

Augustana College

Office of Environmental Health and Safety

Hazard Waste Management

40 CFR 172, 173, 178, 179, 261, 262, 264, 265, 279

SARA (Superfund Amendments and Reauthorization Act)

**CERCLA (Comprehensive Environmental Response, Compensation and
Liability Act)**

**EPCRA (Emergency Planning and Community Right-To-Know Act)
(SARA Title III)**

TRI (Toxic Release Inventory)



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I. INTRODUCTION TO RCRA

The Resource Conservation and Recovery Act (RCRA) was passed by Congress in 1976 to ensure "cradle to grave" management of hazardous waste. It was written to avoid chemical disasters such as the huge chemical clean up of Love Canal which occurred in the 1950's and the dioxin cleanup which was necessitated in Missouri in the 1970's.

RCRA divides businesses into three types of generators; basically small, medium and large. The regulatory requirements vary depending upon the amount of waste generated at the college and our corresponding generator status. The more waste we generate, the more rules we need to follow.

Augustana College generates a variety of waste streams. These can include:

Waste Stream	Source
Photographic chemicals	Art Department
Paint waste, rags, used thinner	Art Dep't, Painting Dep't (Structural)
Waste chemicals including solvents, acids, toxics	Chemistry Department
Flammable liquids	Art, Chemistry, Biology, Motor Pool
Biological specimens	Biology
Spent filters, used parts washing solvent	Motor Pool
Expired materials	Facilities
Broken or spent aerosol cans	Facilities, Art
Mercury containing items including thermometers, used parts & equipment	Science building, Facilities
Used fluorescent lamps Mercury switches Batteries	Facilities / campus sources

Some of these waste streams must be disposed as hazardous waste, while other waste streams may be included in our recycling program as "universal waste."

II. IDENTIFYING HAZARDOUS WASTE

A waste is any solid, liquid or contained gaseous material that we no longer use, and either recycle, throw away or store until we have enough for treatment or disposal. There are two ways a waste may be brought into regulation as a hazardous waste:

A. CHARACTERISTIC WASTES

Waste is hazardous by its characteristic when it exhibits one of the following physical traits. The presence of these characteristics may be determined by reading the material safety data sheet (MSDS), by analytical testing, or by the knowledge of the generator.

Ignitability: The waste is easily flammable. It is a liquid with a flash point of less than 14 degrees F or a solid capable of causing a fire at standard temperature and pressure. The RCRA Code for this waste stream is D001. Examples: used thinner, paint rags, chemical solids.

Corrosivity: The waste dissolves metals or burns skin. It has a pH less than or equal to 2.0 or greater than or equal to 12.5. The RCRA Code for this waste stream is D002. Examples: floor stripper, aerosol oven cleaner, battery acid.

Reactivity: The waste generates toxic gasses, vapors or fumes when mixed with water, reacts violently with water or is capable of exploding at standard temperature and pressure. The RCRA Code for this waste stream is D003. Examples: used chemicals from chemistry.

Toxicity: A waste that is capable of leaching listed contaminants in levels above maximum concentration limits. A solid waste that exhibits the characteristic of toxicity has the EPA Hazardous Waste Number specified the following table which corresponds to the toxic contaminant causing it to be hazardous. Toxic Waste use codes D004 through D043.40 CFR 261.24 Examples: mercury containing equipment, used chemicals from chemistry.

Maximum Concentration of Contaminants for the Toxicity Characteristic

<i>EPA Waste</i>	<i>Contaminant</i>	<i>CAS No.</i>	<i>Level (mg/L)</i>
D004	Arsenic	7440-38-2	5.0
D005	Barium	7440-39-3	100.0
D018	Benzene	71-43-2	0.5
D006	Cadmium	7440-43-9	1.0
D019	Carbon tetrachloride	56-23-5	0.5
D020	Chlordane	57-74-9	0.03

