compounds are known by many chemical names, and only one or a few of those names may be printed in the list.

U List

Waste code	CAS Registry #	Generic name	Reason
U394	30558-43-1	A2213	(T)
U001	75-07-0	Acetaldehyde	(I) ¹
U034	75-87-6	Acetaldehyde, trichloro-	(T)
U187	62-44-2	Acetamide, N-(4-ethoxyphenyl)-	(T)
U005	53-96-3	Acetamide, N-9H-fluoren-2-yl-	(T)
U240	94-75-7	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters	(T) ²
U112	141-78-6	Acetic acid ethyl ester	(I) ¹
U144	301-04-2	Acetic acid, lead(2+) salt	(T)
U214	563-68-8	Acetic acid, thallium(1+) salt	(T)
U002	67-64-1	Acetone	(I) ¹
U003	75-05-8	Acetonitrile	(I,T)
U004	98-86-2	Acetophenone	(T)
U005	53-96-3	2-Acetylaminofluorene	(T)
U006	75-36-5	Acetyl chloride	(C,R,T)
U007	79-06-1	Acrylamide	(T)
U008	79-10-7	Acrylic acid	(I) ¹
U009	107-13-1	Acrylonitrile	(T)
U011	61-82-5	Amitrole	(T)
U012	62-53-3	Aniline	(I,T)
U136	75-60-5	Arsinic acid, dimethyl-	(T)
U014	492-80-8	Auramine	(T)
U015	115-02-6	Azaserine	(T)

Waste code	CAS Registry #	Generic name	Reason
U010	50-07-7	Azirino[2',3':3,4]pyrrolo[1,2-a]indole-4,7-dione, 6-amino-8-[[[(aminocarbonyl)oxy]methyl] -1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-, [1aS-(1aalpha, 8beta,8aalpha,8balpha)]-	(T)
U280	101-27-9	Barban	(T)
U278	22781-23-3	Bendiocarb	(T)
U364	22961-82-6	Bendiocarb phenol	(T)
U271	17804-35-2	Benomyl	(T)
U157	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	(T)
U016	225-51-4	Benz[c]acridine	(T)
U017	98-87-3	Benzal chloride	(T)
U192	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	(T)
U018	56-55-3	Benz[a]anthracene	(T)
U094	57-97-6	Benz[a]anthracene, 7,12-dimethyl-	(T)
U012	62-53-3	Benzenamine	(I,T)
U014	492-80-8	Benzenamine, 4,4'-carbonimidoylbis[N,N-dimethyl-	(T)
U049	3165-93-3	Benzenamine, 4-chloro-2-methyl-, hydrochloride	(T)
U093	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-	(T)
U328	95-53-4	Benzenamine, 2-methyl-	(T)
U353	106-49-0	Benzenamine, 4-methyl-	(T)
U158	101-14-4	Benzenamine, 4,4'-methylenebis[2-chloro-	(T)
U222	636-21-5	Benzenamine, 2-methyl-, hydrochloride	(T)
U181	99-55-8	Benzenamine, 2-methyl-5-nitro-	(T)
U019	71-43-2	Benzene	(I,T) ³
U038	510-15-6	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester	(T)
U030	101-55-3	Benzene, 1-bromo-4-phenoxy-	(T)
U035	305-03-3	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-	(T)
U037	108-90-7	Benzene, chloro-	(T)
U221	25376-45-8	Benzenediamine, ar-methyl-	(T)
U028	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	(T)
U069	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester	(T)
U088	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester	(T)
U102	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester	(T)
U107	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester	(T)
U070	95-50-1	Benzene, 1,2-dichloro-	(T)
U071	541-73-1	Benzene, 1,3-dichloro-	(T)
U072	106-46-7	Benzene, 1,4-dichloro-	(T)

Waste code	CAS Registry #	Generic name	Reason
U060	72-54-8	Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro-	(T)
U017	98-87-3	Benzene, (dichloromethyl)-	(T)
U223	26471-62-5	Benzene, 1,3-diisocyanatomethyl-	(R,T)
U239	1330-20-7	Benzene, dimethyl-	(I) ¹
U201	108-46-3	1,3-Benzenediol	(T)
U127	118-74-1	Benzene, hexachloro-	(T)
U056	110-82-7	Benzene, hexahydro-	(I) ¹
U220	108-88-3	Benzene, methyl-	(T)
U105	121-14-2	Benzene, 1-methyl-2,4-dinitro-	(T)
U106	606-20-2	Benzene, 2-methyl-1,3-dinitro-	(T)
U055	98-82-8	Benzene, (1-methylethyl)-	(I)1
U169	98-95-3	Benzene, nitro-	(T)
U183	608-93-5	Benzene, pentachloro-	(T)
U185	82-68-8	Benzene, pentachloronitro-	(T)
U020	98-09-9	Benzenesulfonic acid chloride	(C,R) ¹
U020	98-09-9	Benzenesulfonyl chloride	(C,R) ¹
U207	95-94-3	Benzene, 1,2,4,5-tetrachloro-	(T)
U061	50-29-3	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-	(T)
U247	72-43-5	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4- methoxy-	(T)
U023	98-07-7	Benzene, (trichloromethyl)-	(T)
U234	99-35-4	Benzene, 1,3,5-trinitro-	(T)
U021	92-87-5	Benzidine	(T)
U202	81-07-2	1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide, & salts	(T) ²
U278	22781-23-3	1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate	(T)
U364	22961-82-6	1,3-Benzodioxol-4-ol, 2,2-dimethyl-,	(T)
U203	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-	(T)
U141	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-	(T)
U367	1563-38-8	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-	(T)
U090	94-58-6	1,3-Benzodioxole, 5-propyl-	(T)
U064	189-55-9	Benzo[rs]t]pentaphene	(T)
U248	81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations of 0.3% or less	(T) ^{2,5}
U022	50-32-8	Benzo[a]pyrene	(T)
U197	106-51-4	p-Benzoquinone	(T)
U023	98-07-7	Benzotrichloride	(C,R,T)
U085	1464-53-5	2,2'-Bioxirane	(T)

Waste code	CAS Registry #	Generic name	Reason
U021	92-87-5	[1,1'-Biphenyl]-4,4'-diamine	(T)
U073	91-94-1	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-	(T)
U091	119-90-4	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-	(T)
U095	119-93-7	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-	(T)
U225	75-25-2	Bromoform	(T)
U030	101-55-3	4-Bromophenyl phenyl ether	(T)
U128	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	(T)
U172	924-16-3	1-Butanamine, N-butyl-N-nitroso-	(T)
U031	71-36-3	1-Butanol	(I) ¹
U159	78-93-3	2-Butanone	(I,T)
U160	1338-23-4	2-Butanone, peroxide	(R,T)
U053	4170-30-3	2-Butenal	(T)
U074	764-41-0	2-Butene, 1,4-dichloro-	(I,T)
U143	303-34-4	2-Butenoic acid, 2-methyl-, 7-[[[2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy] methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester,[1S-[1alpha(Z),7(2S*,3R*),7aalpha]]-	(T)
U031	71-36-3	n-Butyl alcohol	(I) ¹
U136	75-60-5	Cacodylic acid	(T)
U032	13765-19-0	Calcium chromate	(T)
U372	10605-21-7	Carbamic acid, 1H-benzimidazol-2-yl, methyl ester	(T)
U271	17804-35-2	Carbamic acid, [1-[(butylamino)carbonyl]-1H-benzimidazol-2-yl]-, methyl ester	(T)
U280	101-27-9	Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butynyl ester	(T)
U238	51-79-6	Carbamic acid, ethyl ester	(T)
U178	615-53-2	Carbamic acid, methylnitroso-, ethyl ester	(T)
U373	122-42-9	Carbamic acid, phenyl-, 1-methylethyl ester	(T)
U409	23564-05-8	Carbamic acid, [1,2-phenylenebis (iminocarbonothioyl)]bis-, dimethyl ester	(T)
U097	79-44-7	Carbamic chloride, dimethyl-	(T)
U389	2303-17-5	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3,3-trichloro-2-propenyl) ester	(T)
U387	52888-80-9	Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester	(T)
U114	1 111-54-6	Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters	(T)
U062	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester	(T)
U279	63-25-2	Carbaryl	(T)
U372	10605-21-7	Carbendazim	(T)
U367	1563-38-8	Carbofuran phenol	(T)

Waste code	CAS Registry #	Generic name	Reason
U215	6533-73-9	Carbonic acid, dithallium(1+) salt	(T)
U033	353-50-4	Carbonic difluoride	(T)
U156	79-22-1	Carbonochloridic acid, methyl ester	(I,T)
U033	353-50-4	Carbon oxyfluoride	(R,T)
U211	56-23-5	Carbon tetrachloride	(T) ³
U034	75-87-6	Chloral	(T)
U035	305-03-3	Chlorambucil	(T)
U036	57-74-9	Chlordane, alpha & gamma isomers	(T) ³
U026	494-03-1	Chlornaphazin	(T)
U037	108-90-7	Chlorobenzene	(T) ³
U038	510-15-6	Chlorobenzilate	(T)
U039	59-50-7	p-Chloro-m-cresol	(T)
U042	110-75-8	2-Chloroethyl vinyl ether	(T)
U044	67-66-3	Chloroform	(T) ³
U046	107-30-2	Chloromethyl methyl ether	(T)
U047	91-58-7	beta-Chloronaphthalene	(T)
U048	95-57-8	o-Chlorophenol	(T)
U049	3165-93-3	4-Chloro-o-toluidine, hydrochloride	(T)
U032	13765-19-0	Chromic acid H ₂ CrO ₄ , calcium salt	(T)
U050	218-01-9	Chrysene	(T)
U051	-----	Creosote	(T)
U052	1319-77-3	Cresol (Cresylic acid)	(T) ³
U053	4170-30-3	Crotonaldehyde	(T)
U055	98-82-8	Cumene	(I) ¹
U246	506-68-3	Cyanogen bromide (CN)Br	(T)
U197	106-51-4	2,5-Cyclohexadiene-1,4-dione	(T)
U056	110-82-7	Cyclohexane	(I) ¹
U129	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha,3beta,4alpha,5alpha,6beta)-	(T)
U057	108-94-1	Cyclohexanone	(I) ¹
U130	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	(T)
U058	50-18-0	Cyclophosphamide	(T)
U240	94-75-7	2,4-D, salts & esters	(T) ^{2,3}
U059	20830-81-3	Daunomycin	(T)
U060	72-54-8	DDD	(T)
U061	50-29-3	DDT	(T)