D021	Chlorobenzene	108-90-7	100.0
D022	Chloroform	67-66-3	6.0
D007	Chromium	7440-47-3	5.0
D023	o-Cresol	95-48-7	200.0
D024	m-Cresol	108-39-4	200.0
D025	p-Cresol	106-44-5	200.0
D026	Cresol		200.0
D016	2,4-D	94-75-7	10.0
D027	1,4_Dichlorobenzene	106-46-7	7.5
D028	1,2-Dichloroethan	107-06-2	0.5
D029	1,1_Dichloroethylene	75-35-4	0.7
D030	2,4-Dinitrotoluene	121-14-2	0.13
D012	Endrin	72-20-8	0.02
D031	Heptachlor (and its epoxide)	76-44-8	0.008
D032	Hexachlorobenzene	118-74-1	0.13
D033	Hexachloroethane	67-72-1	3.0
D034	Hexachloroethane	67-72-1	3.0
D008	Lead	7439-92-1	5.0
D013	Lindane	58-89-9	0.4
D009	Mercury	7439-97-6	0.2
D014	Methoxychlor	72-43-5	10.0
D035	Methyl ethyl ketone	78-93-3	200.0
D036	Nitrobenzene	98-95-3	2.0
D037	Pentachlorophenol	87-86-5	100.0
D038	Pyridine	110-86-1	5.0
D010	Selenium	7782-49-2	1.0
D011	Silver	7440-22-4	5.0
D039	Tetrachloroethylene	127-18-4	0.7
D015	Toxaphene	8001-35-2	0.5
D040	Trichloroethylene	79-01-6	0.5
D041	2,4,5-Trichlorophenol	95-95-4	400.0

D042	2,4,6-Trichlorophenol	88-06-2	2.0
D017	2,4,5-TP (Silvex)	93-72-1	1.0
D043	Vinyl chloride	75-01-4	0.2

B. LISTED WASTES

A waste is specifically listed in the regulations as hazardous when it has been shown to be harmful. Anything listed in the regulations is presumed hazardous and we are required to manage the waste as hazardous waste. There are over 400 waste streams *listed* as hazardous waste. See Appendix A at the end of this manual for a complete list.

The lists published in the regulations separate wastes by type using codes that have the following meaning:

- P = an *unused* product that is acutely hazardous when disposed
- U = and *unused* product which is hazardous when disposed
- K = *used* product from specific sectors of industry
(*This is not relevant to the college and not provided in this manual*)
- F = *used* product from a common manufacturing or industrial process

F001-F005	Spent solvent wastes
F006-F012, F019	Metal finishing
F020-F023 and F026-F028	Waste containing dioxin
F024, F025	Waste from chlorinated aliphatic hydrocarbons
F032, F034, and F035	Wood Preserving
F037 and F038	Petroleum refinery waste water treatment sludges
F039	Multi-source leachate

Note the "P" and "U" waste are UNUSED products, while the "F" and "K" listed waste are USED products generated by specific processes or industries. Augustana College does not typically generate wastes that are on these lists, although we have the legal obligation to check.

EPA assigns hazard codes to indicate the basis for listing each waste stream. The hazard codes are:

Toxic Waste	(T)
Acute Hazardous Waste	(H)
Ignitable Waste	(I)
Corrosive Waste	(C)
Reactive Waste	(R)
Toxic Hazardous Waste	(E)

Special Notes

- It is the College's responsibility to determine whether wastes are hazardous.
- You may determine a waste is hazardous through professional knowledge of the processes involved, by consulting with the manufacturer of the chemical (and reading the MSDS), by consulting with the Office of Public Safety, or by laboratory analysis. You do not have to perform analytical testing in every case.

III. STANDARDS FOR HAZARDOUS WASTE GENERATORS**A. DETERMINING GENERATOR "STATUS"**

There are three categories of hazardous waste generators. Augustana College strives to operate as a small quantity generator of hazardous waste.

Categories of Hazardous Waste Generators

<i>Generator Status</i>	<i>Definition</i>	<i>Approx. limit in pounds</i>	<i>Approx. limit in gallons</i>
Conditionally Exempt Small Quantity Generators	Generators of no more than 100 Kg of hazardous waster per month	220 pounds	25 gallons
Small Quantity Generators	Generators of between 100 Kg and 1,000 Kg per month	220 – 2,200 pounds	25 – 300 gallons
Large Quantity / 90 Day	Generators of 1,000 Kg	no limit	no limit

Hazardous Waste (2,200 pounds) or more
Generators per month

Special Notes:

- Some chemicals are so dangerous that even small amounts are specially managed. These are called "acutely hazardous waste." If the College generates more than 2.2 pounds (1 Kg) in a calendar month or stores more than that amount for any period of time, we are subject to standards for large quantity hazardous waste generators. Acute hazardous wastes include all of the P listed wastes, plus wastes with the codes F020, F021, F023, F022, F026 and F027. Please NOTIFY THE OFFICE OF PUBLIC SAFETY IMMEDIATELY if you believe your department has generated (or will generate) an acutely hazardous waste.
- The College's generator status may change on a monthly basis depending on generation rate. In an audit, an inspector may evaluate our generator status for the last three years. In general, Augustana College operates as a small quantity hazardous waste generator to facilitate compliance and consistency of operations.
- Illinois does not allow "one-time exemptions" for non-routine generation of hazardous waste. Consider the effect one-time projects may have on our generation rate, and schedule the activity in phases as necessary. Projects that are executed over two calendar months, for example, may have the quantity divided between those months.

B. REQUIREMENTS FOR SMALL QUANTITY HAZARDOUS WASTE GENERATORS

Augustana College is required by federal law to perform a variety of tasks to operate legally as a small quantity hazardous waste generator (or "SQG"). Here's what we are required to do as a College. Tasks that should be performed by departments generating hazardous waste are underlined for convenience.

- a) Determine if your waste is hazardous, based either on analysis or knowledge of products and processes (40 CFR 262.11).
- b) Limit the total volume of accumulated hazardous waste on campus at any one time to 6,000 kilograms (that's 13,200 pounds or about twenty 55-gallon drums campus-wide) (40 CFR 262.34(d)).
- c) Limit accumulation time for each container to 180 days (40 CFR 262.34(d)). Although we ship to Chicago and more distant outlying areas, we will schedule disposal activity at least twice each year.

- d) Date each accumulation container with the start date of accumulation (40 CFR 262.34(d)).
- e) While on-site, label each tank or container used to accumulate hazardous waste with the words "hazardous waste" (40 CFR 262.34 (a) (3)).
- f) Keep hazardous waste containers closed except when adding or removing waste (40 CFR 262.34(d), 40 CFR 265.173(a)).
- g) Ensure that containers in satellite accumulation areas are in good condition, (265.171), compatible with the waste stored (265.172), closed except when adding or removing waste (265.173), and marked with the words "hazardous waste" or other words that identify the contents of the container (262.34).
- h) Perform weekly inspections of hazardous waste storage areas (40 CFR 265.174). Document the inspections and keep records of them. A sample form is provided in the Appendices.
- i) Separate incompatible materials and wastes (40 CFR 265.177(a)).
- j) Post the following emergency information next to the phones:
 - Name and telephone number of the emergency coordinator.
 - The locations of fire extinguishers, fire alarms, and spill control equipment.
 - The telephone number of the fire department unless the College has a direct alarm (40 CFR 262.34(d) (5)).
- k) Train employees to be familiar with emergency procedures and container management standards (40 CFR 262.34(d) (5). Your department provides initial "on the job" training. The Office of Public Safety provides "refresher training" as needed.
- l) Designate an emergency coordinator (40 CFR 262.34(d) (5)).
- m) Obtain a hazardous waste identification number from the EPA (40 CFR 262.12).
- n) Package, label and mark each container prior to shipment in compliance with DOT standards (40 CFR Parts 172, 173, 178 and 179).
- o) Keep records of test results for at least three years (40 CFR 262.44).
- p) Properly manifest shipments of hazardous waste, and keep copies of manifests for at least 3 years.

IV. UNIVERSAL WASTE

EPA's regulations streamline hazardous waste management standards for federally designated "universal wastes," which include batteries, pesticides, mercury-containing equipment and lamps. The regulations govern the collection and management of these widely generated wastes, thus facilitating environmentally sound collection and proper recycling or treatment.

There are two types of Universal Waste handlers:

- Small Quantity Handlers of Universal Waste (SQHUW) that accumulate less than 5,000 kg (11,000 lbs) of universal waste at any one time.
- Large Quantity Handlers of Universal Waste (LQHUW) that accumulate 5,000 kg (11,000 lbs) or more of universal waste at any one time.

Augustana College is a small quantity handler of universal waste.

A universal waste handler may accumulate universal waste for no longer than one year from the date the universal waste is generated or received from another handler. In general, the College will dispose of Universal waste twice each year when we dispose of hazardous waste, or as required to facilitate campus recycling programs.

A. BATTERIES

- a) A small quantity handler must manage universal waste batteries in a way that prevents releases of the waste to the environment. This means we are required to:
 - 1) Contain any universal waste battery that shows evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions in a container. The container must be closed, structurally sound, compatible with the contents of the battery, and must lack evidence of deterioration or damage that would allow leakage under reasonably foreseeable conditions.
 - 2) Label waste batteries with any one of the following phrases: "Universal Waste -- Battery(ies)," or "Waste Battery(ies)," or "Used Battery(ies)" and date the container with the start date of accumulation.
 - 3) We may also conduct the following activities as long as the casing of each individual battery cell is not breached and remains intact and closed (except that cells may be opened to remove electrolyte but must be immediately closed after removal):
 - Sort batteries by type;
 - Mix battery types in one container;
 - Discharge batteries so as to remove the electric charge;

- Regenerate used batteries;
- Disassemble batteries or battery packs into individual batteries or cells;
- Remove batteries from consumer products; or
- Remove electrolyte from batteries.