Waste code	CAS Registry #	Generic name	Reason
U062	2303-16-4	Diallate	(T)
U063	53-70-3	Dibenz[a,h]anthracene	(T)
U064	189-55-9	Dibenzo[a,i]pyrene	(T)
U066	96-12-8	1,2-Dibromo-3-chloropropane	(T)
U069	84-74-2	Dibutyl phthalate	(T)
U070	95-50-1	o-Dichlorobenzene	(T)
U071	541-73-1	m-Dichlorobenzene	(T)
U072	106-46-7	p-Dichlorobenzene	(T)
U073	91-94-1	3,3'-Dichlorobenzidine	(T)
U074	764-41-0	1,4-Dichloro-2-butene	(I,T)
U075	75-71-8	Dichlorodifluoromethane	(T)
U078	75-35-4	1,1-Dichloroethylene	(T) ³
U079	156-60-5	1,2-Dichloroethylene	(T)
U025	111-44-4	Dichloroethyl ether	(T)
U027	108-60-1	Dichloroisopropyl ether	(T)
U024	111-91-1	Dichloromethoxy ethane	(T)
U081	120-83-2	2,4-Dichlorophenol	(T)
U082	87-65-0	2,6-Dichlorophenol	(T)
U084	542-75-6	1,3-Dichloropropene	(T)
U085	1464-53-5	1,2:3,4-Diepoxybutane	(I,T)
U108	123-91-1	1,4-Diethyleneoxide	(T)
U028	117-81-7	Diethylhexyl phthalate	(T)
U395	5952-26-1	Diethylene glycol, dicarbamate	(T)
U086	1615-80-1	N,N'-Diethylhydrazine	(T)
U087	3288-58-2	O,O-Diethyl S-methyl dithiophosphate	(T)
U088	84-66-2	Diethyl phthalate	(T)
U089	56-53-1	Diethylstilbesterol	(T)
U090	94-58-6	Dihydrosafrole	(T)
U091	119-90-4	3,3'-Dimethoxybenzidine	(T)
U092	124-40-3	Dimethylamine	(I) ¹
U093	60-11-7	p-Dimethylaminoazobenzene	(T)
U094	57-97-6	7,12-Dimethylbenz[a]anthracene	(T)
U095	119-93-7	3,3'-Dimethylbenzidine	(T)
U096	80-15-9	alpha,alpha-Dimethylbenzylhydroperoxide	(R) ¹
U097	79-44-7	Dimethylcarbamoyl chloride	(T)
U098	57-14-7	1,1-Dimethylhydrazine	(T)

Waste code	CAS Registry #	Generic name	Reason
U099	540-73-8	1,2-Dimethylhydrazine	(T)
U101	105-67-9	2,4-Dimethylphenol	(T)
U102	131-11-3	Dimethyl phthalate	(T)
U103	77-78-1	Dimethyl sulfate	(T)
U105	121-14-2	2,4-Dinitrotoluene	(T) ³
U106	606-20-2	2,6-Dinitrotoluene	(T)
U107	117-84-0	Di-n-octyl phthalate	(T)
U108	123-91-1	1,4-Dioxane	(T)
U109	122-66-7	1,2-Diphenylhydrazine	(T)
U110	142-84-7	Dipropylamine	(I) ¹
U111	621-64-7	Di-n-propylnitrosamine	(T)
U041	106-89-8	Epichlorohydrin	(T)
U001	75-07-0	Ethanal	(I) ¹
U404	121-44-8	Ethanamine, N,N-diethyl-	(T)
U174	55-18-5	Ethanamine, N-ethyl-N-nitroso-	(T)
U155	91-80-5	1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-	(T)
U067	106-93-4	Ethane, 1,2-dibromo-	(T)
U076	75-34-3	Ethane, 1,1-dichloro-	(T)
U077	107-06-2	Ethane, 1,2-dichloro-	(T)
U131	67-72-1	Ethane, hexachloro-	(T)
U024	111-91-1	Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-	(T)
U117	60-29-7	Ethane, 1,1'-oxybis-	(I) ¹
U025	111-44-4	Ethane, 1,1'-oxybis[2-chloro-	(T)
U184	76-01-7	Ethane, pentachloro-	(T)
U208	630-20-6	Ethane, 1,1,1,2-tetrachloro-	(T)
U209	79-34-5	Ethane, 1,1,2,2-tetrachloro-	(T)
U218	62-55-5	Ethanethioamide	(T)
U226	71-55-6	Ethane, 1,1,1-trichloro-	(T)
U227	79-00-5	Ethane, 1,1,2-trichloro-	(T)
U410	59669-26-0	Ethanimidothioic acid, N,N'- [thiobis[(methylimino)carbonyloxy]]bis-, dimethyl ester	(T)
U394	30558-43-1	Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester	(T)
U359	110-80-5	Ethanol, 2-ethoxy-	(T)
U173	1116-54-7	Ethanol, 2,2'-(nitrosoimino)bis-	(T)
U395	5952-26-1	Ethanol, 2,2'-oxybis-, dicarbamate	(T)
U004	98-86-2	Ethanone, 1-phenyl-	(T)

Waste code	CAS Registry #	Generic name	Reason
U043	75-01-4	Ethene, chloro-	(T)
U042	110-75-8	Ethene, (2-chloroethoxy)-	(T)
U078	75-35-4	Ethene, 1,1-dichloro-	(T)
U079	156-60-5	Ethene, 1,2-dichloro-, (E)-	(T)
U210	127-18-4	Ethene, tetrachloro-	(T)
U228	79-01-6	Ethene, trichloro-	(T)
U112	141-78-6	Ethyl acetate	(I) ¹
U113	140-88-5	Ethyl acrylate	(I)1
U238	51-79-6	Ethyl carbamate (urethane)	(T)
U117	60-29-7	Ethyl ether	(I)1
U114	111-54-6	Ethylenebisdithiocarbamic acid, salts & esters	(T)2
U067	106-93-4	Ethylene dibromide	(T)
U077	107-06-2	Ethylene dichloride	(T)
U359	110-80-5	Ethylene glycol monoethyl ether	(T)
U115	75-21-8	Ethylene oxide	(I,T)
U116	96-45-7	Ethylenethiourea	(T)
U076	75-34-3	Ethylidene dichloride	(T)
U118	97-63-2	Ethyl methacrylate	(T)
U119	62-50-0	Ethyl methanesulfonate	(T)
U120	206-44-0	Fluoranthene	(T)
U122	50-00-0	Formaldehyde	(T)4
U123	64-18-6	Formic acid	(C,T)
U124	110-00-9	Furan	(I) ¹
U125	98-01-1	2-Furancarboxaldehyde	(I) ¹
U147	108-31-6	2,5-Furandione	(T)
U213	109-99-9	Furan, tetrahydro-	(I) ¹
U125	98-01-1	Furfural	(I) ¹
U124	110-00-9	Furfuran	(I) ¹
U206	18883-66-4	Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoareido)-, D-	(T)
U206	18883-66-4	D-Glucose, 2-deoxy-2-[[[(methylnitrosoamino)- carbonyl]amino]-	(T)
U126	765-34-4	Glycidylaldehyde	(T)
U163	70-25-7	Guanidine, N-methyl-N'-nitro-N-nitroso-	(T)
U127	118-74-1	Hexachlorobenzene	(T) ³
U128	87-68-3	Hexachlorobutadiene	(T) ³
U130	77-47-4	Hexachlorocyclopentadiene	(T)
U131	67-72-1	Hexachloroethane	(T) ³

Waste code	CAS Registry #	Generic name	Reason
U132	70-30-4	Hexachlorophene	(T)
U243	1888-71-7	Hexachloropropene	(T)
U133	302-01-2	Hydrazine (R,T)	(T)
U086	1615-80-1	Hydrazine, 1,2-diethyl-	(T)
U098	57-14-7	Hydrazine, 1,1-dimethyl-	(T)
U099	540-73-8	Hydrazine, 1,2-dimethyl-	(T)
U109	122-66-7	Hydrazine, 1,2-diphenyl-	(T)
U134	7664-39-3	Hydrofluoric acid	(C,T)
U134	7664-39-3	Hydrogen fluoride	(C,T)
U135	7783-06-4	Hydrogen sulfide	(T)
U135	7783-06-4	Hydrogen sulfide H2 S	(T)
U096	80-15-9	Hydroperoxide, 1-methyl-1-phenylethyl-	(R) ¹
U116	96-45-7	2-Imidazolidinethione	(T)
U137	193-39-5	Indeno[1,2,3-cd]pyrene	(T)
U190	85-44-9	1,3-Isobenzofurandione	(T)
U140	78-83-1	Isobutyl alcohol	(I,T)
U141	120-58-1	Isosafrole	(T)
U142	143-50-0	Kepone	(T)
U143	303-34-4	Lasiocarpine	(T)
U144	301-04-2	Lead acetate	(T)
U146	1335-32-6	Lead, bis(acetato-O)tetrahydroxytri-	(T)
U145	7446-27-7	Lead phosphate	(T)
U146	1335-32-6	Lead subacetate	(T)
U129	58-89-9	Lindane	(T) ³
U163	70-25-7	MNNG	(T)
U147	108-31-6	Maleic anhydride	(T)
U148	123-33-1	Maleic hydrazide	(T)
U149	109-77-3	Malononitrile	(T)
U150	148-82-3	Melphalan	(T)
U151	7439-97-6	Mercury	(T) ³
U152	126-98-7	Methacrylonitrile	(I, T)
U092	124-40-3	Methanamine, N-methyl-	(I) ¹
U029	74-83-9	Methane, bromo-	(T)
U045	74-87-3	Methane, chloro-	(I, T)
U046	107-30-2	Methane, chloromethoxy-	(T)
U068	74-95-3	Methane, dibromo-	(T)

Waste code	CAS Registry #	Generic name	Reason
U080	75-09-2	Methane, dichloro-	(T)
U075	75-71-8	Methane, dichlorodifluoro-	(T)
U138	74-88-4	Methane, iodo-	(T)
U119	62-50-0	Methanesulfonic acid, ethyl ester	(T)
U211	56-23-5	Methane, tetrachloro-	(T)
U153	74-93-1	Methanethiol	(I, T)
U225	75-25-2	Methane, tribromo-	(T)
U044	67-66-3	Methane, trichloro-	(T)
U121	75-69-4	Methane, trichlorofluoro-	(T)
U036	57-74-9	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-	(T)
U154	67-56-1	Methanol	(I) ¹
U155	91-80-5	Methapyrilene	(T)
U142	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5a,5b,6-decachlorooctahydro-	(T)
U247	72-43-5	Methoxychlor	(T) ³
U154	67-56-1	Methyl alcohol	(I) ¹
U029	74-83-9	Methyl bromide	(T)
U186	504-60-9	1-Methylbutadiene	(I) ¹
U045	74-87-3	Methyl chloride	(I,T)
U156	79-22-1	Methyl chlorocarbonate	(I,T)
U226	71-55-6	Methyl chloroform	(T)
U157	56-49-5	3-Methylcholanthrene	(T)
U158	101-14-4	4,4'-Methylenebis(2-chloroaniline)	(T)
U068	74-95-3	Methylene bromide	(T)
U080	75-09-2	Methylene chloride	(T)
U159	78-93-3	Methyl ethyl ketone (MEK)	(I,T) ³
U160	1338-23-4	Methyl ethyl ketone peroxide	(R,T)
U138	74-88-4	Methyl iodide	(T)
U161	108-10-1	Methyl isobutyl ketone	(I) ¹
U162	80-62-6	Methyl methacrylate	(I,T)
U161	108-10-1	4-Methyl-2-pentanone	(I) ¹
U164	56-04-2	Methylthiouracil	(T)
U010	50-07-7	Mitomycin C	(T)
U059	20830-81-3	5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy)-alpha-L-lyxo-hexopyranosyl]oxy]- 7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)	(T)

Waste code	CAS Registry #	Generic name	Reason
U167	134-32-7	1-Naphthalenamine	(T)
U168	91-59-8	2-Naphthalenamine	(T)
U026	494-03-1	Naphthalenamine, N,N'-bis(2-chloroethyl)-	(T)
U165	91-20-3	Naphthalene	(T)
U047	91-58-7	Naphthalene, 2-chloro-	(T)
U166	130-15-4	1,4-Naphthalenedione	(T)
U236	72-57-1	2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl[1,1'-biphenyl]-4,4'-diyl)bis(azo)bis[5-amino-4-hydroxy]-, tetrasodium salt	(T)
U279	63-25-2	1-Naphthalenol, methylcarbamate	(T)
U166	130-15-4	1,4-Naphthoquinone	(T)
U167	134-32-7	alpha-Naphthylamine	(T)
U168	91-59-8	beta-Naphthylamine	(T)
U217	10102-45-1	Nitric acid, thallium(1+) salt	(T)
U169	98-95-3	Nitrobenzene (I,T)	(T) ³
U170	100-02-7	p-Nitrophenol	(T)
U171	79-46-9	2-Nitropropane	(I,T)
U172	924-16-3	N-Nitrosodi-n-butylamine	(T)
U173	1116-54-7	N-Nitrosodiethanolamine	(T)
U174	55-18-5	N-Nitrosodiethylamine	(T)
U176	759-73-9	N-Nitroso-N-ethylurea	(T)
U177	684-93-5	N-Nitroso-N-methylurea	(T)
U178	615-53-2	N-Nitroso-N-methylurethane	(T)
U179	100-75-4	N-Nitrosopiperidine	(T)
U180	930-55-2	N-Nitrosopyrrolidine	(T)
U181	99-55-8	5-Nitro-o-toluidine	(T)
U193	1120-71-4	1,2-Oxathiolane, 2,2-dioxide	(T)
U058	50-18-0	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide	(T)
U115	75-21-8	Oxirane	(I,T)
U126	765-34-4	Oxiranecarboxyaldehyde	(T)
U041	106-89-8	Oxirane, (chloromethyl)-	(T)
U182	123-63-7	Paraldehyde	(T)
U183	608-93-5	Pentachlorobenzene	(T)
U184	76-01-7	Pentachloroethane	(T)
U185	82-68-8	Pentachloronitrobenzene (PCNB)	(T)
U161	108-10-1	Pentanol, 4-methyl-	(I) ¹

Waste code	CAS Registry #	Generic name	Reason
U186	504-60-9	1,3-Pentadiene	(I) ¹
U187	62-44-2	Phenacetin	(T)
U188	108-95-2	Phenol	(T)
U048	95-57-8	Phenol, 2-chloro-	(T)
U039	59-50-7	Phenol, 4-chloro-3-methyl-	(T)
U081	120-83-2	Phenol, 2,4-dichloro-	(T)
U082	87-65-0	Phenol, 2,6-dichloro-	(T)
U089	56-53-1	Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)-	(T)
U101	105-67-9	Phenol, 2,4-dimethyl-	(T)
U052	1319-77-3	Phenol, methyl-	(T)
U132	70-30-4	Phenol, 2,2'-methylenebis[3,4,6-trichloro-	(T)
U411	114-26-1	Phenol, 2-(1-methylethoxy)-, methylcarbamate.	(T)
U170	100-02-7	Phenol, 4-nitro-	(T)
U150	148-82-3	L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-	(T)
U145	7446-27-7	Phosphoric acid, lead(2+) salt (2:3)	(T)
U087	3288-58-2	Phosphorodithioic acid, O,O-diethyl S-methyl ester	(T)
U189	1314-80-3	Phosphorus sulfide	(R) ¹
U190	85-44-9	Phthalic anhydride	(T)
U191	109-06-8	2-Picoline	(T)
U179	100-75-4	Piperidine, 1-nitroso-	(T)
U192	23950-58-5	Pronamide	(T)
U194	107-10-8	1-Propanamine	(I,T)
U111	621-64-7	1-Propanamine, N-nitroso-N-propyl-	(T)
U110	142-84-7	1-Propanamine, N-propyl-	(I) ¹
U066	96-12-8	Propane, 1,2-dibromo-3-chloro-	(T)
U083	78-87-5	Propane, 1,2-dichloro-	(T)
U149	109-77-3	Propanedinitrile	(T)
U171	79-46-9	Propane, 2-nitro-	(I,T)
U027	108-60-1	Propane, 2,2'-oxybis[2-chloro-	(T)
U193	1120-71-4	1,3-Propane sultone	(T)
U235	126-72-7	1-Propanol, 2,3-dibromo-, phosphate (3:1)	(T)
U140	78-83-1	1-Propanol, 2-methyl-	(I,T)
U002	67-64-1	2-Propanone	(I) ¹
U007	79-06-1	2-Propenamide	(T)
U084	542-75-6	1-Propene, 1,3-dichloro-	(T)
U243	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-	(T)

Waste code	CAS Registry #	Generic name	Reason
U009	107-13-1	2-Propenenitrile	(T)
U152	126-98-7	2-Propenenitrile, 2-methyl-	(I,T)
U008	79-10-7	2-Propenoic acid	(I) ¹
U113	140-88-5	2-Propenoic acid, ethyl ester	(I) ¹
U118	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester	(T)
U162	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester	(I,T)
U373	122-42-9	Propham	(T)
U411	114-26-1	Propoxur	(T)
U387	52888-80-9	Prosulfocarb	(T)
U194	107-10-8	n-Propylamine	(I,T)
U083	78-87-5	Propylene dichloride	(T)
U148	123-33-1	3,6-Pyridazinedione, 1,2-dihydro-	(T)
U196	110-86-1	Pyridine	(T) ³
U191	109-06-8	Pyridine, 2-methyl-	(T)
U237	66-75-1	2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2- chloroethyl)amino]-	(T)
U164	56-04-2	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-	(T)
U180	930-55-2	Pyrrolidine, 1-nitroso-	(T)
U200	50-55-5	Reserpine	(T)
U201	108-46-3	Resorcinol	(T)
U203	94-59-7	Safrole	(T)
U204	7783-00-8	Selenious acid	(T)
U204	7783-00-8	Selenium dioxide	(T)
U205	7488-56-4	Selenium sulfide	(T)
U205	7488-56-4	Selenium sulfide SeS2	(R,T)
U015	115-02-6	L-Serine, diazoacetate (ester)	(T)
U206	18883-66-4	Streptozotocin	(T)
U103	77-78-1	Sulfuric acid, dimethyl ester	(T)
U189	1314-80-3	Sulfur phosphide	(R) ¹
U207	95-94-3	1,2,4,5-Tetrachlorobenzene	(T)
U208	630-20-6	1,1,1,2-Tetrachloroethane	(T)
U209	79-34-5	1,1,2,2-Tetrachloroethane	(T)
U210	127-18-4	Tetrachloroethylene	(T) ³
U213	109-99-9	Tetrahydrofuran	(I)1
U214	563-68-8	Thallium(I) acetate	(T)
U215	6533-73-9	Thallium(I) carbonate	(T)
U216	7791-12-0	Thallium(I) chloride	(T)

Waste code	CAS Registry #	Generic name	Reason
U216	7791-12-0	Thallium chloride TlCl	(T)
U217	10102-45-1	Thallium(I) nitrate	(T)
U218	62-55-5	Thioacetamide	(T)
U410	59669-26-0	Thiodicarb	(T)
U153	74-93-1	Thiomethanol	(I,T)
U244	137-26-8	Thioperoxydicarbonic diamide [(H2 N)C(S)]2 S2, tetramethyl-	(T)
U409	23564-05-8	Thiophanate-methyl	(T)
U219	62-56-6	Thiourea	(T)
U244	137-26-8	Thiram	(T)
U220	108-88-3	Toluene	(T)
U221	25376-45-8	Toluenediamine	(T)
U223	26471-62-5	Toluene diisocyanate	(R,T)
U328	95-53-4	o-Toluidine	(T)
U353	106-49-0	p-Toluidine	(T)
U222	636-21-5	o-Toluidine hydrochloride	(T)
U389	2303-17-5	Triallate	(T)
U011	61-82-5	1H-1,2,4-Triazol-3-amine	(T)
U226	71-55-6	1,1,1-Trichloroethane	(T)
U227	79-00-5	1,1,2-Trichloroethane	(T)
U228	79-01-6	Trichloroethylene	(T) ³
U121	75-69-4	Trichloromonofluoromethane	(T)
U404	121-44-8	Triethylamine	(T)
U234	99-35-4	1,3,5-Trinitrobenzene	(R,T)
U182	123-63-7	1,3,5-Trioxane, 2,4,6-trimethyl-	(T)
U235	126-72-7	Tris(2,3-dibromopropyl) phosphate	(T)
U236	72-57-1	Trypan blue	(T)
U237	66-75-1	Uracil mustard	(T)
U176	759-73-9	Urea, N-ethyl-N-nitroso-	(T)
U177	684-93-5	Urea, N-methyl-N-nitroso-	(T)
U043	75-01-4	Vinyl chloride	(T) ³
U248	81-81-2	Warfarin, & salts, when present at concentrations of 0.3% or less	(T) ^{2,5}
U239	1330-20-7	Xylene	(I) ¹
U200	50-55-5	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester, (3beta,16beta,17alpha,18beta,20alpha)-	(T)
U249	1314-84-7	Zinc phosphide Zn3 P2, when present at concentrations of 10% or less	(T) ⁶

Explanation of superscripts

1. Wastes are not U Listed if they are not listed for toxicity and also do not exhibit the characteristics of corrosivity, ignitability, or reactivity at the time they become a waste.

For more information on this exemption, see MPCA hazardous waste fact sheet #8.01, *Exclusion of Some Characteristic Wastes under Certain Conditions*, available at <http://www.pca.state.mn.us/publications/w-hw8-01.pdf>.

2. These listings include both the parent named compound and also daughter compound salts or other daughter compounds where specified. The CAS Registry Number is given only for the parent compound.
3. Note that the wastes in these listings are Toxicity Characteristic hazardous wastes above certain concentrations, regardless of whether disposed of after use or as other than the sole active ingredient.