4) A small quantity handler of universal waste who removes electrolyte from batteries, or who generates other solid waste (e.g., battery pack materials, discarded consumer products) as a result of the activities listed above, must determine whether the electrolyte and/or other solid waste exhibit a characteristic of hazardous waste identified in 40 CFR part 261, subpart C.

- If the electrolyte and/or other solid waste exhibit a characteristic of hazardous waste, it must be properly managed as a hazardous waste.
- If the electrolyte or other solid waste is not hazardous, the handler may manage the waste in any way that is in compliance with applicable federal, state or local solid waste regulations.

B. LAMPS

A "lamp", also referred to as "universal waste lamp," is defined as the bulb or tube portion of an electric lighting device. A lamp is specifically designed to produce radiant energy, most often in the ultraviolet, visible, and infra-red regions of the electromagnetic spectrum. Examples of common universal waste electric lamps include, but are not limited to, fluorescent, high intensity discharge, neon, mercury vapor, high pressure sodium, and metal halide lamps.

A small quantity handler of universal waste must manage lamps in a way that prevents releases of any universal waste or component of a universal waste to the environment, as follows:

(1) A small quantity handler of universal waste must contain any lamp in containers or packages that are structurally sound, adequate to prevent breakage, and compatible with the contents of the lamps. Such containers and packages must remain closed and must lack evidence of leakage, spillage or damage that could cause leakage under reasonably foreseeable conditions.

(2) A small quantity handler of universal waste must immediately clean up and place in a container any lamp that is broken and must place in a container any lamp that shows evidence of breakage, leakage, or damage that could cause the release of mercury or other hazardous constituents to the environment. Containers must be closed, structurally sound, compatible with the contents of the lamps and must lack evidence of leakage, spillage or damage that could cause leakage or releases of mercury or other hazardous constituents to the environment under reasonably foreseeable conditions.

Each lamp or a container or package in which such lamps are contained must be labeled or marked clearly with one of the following phrases: "Universal Waste -- Lamp(s)," or "Waste Lamp(s)," or "Used Lamp(s)" and dated with the start date of accumulation.

C. MERCURY SWITCHES

Augusta generates mercury switches through the maintenance of lights and equipment. These switches will either be segregated as entire units, or if possible, staff will remove the mercury tubes from the equipment and set those aside for recycling. Augustana College routinely recycles mercury from the science departments, and the mercury switches will be included for disposal or recycling through the same disposal company. Mercury will be containerized in a manner that prevents spillage or other releases to the environment. The containers will be labeled with the words "mercury switches" or "used mercury."

V. SPECIAL TOPICS

A. USED OIL

Regulated at 40 CFR 279. The program designed by EPA presumes that most used oil will be recycled instead of disposed. Used oil is defined in 279.1 as any oil that has been refined from crude oil (or synthetic oil), that has been used and as a result of such use is contaminated by physical or chemical impurities. This definition includes spent automotive lubricating oils, hydraulic fluids, and compressor oils from refrigeration units and metal working oils.

1. *Applicability of Used Oil Regulations*

The following waste streams are regulated as used oil:

- Used oil mixed with an ignitable characteristic hazardous waste that does not exhibit the characteristic of ignitability after mixing is regulated as used oil.
- Used oil mixed with a hazardous waste possessing another characteristic is regulated as used oil only if the mixture no longer meets any characteristic. Example: Used oil with lead (D008) mixed with solvent (D001) is regulated as used oil as long as the mix is not ignitable.
- Used oil that is recovered from wastewater is regulated as used oil.

The following used oil waste streams are regulated as hazardous waste:

- Oil mixed with a listed hazardous waste is regulated as a listed hazardous waste.
- Used oil that contains more than 1,000 parts per million (ppm) of total halogens is presumed to have been mixed with a halogenated hazardous waste.

These waste streams are not regulated under the used oil standard:

- "Oily waste" from bottom waste from an oil tank or virgin oil spill residue (because these materials have not been "used").
- Non-terne plated used oil filters if the oil is removed in one of four ways. The filter may be punctured and hot-drained, hot drained and crushed, hot-drained and dismantled or any other equivalent methods, as long as the oil is removed. EPA does not require draining for a certain length of time, although they recommend 12 hours. (Note: "terne" plating describes an alloy of tin and lead - ask the manufacturer to obtain this information if you are unsure of the filter's construction).
- Mixtures of diesel fuel and used oil if it is burned in the generators' own vehicle as fuel.
- Wastewater contaminated with de minimis quantities of used oil are excluded because they are regulated under the Clean Water Act.
- Metalworking oils containing chlorinated paraffins and refrigeration compressor oils containing CFCs are not assumed to be hazardous waste even though they contain halogens.