For more information on the Toxicity Characteristic, see MPCA hazardous waste fact sheet #2.04, *Characteristic Wastes*, available at <http://www.pca.state.mn.us/publications/w-hw2-04.pdf>.

4. Formaldehyde is a Lethality Characteristic hazardous waste if the concentration at disposal is greater than 20 percent, regardless of whether it is disposed of after use or as other than the sole active ingredient.

For more information on the Lethality Characteristic, see MPCA hazardous waste fact sheet #2.05, *The Lethality Characteristic*, available at <http://www.pca.state.mn.us/publications/w-hw2-05.pdf>.

5. Warfarin at an original concentration of greater than 0.3 percent is a P001 P-listed acute hazardous waste.

For more information on the P List, see MPCA hazardous waste fact sheet #2.02, *P List of Acute Hazardous Waste*, available at <http://www.pca.state.mn.us/publications/w-hw2-02.pdf>.

6. Zinc phosphide at an original concentration of greater than 10% is a P122 P Listed acute hazardous waste.

More information

Your metropolitan county and the MPCA have staff available to answer waste management questions. For more information, contact your metropolitan county hazardous waste office or your nearest MPCA regional hazardous waste staff. For information about waste reduction, contact the Minnesota Technical Assistance Program.

Metro County Hazardous Waste Offices

Anoka	763-422-7093
Carver	952-361-1800
Dakota	952-891-7557
Hennepin	612-348-3777
Ramsey	651-266-1199
Scott County	952-496-8475
Washington County	651-430-6655
Web sites.....	http://www.co.[county].mn.us

Minnesota Technical Assistance Program

Toll free.....	1-800-247-0015
Metro	612-624-1300
Web site	http://www.mntap.umn.edu

Minnesota Pollution Control Agency

Toll free (all offices)	1-800-657-3864
Brainerd.....	218-828-2492
Detroit Lakes.....	218-847-1519
Duluth	218-723-4660
Mankato	507-389-5977
Marshall	507-537-7146
Rochester.....	507-285-7343
St. Paul	651-296-6300
Willmar	320-214-3786
Web site	http://www.pca.state.mn.us

P-list and F-list of acute hazardous wastes

Identifying and managing acute hazardous wastes

All wastes generated by businesses and government entities in Minnesota must be assumed to be hazardous wastes unless evaluated as non-hazardous by the generator of the waste. Waste may be hazardous due to either being included on any of the five hazardous waste lists: F, K, P, U, or PCB; or by displaying any hazardous waste characteristic: Ignitability, Oxidizer, Corrosivity, Reactivity, Toxicity, or Lethality.

For information on the other lists and characteristics, see MPCA fact sheets:

#w-hw2-00	F-list of hazardous waste	https://www.pca.state.mn.us/sites/default/files/w-hw2-00.pdf
#w-hw2-01	K-list of hazardous waste	https://www.pca.state.mn.us/sites/default/files/w-hw2-01.pdf
#w-hw2-03	U-list of hazardous waste	https://www.pca.state.mn.us/sites/default/files/w-hw2-03.pdf
#w-hw4-48a	Identifying PCBs	https://www.pca.state.mn.us/sites/default/files/w-hw4-48a.pdf
#w-hw2-04	Characteristic wastes	https://www.pca.state.mn.us/sites/default/files/w-hw2-04.pdf
#w-hw2-05	The lethality characteristic	https://www.pca.state.mn.us/sites/default/files/w-hw2-05.pdf

The Minnesota Pollution Control Agency (MPCA) and the metropolitan counties of Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington (Metro Counties) administer Minnesota's hazardous waste requirements and the evaluation of wastes. For assistance evaluating wastes, see MPCA fact sheet #w-hw1-01, Evaluate waste, at <https://www.pca.state.mn.us/sites/default/files/w-hw1-01.pdf>.

What is an acute hazardous waste?

Acute hazardous wastes are hazardous wastes that present specific health or safety risks that subject them to more stringent on-site generation and accumulation limits, discussed in the [Managing acute hazardous wastes](#) section on page 7. All P-listed wastes, identified in the [P-list table](#) starting on page 3 are acute hazardous wastes, as well as six F-listed wastes, identified in the [Acute F-list table](#) starting on page 5. In addition, any other waste inseparably mixed with a P-listed or acute F-listed waste also becomes an acute hazardous waste.

Are the Minnesota P-list and F-list the same as the federal P-list and F-list?

Yes, Minnesota has adopted the federal lists of hazardous wastes, found at 40 Code of Federal Regulations (CFR), part 261.33, as amended. This means that any changes to the federal lists made by the U.S. Environmental Protection Agency (EPA) are implemented immediately and automatically in Minnesota.

Are wastes that are not P-listed or F-listed non-hazardous?

Wastes that have been evaluated as not P-listed may still be a hazardous waste due to another list or displaying a characteristic. You must continue to assume a waste is hazardous and manage it accordingly until it has been evaluated as non-hazardous under all the applicable lists and characteristics.

When are wastes regulated under the P-list?

A waste is only regulated under the P-list when it is disposed of *unused* for its intended purpose. Dilution or other preparation of a product for use is not considered being used for the intended purpose.

For example, a sodium azide-based pesticide would be a P-listed acute hazardous waste if discarded before use, even if it was discarded after being diluted or otherwise prepared for use. However, overspray of the used pesticide rinsed from a crop duster airplane after a flight would no longer be a P-listed waste because the overspray is waste resulting from use of the pesticide.

Is any waste containing an ingredient on the P-list regulated?

A waste is regulated under the P-list only if the ingredient contained in the list is the sole active ingredient of the product that became a waste. Active ingredients are those that perform the primary function of the product, regardless of the concentration of those ingredients. Ingredients used as preservatives, solvents, stabilizers, and adjuncts are not active ingredients unless that is the function of the product.

For example:

- Sodium azide is the sole active ingredient in some broad-spectrum pesticides. These pesticides would be P-listed acute hazardous wastes if discarded before use.
- Some automotive airbag activators, however, contain ferric oxide as an oxidizer in addition to sodium azide as a propellant, both active ingredients. These activators would not be P-listed wastes if discarded, because the sodium azide was not the sole active ingredient.
- Finally, some pregnancy test strips contain sodium azide as a preservative. These strips would not be P-listed wastes if discarded because the sodium azide did perform the function of the product, and was therefore not an active ingredient.

How do I read the P-list and F-list tables?

Each waste entry in the [P-list table](#) starting on page 3 consists of five elements: the waste code, Chemical Abstract Service (CAS) Registry number, its generic listed name, the listing reason, and notes specific to that waste. The [Acute F-list table](#) starting on page 5 does not include the CAS Registry number, since each of these wastes may include several different chemical compounds.

Waste code

Every Listed waste is assigned a unique four-character waste code. Use this code to annually report your site's hazardous waste generation to the MPCA or Metro County and to identify wastes on a *hazardous waste manifest*. For more information about using waste codes on a manifest, see MPCA fact sheet #w-hw1-07, Manifest shipments of hazardous waste, at <https://www.pca.state.mn.us/sites/default/files/w-hw1-07.pdf>.

CAS Registry number

The CAS Registry assigns a unique number to individual chemical compounds to differentiate them from similar compounds that may have different physical structures or confusingly close generic or common names.

However, though a single CAS Registry number is shown for each waste in the P-list, the CAS Registry number is included only as an aid to identification and does not restrict the listing to the individual chemical compound assigned that CAS Registry number. ***All wastes having the generic name in the P-list are regulated, regardless of their specific CAS numbers, unless otherwise noted.***

Generic listed name

The P-list is organized alphabetically by the chemical compounds' generic names. However, chemical compounds may often be known by many different names, and only one of those names may be in the P-list. ***Any waste having the generic name in the P-list is regulated, regardless of whether your site might know it by another name that is not listed.*** The generic names on the F-list describe the source of the regulated waste.

Listing reason

Acute hazardous wastes may be listed for any of three reasons, indicated by a capital letter; they are acutely toxic (H), reactive (R), or toxic (T).

Note: The toxic (T) listing reason is different and has a separate definition from the Toxicity Characteristic. Wastes may be listed for being toxic (T) without displaying the Toxicity Characteristic and vice versa.

Notes

Many listed wastes have additional listing-specific information, including special definitions and potential exemptions. These notes are explained in the [Notes on Listings](#) section on page 6.

P-list table

Waste code	CAS registry #	Generic listed name	Listing reason	Notes
P002	591-08-2	1-Acetyl-2-thiourea	H	
P003	107-02-8	Acrolein	H	
P070	116-06-3	Aldicarb	H	
P203	1646-88-4	Aldicarb sulfone	H	
P004	309-00-2	Aldrin	H	
P005	107-18-6	Allyl alcohol	H	
P006	20859-73-8	Aluminum phosphide	R, T	
P007	2763-96-4	5-(Aminomethyl)-3-isoxazolol	H	
P008	504-24-5	4-Aminopyridine	H	
P009	131-74-8	Ammonium picrate	R	1
P119	7803-55-6	Ammonium vanadate	H	
P010	7778-39-4	Arsenic acid H ₃ AsO ₄	H	
P011	1303-28-2	Arsenic pentoxide	H	
P012	1327-53-3	Arsenic trioxide	H	
P054	151-56-4	Aziridine	H	
P067	75-55-8	Aziridine, 2-methyl-	H	
P013	542-62-1	Barium cyanide	H	
P028	100-44-7	Benzyl chloride	H	
P015	7440-41-7	Beryllium powder	H	2
P017	598-31-2	Bromoacetone	H	
P018	357-57-3	Brucine	H	
P021	592-01-8	Calcium cyanide	H	
P127	1563-66-2	Carbofuran	H	
P022	75-15-0	Carbon disulfide	H	
P189	55285-14-8	Carbosulfan	H	
P023	107-20-0	Chloroacetaldehyde	H	
P024	106-47-8	p-Chloroaniline	H	
P029	544-92-3	Copper cyanide	H	
P030	-----	Cyanides (soluble cyanide salts), not otherwise specified	H	
P031	460-19-5	Cyanogen	H	
P033	506-77-4	Cyanogen chloride	H	
P016	542-88-1	Dichloromethyl ether	H	
P036	696-28-6	Dichlorophenylarsine	H	
P037	60-57-1	Dieldrin	H	
P038	692-42-2	Diethylarsine	H	
P043	55-91-4	Diisopropylfluorophosphate (DFP)	H	
P044	60-51-5	Dimethoate	H	
P191	644-64-4	Dimetilan	H	
P020	88-85-7	Dinoseb	H	
P039	298-04-4	Disulfoton	H	
P049	541-53-7	Dithiobiuret	H	
P050	115-29-7	Endosulfan	H	
P088	145-73-3	Endothall	H	
P051	72-20-8	Endrin & metabolites	H	3, 4
P042	51-43-4	Epinephrine	H	5

Waste code	CAS registry #	Generic listed name	Listing reason	Notes
P097	52-85-7	Famphur	H	
P056	7782-41-4	Fluorine	H	
P057	640-19-7	Fluoroacetamide	H	
P058	62-74-8	Fluoroacetic acid, sodium salt	H	
P198	23422-53-9	Formetanate hydrochloride	H	
P197	17702-57-7	Formparanate	H	
P059	76-44-8	Heptachlor	H	6
P062	757-58-4	Hexaethyl tetraphosphate	H	
P116	79-19-6	Hydrazinecarbothioamide	H	
P063	74-90-8	Hydrogen cyanide	H	
P060	465-73-6	Isodrin	H	
P192	119-38-0	Isolan	H	
P196	15339-36-3	Manganese dimethyldithiocarbamate	H	
P065	628-86-4	Mercury fulminate	R, T	
P199	2032-65-7	Methiocarb.	H	
P066	16752-77-5	Methomyl	H	
P068	60-34-4	Methyl hydrazine	H	
P064	624-83-9	Methyl isocyanate	H	
P071	298-00-0	Methyl parathion	H	
P190	1129-41-5	Metolcarb	H	
P128	315-8-4	Mexacarbate	H	
P073	13463-39-3	Nickel carbonyl	H	
P074	557-19-7	Nickel cyanide	H	
P075	54-11-5	Nicotine & salts	H	3, 7
P076	10102-43-9	Nitric oxide	H	
P077	100-01-6	p-Nitroaniline	H	
P078	10102-44-0	Nitrogen dioxide	H	
P081	55-63-0	Nitroglycerine	R	1
P082	62-75-9	N-Nitrosodimethylamine	H	
P084	4549-40-0	N-Nitrosomethylvinylamine	H	
P085	152-16-9	Octamethylpyrophosphoramide	H	
P087	20816-12-0	Osmium tetroxide	H	
P194	23135-22-0	Oxamyl	H	
P089	56-38-2	Parathion	H	
P034	131-89-5	Phenol, 2-cyclohexyl-4,6-dinitro-	H	
P048	51-28-5	Phenol, 2,4-dinitro-	H	
P047	534-52-1	Phenol, 2-methyl-4,6-dinitro- & salts	H	3
P202	64-00-6	Phenol, 3-(1-methylethyl)-, methyl carbamate	H	
P046	122-09-8	Phentermine	H	8
P092	62-38-4	Phenylmercury acetate	H	
P093	103-85-5	Phenylthiourea	H	
P094	298-02-2	Phorate	H	
P095	75-44-5	Phosgene	H	
P096	7803-51-2	Phosphine	H	
P041	311-45-5	Phosphoric acid, diethyl 4-nitrophenyl ester	H	
P040	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	H	

Waste code	CAS registry #	Generic listed name	Listing reason	Notes
P204	57-47-6	Physostigmine	H	
P188	57-64-7	Physostigmine salicylate	H	
P098	151-50-8	Potassium cyanide	H	
P099	506-61-6	Potassium silver cyanide	H	
P201	2631-37-0	Promecarb	H	
P101	107-12-0	Propanenitrile	H	
P027	542-76-7	Propanenitrile, 3-chloro-	H	
P069	75-86-5	Propanenitrile, 2-hydroxy-2-methyl-	H	
P102	107-19-7	Propargyl alcohol	H	
P103	630-10-4	Selenourea	H	
P104	506-64-9	Silver cyanide	H	
P105	26628-22-8	Sodium azide	H	
P106	143-33-9	Sodium cyanide	H	
P108	57-24-9	Strychnine & salts	H	3
P109	3689-24-5	Tetraethyldithiopyrophosphate	H	
P110	78-00-2	Tetraethyl lead	H	
P111	107-49-3	Tetraethyl pyrophosphate	H	
P112	509-14-8	Tetranitromethane	R	1
P113	1314-32-5	Thallic oxide	H	
P114	12039-52-0	Thallium(I) selenite	H	
P115	7446-18-6	Thallium(I) sulfate	H	
P045	39196-18-4	Thiofanox	H	
P014	108-98-5	Thiophenol	H	
P026	5344-82-1	Thiourea, (2-chlorophenyl)-	H	
P072	86-88-4	Thiourea, 1-naphthalenyl-	H	
P185	26419-73-8	Tirpate	H	
P123	8001-35-2	Toxaphene	H	9
P118	75-70-7	Trichloromethanethiol	H	
P120	1314-62-1	Vanadium pentoxide	H	
P001	81-81-2	Warfarin & salts, when present at concentrations > 0.3%	H	3, 10
P121	557-21-1	Zinc cyanide	H	
P122	1314-84-7	Zinc phosphide Zn ₃ P ₂ , when present at concentrations > 10%	R, T	11
P205	137-30-4	Ziram	H	

Acute F-list table

Waste code	Generic listed name	Listing reason	Notes
F020	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives.	H	
F021	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.	H	
F022	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.	H	

Waste code	Generic listed name	Listing reason	Notes
F023	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols.	H	
F026	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.	H	
F027	Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols.	H	12

Notes on listings

- Wastes are not P-listed if listed solely for reactivity (R) and the waste does not exhibit the characteristic of reactivity at the time it becomes a waste, also known as *at the point of generation*. Includes P009, P081, and P112. See MPCA fact sheet #w-hw8-01, Exclusion of some characteristic wastes, at: <https://www.pca.state.mn.us/sites/default/files/w-hw8-01.pdf>.
- Beryllium in any form at > 2% is an MN01 lethal hazardous waste regardless of whether the waste also meets the P-list definition. See [The lethality characteristic](#) on page 1.
- These listings include both the named parent compound and also daughter compound, including salts. However, the CAS Registry number is given only for the parent compound. Includes P001, P047, P051, P075, and P108.
- Endrin in a liquid at a concentration of > 0.02 milligrams per liter (mg/L), or in a solid with a leachate at that concentration, is a D012 toxicity characteristic hazardous waste regardless of whether the waste also meets the P-list definition. See [Characteristic wastes](#) on page 1.
- Epinephrine salts are not P-listed. Epinephrine at a concentration > 0.24% is an MN01 lethal hazardous waste regardless of whether it also meets the P-list definition. See MPCA fact sheet #w-hw3-35, Regulatory consensus, at: <https://www.pca.state.mn.us/sites/default/files/w-hw3-35.pdf>.
- Heptachlor in a liquid at a concentration of > 0.008 milligrams per liter (mg/L), or in a solid with a leachate at that concentration, is a D031 toxicity characteristic hazardous waste regardless of whether the waste also meets the P-list definition. See [Characteristic wastes](#) on page 1.
- Nicotine-containing over-the-counter patches, gums, and lozenges that are nicotine replacement therapies approved for that use by the U.S. Food & Drug Administration (FDA) and tobacco products are not P-listed. Prescription nicotine pharmaceuticals and consumer-ready recreational vaping products containing nicotine remain P075 acute hazardous wastes when discarded but are considered pharmaceuticals and are eligible for pharmaceutical hazardous waste management allowances. See MPCA fact sheet #w-hw3-33, Changes in pharmaceutical waste management, at: <https://www.pca.state.mn.us/sites/default/files/w-hw3-33.pdf>. Nicotine-containing manufacturing or compounding materials and intermediates remain fully regulated P075 acute hazardous wastes and are not pharmaceuticals. See MPCA fact sheet #w-hw4-65, Vaping liquids, E-cigarettes, and nicotine wastes, at: <https://www.pca.state.mn.us/sites/default/files/w-hw4-65.pdf>.
- Phentermine salts are not P-listed. Phentermine is Listed under the generic listing names Benzeneethanamine, alpha,alpha-dimethyl-; and alpha,alpha-Dimethylphenethylamine. See MPCA fact sheet #w-hw3-35, Regulatory consensus, at: <https://www.pca.state.mn.us/sites/default/files/w-hw3-35.pdf>.
- Toxaphene in a liquid at a concentration of > 0.5 milligrams per liter (mg/L), or in a solid with a leachate at that concentration, is a D015 toxicity characteristic hazardous waste regardless of whether the waste also meets the P-list definition. See [Characteristic wastes](#) on page 1.
- Warfarin at a concentration ≤ 0.3% is a U248 listed hazardous waste. See the [U-list](#) on page 1.
- Zinc phosphide at a concentration ≤ 10% is a U249 listed hazardous waste. See the [U-list](#) on page 1.
- F027 does not include formulations containing hexachlorophene synthesized from pre-purified 2,4,5-trichlorophenol as the sole component. See the [F-list](#) on page 1.

Managing acute hazardous wastes

Generation

If a site generates:

- Any amount of any acute hazardous waste in a calendar year, the site is ineligible to be considered a Minimal Quantity Generator (MiniQG) for that year.
- One kilogram (2.2 pounds) or less of non-pharmaceutical acute hazardous waste in a month, calculate the status of the site using the volume of all non-pharmaceutical hazardous wastes generated each month. The site may be a Very Small Quantity Generator (VSQG), Small Quantity Generator (SQG) or Large Quantity Generator (LQG).
- More than one kilogram of non-pharmaceutical acute hazardous waste in a month, the site is an LQG, regardless of the volume of other hazardous wastes you generated.

Do not average a site's annual generation; use the actual amount generated each month. You do not need to include acute hazardous waste container weight, just the net waste weight. See MPCA fact sheet #w-hw1-02, Determine generator size, at: <https://www.pca.state.mn.us/sites/default/files/w-hw1-02.pdf>.

Satellite accumulation

You may accumulate up to only one quart of liquid or one kilogram of solid non-pharmaceutical acute hazardous waste in a satellite accumulation area. Once this limit is reached, manage that accumulated acute hazardous waste under the full hazardous waste container requirements within three days, including performing weekly inspections and labeling the container with the date the limit was reached, which is then the accumulation start date. Acute hazardous waste accumulated only under the satellite accumulation exemption does not trigger the enhanced generator requirements below in the Standard accumulation table. See MPCA fact sheet #w-hw1-05, Accumulate hazardous waste, at: <https://www.pca.state.mn.us/sites/default/files/w-hw1-05.pdf>.

Standard accumulation

Note: The requirements in this table do not apply to pharmaceutical acute hazardous wastes. For more information on pharmaceutical acute hazardous waste allowances, see MPCA fact sheet #w-hw3-33, Changes in pharmaceutical waste management, at: <https://www.pca.state.mn.us/sites/default/files/w-hw3-33.pdf>.

If your site is a:	...and accumulates:	...of non-pharmaceutical acute hazardous waste, then:
VSQG	≤ 1 kg	You must meet all SQG requirements except the 180 day accumulation limit, as long as the acute hazardous waste remains onsite. Applicable SQG requirements include employee training, designation of an emergency coordinator, and attempting to make arrangements with local emergency responders. You may continue to accumulate all your hazardous waste indefinitely. The site remains a VSQG.
SQG	≤ 1 kg	No additional requirements apply to the site.
VSQG or SQG	> 1 kg	You must meet all LQG requirements, including the 90 day accumulation limit, as long as the acute hazardous waste remains onsite.
LQG		No additional requirements apply to the site.

Empty containers

Containers that held a non-pharmaceutical acute hazardous waste, or a product that would become a non-pharmaceutical acute hazardous waste when discarded, are not 'empty' for hazardous waste purposes unless they have been triple-rinsed with a solvent, including water that will dissolve the acute hazardous waste or product. The solvent or wastewater must then be managed as an acute hazardous waste itself, including being counted as an acute hazardous waste towards the site's generator status. See MPCA fact sheet #w-hw4-16, Containers that held hazardous wastes or products, at: <https://www.pca.state.mn.us/sites/default/files/w-hw4-16.pdf>.

More information

Guidance and requirements in this fact sheet were compiled from Minn. R. ch. 7045, and incorporates regulatory interpretation decisions made by the MPCA on July 2, 2004; November 25, 2008; and May 17, 2019. . Visit the Office of the Revisor of Statutes at <https://www.revisor.mn.gov/pubs> to review Minnesota Rules.

Contact your Metro County or the MPCA with your questions. The MPCA's Small Business Environmental Assistance Program (SBEAP) can also provide free, confidential regulatory compliance assistance. The Minnesota Technical Assistance Program (MnTAP) can help you reduce the amount of hazardous waste your site generates.

Metro County Hazardous Waste Offices

Anoka	763-324-4260
.....	https://www.anokacounty.us/
Carver	952-361-1800
.....	http://www.co.carver.mn.us/
Dakota	952-891-7557
.....	https://www.co.dakota.mn.us/
Hennepin	612-348-3777
.....	http://www.hennepin.us/
Ramsey	651-266-1199
.....	https://www.ramseycounty.us/
Scott	952-496-8177
.....	http://www.scottcountymn.gov/
Washington	651-430-6655
.....	https://www.co.washington.mn.us/

Minnesota Pollution Control Agency

Toll free (all offices)	1-800-657-3864
All offices.....	651-296-6300
.....	https://www.pca.state.mn.us/

Small Business Environmental Assistance

Toll free	1-800-657-3938
Metro	651-282-6143
.....	https://www.pca.state.mn.us/sbeap/

Minnesota Technical Assistance Program

Toll free	1-800-247-0015
Metro	612-624-1300
.....	http://www.mntap.umn.edu

Appendix C



Minnesota
Pollution
Control
Agency

F List of Hazardous Wastes

Waste/Hazardous waste #2.00 • January 2011

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Listed hazardous wastes

In Minnesota, a waste may be hazardous for one of these reasons:

- It displays a hazardous waste characteristic
- It is recorded in one of four lists of hazardous waste – the K, F, P, or U List
- It contains polychlorinated biphenyls (PCBs)

This fact sheet will discuss the F List of hazardous waste.

For more information on the other lists, PCBs, or hazardous waste characteristics, see Minnesota Pollution Control Agency (MPCA) hazardous waste fact sheets #2.01, 2.02, 2.03, 2.04, 2.05, and 4.48a, available on the MPCA's [hazardous waste publications](http://www.pca.state.mn.us/waste/pubs/business.html) webpage, <http://www.pca.state.mn.us/waste/pubs/business.html>.

F List in Minnesota

The MPCA has adopted the federal F List of hazardous waste, located in Chapter 40 of the Code of Federal Regulations (CFR), parts 261.30 and 261.31, as amended. Because Minnesota adopted the federal list, changes made to the list by the U.S. Environmental Protection Agency (EPA) are implemented automatically in Minnesota.

Reducing listed waste

Reducing the amount of listed hazardous waste you generate can lower your costs as well as make complying with the regulatory requirements easier. The Minnesota Technical Assistance Program (MnTAP) has staff and resources to assist you in assessing alternate products and processes to help reduce your listed waste generation. For contact information for MnTAP, see the 'More information' section on page six.

Wastes mixed with listed waste

If a listed waste is mixed with any other waste, the entire mixture then takes on the listed waste's identity and requirements. Examples of listed mixtures include F-listed solvents sprayed over or into a parts washer and F-listed solvents applied to a sorbent for wiping. The resulting parts washer waste and sorbents become regulated as F-listed wastes.

For more information on managing sorbents used with hazardous waste solvents, see MPCA hazardous waste fact sheet #4.61, [Managing Towels, Wipes, and Sorbents](#), available on the MPCA's [hazardous waste publications](#) webpage.

Explanation of F List

Reason for listing

Each group of wastes on the F List (list) was included for one or more of the following reasons, identified in the list by the capitalized letters in parentheses following the definition:

- Ignitable (I)
- Reactive (R)
- Toxic (T)
- Acutely Hazardous (H)

Acutely hazardous F-listed wastes

The wastes listed for being acutely hazardous (H) are F020, F021, F022, F023, F026, and F027. These wastes are subject to more restrictive requirements than other hazardous wastes, including generator size calculation, accumulation limits, and empty container determinations.

For more information on managing acutely hazardous wastes, see MPCA hazardous waste fact sheet #2.02, [P List of Acutely Hazardous Waste](#), available on the MPCA's [hazardous waste publications](#) webpage.

Listing-specific information

Many wastes on the F List have additional listing-specific information associated with them, including definitions and possible exemptions. This information is referenced in this fact sheet by the numbers in superscript following the reason for listing. Explanation of the numbers is given after the complete list in this document.

Although the MPCA has included the most common particulars in this guidance document, the EPA may have issued additional interpretation.

Waste codes

A four-character hazardous waste code is assigned to each group of wastes on the list. Use this code for annual reporting and manifesting. The list below is grouped according to the type of waste. In alphabetical order:

- Contaminated soil treatment residues (F028)
- Discarded unused products (F027)
- Landfill leachate (F039)
- Manufacturing and processing (F020-F026)
- Metal treating (F006-F012 and F019)
- Petroleum refinery (F037-F038)
- Spent solvents (F001-F005)
- Wood preserving (F032-F035)

*Reserved (No listings currently use codes F013-F018, F029-F031, F033 or F036)

The following list is grouped in numerical order of the waste codes.

Spent solvents (F001 – F005)

- F001** These spent halogenated solvents used in degreasing; spent solvent mixtures used in degreasing containing, before use, a total of 10 percent or more by volume of these solvents or the solvents listed in F002, F004, or F005, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures used in degreasing. (T)¹
- carbon tetrachloride
 - chlorinated fluorocarbons
 - methylene chloride
 - tetrachloroethylene, also called perchloroethylene
 - 1,1,1-trichloroethane
 - trichloroethylene, also called 'TCE'
- F002** These spent halogenated solvents; spent solvent mixtures containing, before use, a total of 10 percent or more by volume of these solvents or the solvents listed in F001, F004, or F005, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures. (T)¹
- chlorobenzene
 - methylene chloride
 - ortho-dichlorobenzene
 - tetrachloroethylene, also called 'perchloroethylene'
 - 1,1,1-trichloroethane
 - 1,1,2-trichloroethane
 - trichloroethylene, also called 'TCE'
 - trichlorofluoromethane
 - 1,1,2-trichloro-1,2,2-trifluoroethane
- F003** These spent non-halogenated solvents; spent solvent mixtures containing, before use, either only these non-halogenated solvents, or one or more of these non-halogenated solvents and a total of 10 percent or more by volume of the solvents listed in F001, F002, F004, or F005, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures. (I)^{1,2}
- acetone
 - cyclohexane
 - ethyl acetate
 - ethyl benzene
 - ethyl ether
 - methanol
 - methyl isobutyl ketone
 - n-butyl alcohol
 - xylene
- F004** These spent non-halogenated solvents; spent solvent mixtures containing, before use, a total of 10 percent or more by volume of these solvents or the solvents listed in F001, F002, or F005, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures. (T)¹
- cresols and cresylic acid
 - nitrobenzene

F005 These spent non-halogenated solvents; spent solvent mixtures containing, before use, a total of 10 percent or more by volume of these solvents or the solvents listed in F001, F002, or F004, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures. (I,T)¹

- benzene
- carbon disulfide
- 2-ethoxyethanol
- isobutanol
- methyl ethyl ketone, also called 'MEK'
- 2-nitropropane
- Pyridine
- toluene

Metal treating (F006-F012 and F019)

F006 All wastewater treatment sludges from electroplating operations except those from these processes. However, these sludges may still be hazardous for a hazardous waste characteristic. (T)

- sulfuric acid anodizing of aluminum
- tin plating of carbon steel
- zinc plating (segregated basis) on carbon steel
- aluminum or zinc aluminum plating on carbon steel
- cleaning/stripping associated with tin, zinc, and aluminum plating on carbon steel
- chemical etching and milling of aluminum

F007 Spent cyanide plating bath solutions from electroplating operations. (R,T)

F008 Plating bath sludges from the bottom of plating baths from electroplating operations where cyanides are used in the process. (R,T)³

F009 Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process. Sludges formed in electroplating stripping and cleaning bath solution tanks where cyanides are used in the process are also included. (R,T)³

F010 Quenching bath residues from oil baths from metal heat-treating operations where cyanides are used in the process. (R,T)³

F011 Spent cyanide solutions from salt bath pot cleaning from metal heat-treating operations. (R,T)

F012 Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process. (R,T)³

F019 Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process. (T)⁴

Manufacturing and processing (F020-F026)

F020 Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (H)^{5,6}

- F021** Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives. (H)⁵
- F022** Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions. (H)⁵
- F023** Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (H)^{5,7}
- F024** Process wastes from the production of chlorinated aliphatic hydrocarbons with carbon chain lengths from one through five by free radical catalyzed processes, with any amount and position of chlorine substitution. Process wastes include but are not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, but do not include F025 wastes. (T)⁸
- F025** Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of chlorinated aliphatic hydrocarbons with carbon chain lengths from one through five by free radical catalyzed processes, with any amount and position of chlorine substitution. (T)
- F026** Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions. (H)⁵

Discarded unused products (F027)

- F027** Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (H)^{5,9}

F027 includes, but is not limited to:

- Acetic acid, (2,4,5-trichlorophenoxy)-
- Pentachlorophenol *or* Phenol, pentachloro-
- Phenol, 2,3,4,6-tetrachloro-
- Phenol, 2,4,5-trichloro-
- Phenol, 2,4,6-trichloro-
- Silvex (2,4,5-TP) *or* Propanoic acid, 2-(2,4,5-trichlorophenoxy)-
- 2,4,5-T
- 2,3,4,6-Tetrachlorophenol
- 2,4,5-Trichlorophenol
- 2,4,6-Trichlorophenol

CAS Registry #

93-76-5
87-86-5
58-90-2
95-95-4
88-06-2
93-72-1
93-76-5
58-90-2
95-95-4
88-06-2

Contaminated soil treatment residues (F028)

- F028** Residues resulting from the incineration or thermal treatment of soil contaminated with hazardous waste codes F020, F021, F022, F023, F026, and F027. (T)

Wood preserving (F032-F035)

- F032** Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used chlorophenolic formulations. (T)^{10,11}
- F034** Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. (T)¹¹
- F035** Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. (T)¹¹

Petroleum refinery (F037-F038)

- F037** Petroleum refinery primary oil/water/solids separation sludge—Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. This listing includes residuals generated from processing or recycling oil-bearing hazardous secondary materials excluded in another state under 40 CFR 261.4(a)(12)(i) imported for processing into Minnesota, if those residuals are to be disposed of. (T)^{12,13}
- F038** Petroleum refinery secondary (emulsified) oil/water/solids separation sludge—Any sludge and/or float generated from the physical and/or chemical separation of oil/ water/solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. (T)^{12,14}

Landfill leachate (F039)

- F039** Leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one restricted waste listed as a F-, K-, P- or U-listed hazardous waste. Leachate resulting from the disposal of one or more hazardous wastes bearing the following waste codes which is not mixed with any other hazardous wastes retains its original codes and is not F039: F020, F021, F022, F026, F027, and F028. (T)

Explanation of superscripts

1. Wastes listed as spent solvents are regulated under the F001-F005 listings only when disposed of after use as a solvent. Products, such as paints, that contain ingredients on the F-list but that are not used as solvents, are not regulated as F-listed wastes. Unused solvents added to a non-solvent product, such as a reducer added to a paint to prepare it for use, are not regulated as F-listed wastes. These wastes may still be hazardous for another listing or because they display a hazardous waste characteristic.
2. F003 does not include wastes that would otherwise be F003 wastes, but are not ignitable when they are generated as a waste. Examples include solid still bottoms from F003 solvent reclamation and sorbents used to apply F003 solvents that will not release liquid when compressed ("are dry") after use. Note that deliberate evaporation of hazardous waste solvent is prohibited.

For more information on this exemption, see MPCA hazardous waste fact sheet #8.01, [Exclusion of Some Characteristic Wastes Under Certain Conditions](#), available on the MPCA's [hazardous waste publications](#) webpage.

3. F009, F010, and F012 include wastes from any processes where cyanides are actively used in the process, irrespective of whether the cyanide is added to the process in final form or is added in another form, such as a cyanate, and the cyanide is subsequently formed in the process itself.
4. F019 does not include wastewater treatment sludges from the manufacturing of motor vehicles using a zinc phosphating process if the wastes are not stored outside on the land and are disposed of in a permitted municipal or industrial solid waste landfill. Motor vehicle manufacturing includes only complete vehicles or chassis of automobiles and light truck/utility vehicles. Generators of such waste must maintain records of the volume of waste generated, the identity of the receiving facility, and confirmation of receipt of the waste at that facility.
5. Acutely hazardous wastes, including F020-F023 and F026-F027 are subject to more restrictive requirements than other hazardous wastes, including generator size calculation, accumulation limits, and empty container determinations.

For more information on acutely hazardous waste management, see MPCA hazardous waste fact sheet #2.02, [P List of Acutely Hazardous Waste](#), available on the MPCA's [hazardous waste publications](#) webpage.

6. F020 does not include wastes from the production of hexachlorophene from highly purified 2,4,5-trichlorophenol.
7. F023 does not include wastes from equipment used only for the production or use of hexachlorophene from highly purified 2,4,5-trichlorophenol.
8. F024 does not include light ends, spent filters and filter aids, spent dessicants, wastewater, wastewater treatment sludges, and spent catalysts. Condensed light ends, spent filters and filter aids, and spent desiccant wastes are F025 instead.
9. F027 does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component.
10. F032 does not include cross-contaminated wastes that have had the F032 waste code deleted under 40 CFR 261.65 or potentially cross-contaminated wastes that are otherwise currently regulated as hazardous wastes (i.e., F034 or F035), and where the generator does not resume or initiate use of chlorophenolic formulations.
11. F032, F034, and F035 do not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.
12. F037 and F038 do not include sludge generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, and sludges generated in aggressive biological treatment units (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units). Aggressive biological treatment includes: activated sludge; trickling filter; rotating biological contactor for the continuous accelerated biological oxidation of wastewaters; or high-rate aeration.
13. F037 does not include K051.
14. F038 does not include F037, K048, and K051.

For more information regarding the K001, K048, or K051 listings, see MPCA hazardous waste fact sheet #2.01, [K List of Hazardous Waste](#), available on the MPCA's [hazardous waste publications](#) webpage.

More information

Your metropolitan county and the MPCA have staff available to answer waste management. For more information, contact your metropolitan county hazardous waste office or your nearest MPCA regional hazardous waste staff.

MPCA hazardous waste webpage: <http://www.pca.state.mn.us/waste/pubs/business.html>.

Metro County Hazardous Waste Offices

Anoka	763-422-7093
Carver	952-361-1800
Dakota	952-891-7557
Hennepin	612-348-3777
Ramsey	651-266-1199
Scott County.....	952-496-8475
Washington County.....	651-430-6655
Websites	www.co.[county].mn.us

Minnesota Technical Assistance Program

Toll free.....	1-800-247-0015
Metro	612-624-1300
Website	http://www.mntap.umn.edu

Minnesota Pollution Control Agency

Toll free (all offices).....	1-800-657-3864
Brainerd	218-828-2492
Detroit Lakes	218-847-1519
Duluth	218-723-4660
Mankato	507-389-5977
Marshall	507-537-7146
Rochester	507-285-7343
St. Paul	651-296-6300
Willmar	320-214-3786
Website	http://www.pca.state.mn.us

Appendix D **CARLETON COLLEGE**

Laboratory Move Manual: A Guide to Relocating Hazardous Materials

Purpose: This document provides guidance for the transfer and/or disposal of all hazardous materials from a laboratory being vacated/decommissioned and decontamination of equipment and surfaces. The goal is to help minimize the risk of injury or illness to faculty, staff, students, and contractors.

Scope: This document addresses any and all laboratory closures due to PI and/or staff leaving the College, relocating to another space, closing his/her laboratory or a major lab renovation.

Policy: Proper disposition of all chemical, biological, and radioactive materials is the responsibility of the Principal Investigator (PI) when a laboratory is being relocated, renovated, vacated or closed. Equipment and items that may pose a potential danger to people or the environment must be properly decontaminated prior to movement or disposal.

Topics covered include:

- ✓ *General Guidelines*
- ✓ *Planning Your Move*
- ✓ *Packing and Relocating Chemicals*
- ✓ *Packing and Relocating Biological Materials*
- ✓ *Radioactive Materials*
- ✓ *Handling Equipment During the Move*
- ✓ *Disposal of Regular Non-hazardous Trash*
- ✓ *Preventing and Handling Emergencies*
- ✓ *Hazardous Materials Spills*
- ✓ *First Aid for Chemical Exposure*
- ✓ *Handling Hazardous Materials at the New Location*

If you have questions before, during, or after your move, call the Chemical Hygiene Office at Ex. 4902.

General Guidelines

- The College Movers are not permitted to move any chemical, biological, or radioactive materials.
- Staff who will be packing and relocating chemicals must be trained in the proper handling of chemicals.
- All laboratory personnel must wear personal protective equipment for the materials being handled (splash goggles/safety glasses, lab coats, gloves, closed-toe shoes) when packing.
- Contact the Chemical Hygiene Office for disposal of chemical, biological, or radioactive waste. Regulated medical waste includes all "bio hazardous" waste and "sharps" (e.g., hypodermic needles, contaminated broken glass, etc.) unless contaminated with chemical or radioactive materials.

- Contact the Chemical Hygiene Office for information on how to dispose of old gas cylinders. Gas cylinders should be handled with extreme care, with safety caps on and properly restrained.
- Do not pour any hazardous laboratory waste down the drain!

Planning Your Move

- Obtain moving supplies and equipment needed to pack. At a minimum:
 - Drums
 - Acid buckets
 - Absorbent material
 - Labels
 - Packing tape
 - Gas cylinder cart
 - Hand trucks
 - Personal protective equipment
 - Utility cart
 - Proper spill cleanup materials in the event of a spill
- Inventory chemicals in your laboratory that you want to relocate from the current lab to the new space. Evaluate your inventory for ways to reduce or substitute less hazardous chemicals. Giving them away will be less expensive than disposing of them.
 - Ex. Get rid of them. Dry picric acid, perchloric acid, very old ethers, and other peroxide formers should not be moved. Restrict access to the area and contact the Chemical Hygiene Office immediately if you find any of these.
- Check containers for expiration date and signs of corrosion or crystallization. If such degradation has occurred, arrange for disposal of the material.
- Replace any damaged or illegible labels. All containers must be labeled to accurately describe their contents. No abbreviations or trade names are allowed.
- Check chemical containers and caps for damage and cracks. Replace any faulty caps or containers. Damaged containers cannot be transported. Make sure that containers are not likely to leak in transport. Secure glass stoppers to their containers with tape and provide secondary containment for the containers.
- Separate chemicals from radioactive materials and bio-hazardous materials.
- Check for chemicals left under the fume hood, laboratory sink, in refrigerators/freezers, or tucked behind equipment.
- Have spill cleanup materials on hand before you begin packaging. Know the location of the spill cleanup materials available to you before you get started.
- Have personal protective equipment appropriate for the materials being handled.

Packing and Relocating Chemicals

- Personnel transporting chemicals must be appropriately trained.
- Wear personal protective equipment appropriate for the materials being handled (splash goggles/safety glasses, lab coat, gloves, closed-toe shoes, etc.).
- Segregate chemicals into the following categories/hazard classes:
 - Inorganic oxidizers
 - Flammable liquids
 - Inorganic acids

- Inorganic bases
- Organic acids
- Flammable solids
- Miscellaneous organic compounds
- Miscellaneous inorganic compounds
- Peroxide-forming materials should be disposed of if the container has been opened and is more than six months old or has not been opened and is more than one year old. Always dispose of peroxide-forming chemicals by the expiration date listed by the supplier.
- Use drums, acid buckets, etc. to pack chemical containers. Cushion the containers to prevent breakage and contain spills using compatible absorbent materials.
- Place lid securely on full drum. Drums should be light enough to be picked up by one person. Do not allow bottlenecks or stems to protrude.
- Carts used to move drums must be sturdy enough to handle the weight of the drums.
- Keep boxes of incompatibles separated from one another before and during transportation.
- Label each drum/container with the following:
 - Principal Investigator
 - New facility's laboratory room number
 - Hazard class of chemicals (e.g., radioactive, flammable solid, corrosive acid, etc.)
- Attach an inventory list of each chemical placed in drum along with container size, container type, and physical state. Use an ID system so that the box can be matched with the inventory should they become separated.
- Update chemical inventory as you pack, updating.
- Refrigerated materials need not be boxed together, but should be separated into their hazard class or handled according to their own special requirements.
- Chemicals stored in the cold need to be stabilized at room temperature before packing and moving.
- When chemicals arrive at the new facility, check contents for breakage/damage.

Packing and Relocating Biological Materials

- Personnel transporting biological materials must be appropriately trained. This includes Blood borne Pathogen Training (provided by Carleton EHS) specific to any individual pathogen being moved.
- Wear personal protective equipment appropriate for the materials being handled (splash goggles/safety glasses, lab coat, gloves, closed-toe shoes, etc.).
- The materials must be properly labeled and packed to prevent spills or damage during transport.
- Minimize liquid volume and weight of all materials.
- The bio-hazardous material must be contained in a closed, leak-proof primary container.
- The primary container must be contained within a leak-proof, shatter-resistant secondary container made of a material sufficient to prevent any leak should the primary container fail.
- Freezers can be moved with material still in them, provided all contents are in sealed, unbreakable containers and secured to avoid breakage and spills when the freezer is opened. The freezer must be sealed shut prior to moving.

Radioactive Materials

- If you need radioactive waste picked up, or information on waste packaging, contact the Chemical Hygiene Office.

Handling Equipment During the Move

- Assess whether the equipment needs decontamination before moving and/or recertification after moving (e.g., pathogenic work in a biological safety cabinet, radioactive contamination of liquid scintillation counters or centrifuges, microscopes, incubators, vacuum pumps, refrigerators with an accumulation of contaminated ice and regulated medical waste, or radiation waste containers).
- Freezers, incubators, and refrigerators must be emptied prior to disposal.

Fume Hood

- Remove everything from the fume hood and the cabinets underneath the hood. Do not remove panels, since they may contain asbestos.

Biosafety Cabinet

- Work surfaces of biosafety cabinets should be disinfected prior to moving them. Cabinets used for work involving pathogenic organisms may require paraformaldehyde decontamination prior to being moved. Otherwise, use of 70% alcohol or a 1:10 dilute bleach solution should be sufficient. This solution must remain on the surface for 20 minutes to be effective. Wipe with water to remove solution.
- All biological safety cabinets must be tested and certified for airflow and filter integrity after being moved. Note: Biosafety cabinets have a specially designed HEPA filter system and should not be confused with a chemical fume hood.

Compressed Gases

- Compressed gas cylinders pose hazards for several reasons:
 - Because of their pressure, they can become "unguided missiles". Mishandled gas cylinders can build up enough force to go through a concrete wall.
 - The material in the cylinder may be toxic or flammable.
 - They can tip over easily if not adequately restrained.

Moving Cylinders

- Remove the gauge and regulator and secure the valve cap.
- Transport cylinders on a wheeled cart, carefully securing them in an upright position.
- Secure the label with packaging tape to prevent it from falling off.
- Never leave a cylinder unattended.
- Never move a cylinder by rolling it across the floor; always use a cart.
- Contact vendor for pick-up of empty or unused cylinders.
- When possible, use vendors who will take back unused portions of product so as to avoid costly disposal charges.



Disposal of Regular Non-hazardous Trash

To protect custodians from injury and prevent illegal hazardous waste disposal, be careful about what you put in the trash. Only non-hazardous material should go in the trash. Do not put broken glass in the trash if it is contaminated by hazardous or bio-hazardous material.

Some non-hazardous items that may go into the trash are sugars and some salts, powdered detergent, protein mixes, and "liquid paper®". Since many of these non-hazardous items may be easily confused with hazardous substances once they are in the trash, please follow these guidelines for common trash disposal:

- Broken or unwanted laboratory glass must be sealed in a puncture-resistant sturdy box to prevent custodians from being injured. Glass must be clean (triple rinsed) of chemical and biological contamination. If the container has a volatile or strong-smelling material, rinse with an appropriate solvent to prevent vapor emissions. If the solvent is a hazardous material, collect and dispose of as hazardous waste. Remove the label or completely deface it with a marker or tape so that it is clear that the bottle does not contain hazardous material. Label these containers as Broken Glass and place it outside of your door for pickup by Facilities Custodial Staff.
- Important: Do not place clean hypodermic needles and syringes in the common trash. Place them in a "sharps" container and dispose of as regulated medical waste.
- Before putting a non-hazardous substance in the trash that might be mistaken for a laboratory chemical by a custodian:
 - Seal the substance in a plastic bag.
 - Label the bag so the contents are identified (e.g., sugar, non-hazardous).
 - Put a note on the label reading: "For Questions, contact _____"

Under no circumstances may regulated medical waste, hazardous waste, radioactive waste, or containers labeled with the international biohazard, radioactive symbol, the words "regulated medical waste," "biohazard," "infectious," or "sharps waste" be disposed of in the regular trash.

Preventing and Handling Emergencies

Taking the following precautions can help to avoid mishaps:

- Use sufficient packing material to prevent the bottles breaking.
- Don't lift containers or bottles by the cap.
- Don't try to save trips by stacking drums too high on carts.
- Use a cart designed to carry loads.
- Use the freight elevator when carrying containers, not the stairs.

Hazardous Material Spills

In cleaning up chemical spills, consider:

- The size of the spill
- The toxicity or other hazardous properties of the materials
- Clean-up materials available in the lab (Consult SDS for cleanup procedures)
- The level of knowledge and training of the person doing the cleanup

In general, if it appears you have the supplies to absorb and bag the spilled material, it is reasonable to clean up small spills of the following:

- Dilute acids and bases
- Most solvents (in a ventilated area)
- Materials whose toxic properties with which you are familiar
- Materials for which you have proper protection and cleanup materials

Do not clean up a spill without assistance from the Chemical Hygiene Office if:

- You feel it is unsafe to do so, or you lack the knowledge to do it safely.
- You don't know what the spilled material is or lack the materials to clean it up safely.
- You feel any physical symptoms of exposure.

If spill poses a fire hazard, activate nearest fire alarm. Call College Security Services at Ex. 4444 and give details of spill including specific location, chemical, quantity, and if anyone is injured.

First Aid for Chemical Exposure

Eye Exposure

- Flush exposed eyes immediately with water for at least 15 minutes.

Skin Exposure

- For acid or base exposure, remove contaminated clothing and immerse yourself under the emergency safety shower for at least 15 minutes.

For more serious accidents, the PI will call Carleton Security Services, Ex. 4444, for advice and help.

Handling Hazardous Materials at the New Location

Chemical Storage Guidelines

Incompatible materials need to be segregated and stored separately in compatible groups. The guidelines below outline some basics of chemical storage. Hazard classification information helps in identifying storage groups; however, be aware that there are many materials in the same basic class that have specific incompatibilities.

Check the "Chemical Compatibility Storage Guide" in the Appendix for examples of chemicals in the various compatibility groups. Contact Chemical Hygiene Office if you have questions about the compatibility of specific chemicals.

- Do not store chemicals alphabetically, except within a hazard class.
- Segregate chemicals by hazard class.
- Pay attention to specific chemical incompatibilities.

- Keep flammables by themselves in approved storage cans or cabinets.
- Keep acids away from bases.
- Separate organics from inorganics.
- Store oxidizers away from flammables.
- Store strong oxidizers away from potential sources of fuel such as paper or cardboard packaging.
- Provide as much physical separation as possible between classes.
- Radioactive materials should be properly labeled and stored as a group.
- Biohazards should be properly labeled and stored together as a group.

How to Determine Hazard Classes

Reference materials, such as Safety Data Sheets (SDSs), The Flinn Scientific, Inc. Chemical Storage System, or the "Merck Index" can be used to determine hazard information, or call EHS.

Several chemical manufacturers identify storage classes of the chemicals by color-coding their labels. There are 5 main groups, and several sub-groups.

The Main Storage Groups Are:

Red:	Flammable. Store in an area segregated for flammables.
White:	Corrosive. May harm skin, eyes, and mucous membranes. Store away from red, yellow, and blue coded chemicals.
Yellow:	Reactive and Oxidizer. May react violently with air, water, or other substances. Store separately from flammables and combustibles.
Blue:	Health Hazard. Toxic if inhaled, ingested, or absorbed through the Skin. Store in secure area.
Other:	General storage. Presents no more than a moderate issue.

Storage of Flammable Liquids

Do not store more than 25 gallons of flammable liquid (count the new material, material in use and the waste material) in any lab. Use approved flammable storage cabinets whenever possible, and when you must have more than 25 gallons of flammable liquid. Do not remove the vent cover from a flammable storage cabinet.

Appendix

Chemical Compatibility Guide for Chemical Pick-Up

It is important to properly package unwanted hazardous materials according to the segregation procedures listed below. Mixing incompatible chemicals can result in a fire, explosion, heat generation, or toxic or flammable gas. Contact the Chemical Hygiene Office if you have any questions on packaging your unwanted hazardous materials.

Steps for Packaging Hazardous Materials for Pick-Up

- Step 1 – Segregate organics from inorganics.
- Step 2 – Segregate solids from liquids.
- Step 3 – Further segregate materials into the following groups before packaging into containers:



Do not mix different groups in the same container!

Material Group	Definitions and Examples
1. Flammable and Combustible Liquids:	Materials with a flash point less than 200° F
2. Corrosive Acids:	Materials with a pH<3
3. Corrosive Bases:	Materials with a pH>12
4. Flammable Solids:	Solids which may catch fire due to friction during transportation
5. Oxidizers:	Materials that may cause or enhance the combustion of other materials
6. Poisons:	Materials which are toxic, but not flammable, corrosive, oxidizing or reactive
7. Cyanides:	Materials if in contact with corrosives may generate cyanide gas
8. Peroxide Formers:	Organic materials, like ethyl ether
9. Water Reactive:	Materials that emit toxic fumes or catch fire when in contact with water
10. Organic Peroxides:	Organic materials such as benzoyl peroxide, methyl ethyl ketone peroxide, etc.
11. Explosives	Dry picric acid, out-of-date peroxide formers, heat and shock sensitive materials

LABORATORY CLOSEOUT CHECKLIST

Chemical Hygiene Office

Building: _____ Room(s): _____
 Date Laboratory Vacated: _____
 Principal Investigator: _____ Department: _____
 Signature _____ Date: _____

Chemicals	YES	NO	NA
All hazardous chemicals have been removed.			
All hazardous waste has been removed. Submit a <i>Hazardous Waste Request Form</i> , if needed			

Biological Materials	YES	NO	NA
All biological materials have been removed.			
All regulated medical waste and sharps containers have been removed. Submit a <i>Hazardous Waste Request Form</i> , if needed			

Radioactive Materials	YES	NO	NA
All radioactive sources have been removed.			
All radioactive waste has been removed. Contact the Office of Chemical Hygiene for pick-up			

Non-Hazardous Trash	YES	NO	NA
To protect custodians from injury and prevent illegal hazardous waste disposal, be careful about what you put in the trash. Only non-hazardous material should go in the trash.			
All broken glass is free of biological or chemical contamination and sealed in a puncture- resistant sturdy box.			

Gas Cylinders	YES	NO	NA
Gas cylinders have been removed or returned to supplier.			