2. Operating Requirements

- Containers must be in good condition (279.22(b))
- Containers, pipes, etc. must be labeled with the words "used oil"
- There are no limits on quantity or accumulation time
- Generators must respond to spills and leaks (see 279.22(d))
- Generators can transport his/her own used oil if the oil (1) goes to an approved collection center or self-owned aggregation point, (2) is delivered in shipments of 55 gallons or less and (3) is transported in a vehicle owned by the generator or an employee of the generator
- Transporter must have an approved EPA ID Number unless they have a tolling arrangement in compliance with 279.24(c)

3. Prohibited Activities

The College is prohibited from doing any of the following with used oil:

- Storing it in a surface impoundment or waste pile unless it meet hazardous waste guidelines at 40 CFR Parts 264/265
- Using it for road oiling or dust suppression
- Burning off-spec oil unless it is in certain industrial boilers, furnaces, or space heaters

B. RAGS AND SHOP TOWELS

Shop towels and rags may be classified as hazardous waste when they are contaminated with solvents, paint or inks. In addition, storing solvent-soaked towels may create a fire hazard.

Handling tips for shop towels

- Hire a laundry service to clean the shop rags and return them to you for reuse
- If you use disposable towels, determine whether they are contaminated with hazardous waste and manage them accordingly
- Store shop towels in closed metal containers if they have inks and solvents on them. The containers should be properly labeled and kept in a well-ventilated area. If possible, keep them away from other flammable materials and ignition sources. To reduce the risk of ignition from static, use a grounding cable attached to a grounded pipe.
- An occasional rag can be air-dried and then disposed in normal trash. Air-drying large numbers of solvent, paint or oil-soaked towels (or rags) pose a fire and health hazard is prohibited by the College.
- Separate used towels from corrosives (such as haze removers) and oxidizers because these chemicals may react with the solvents and cause a fire.

C. AEROSOL CANS

An aerosol can is considered "empty" if it did not contain an acutely hazardous waste, or a pesticide with a danger or warning label and the material in the can has been discharged as intended. Empty aerosol cans should be emptied of propellant as well as the original compounds.

When the aerosol can is holding a liquid, the applicability of regulations depends on whether the can is recycled or disposed. If the can is sent to a scrap metal recycler, the can and its contents are exempt from regulation as a scrap metal under 40 CFR 261.6(a) (3) (iii). The act of emptying the can prior to recycling is also an exempt recycling activity under 261.6(c), but the resulting liquid is regulated if it is a listed or characteristic hazardous waste.

If the can is disposed, the can and its contents are subject to regulation. If a can contains hazardous waste and the propellant has been discharged or the nozzle is defective, the can must be managed as hazardous waste. Try to return defective cans to the supplier, or turn it in at Central Receiving for disposal.

D. WASTE STREAMS FOR ARTS & CRAFTS

Photo Processing Liquids

The type of processing waste will depend on the type and quantity of film used and the developing process. Common solutions are fixer, developer and activator, stabilizers, hardeners and neutralizers. Photo processing also generates waste negatives and transfer paper during the developing process.

In general, Augustana College disposes of photo chemicals as hazardous waste.

Waste Ink

Waste and leftover ink may contain a variety of chemicals that lead them to be regulated as hazardous waste. These chemicals include:

- Metals such as lead, chromium, silver, cadmium and silver
- Solvents such as ethylene glycol, xylene, toluene, and petroleum distillates
- Other chemicals such as formaldehyde and ammonium hydroxide

Handling tips for waste ink:

- If the ink is hazardous, dispose of it as hazardous waste
- If the ink is non-hazardous, put solidified ink in the trash. Do not put liquids into the trash.
- Reduce the amount of waste ink you generate by buying only what you need and refusing samples you won't use. Track your inventory to prevent ink from exceeding its shelf life and suddenly becoming waste. Keep lids on containers to prolong the quality of the materials.
- Dispose of ink containers only after they are RCRA empty (contents have been removed using normal practices *and* less than one inch of residue or less than 1% of the volume remains)
- Remove ink from stir sticks using a scraper instead of solvent and shop towels. Use reusable stainless steel or plastic stirrers when possible
- Reduce the need for solvents and shop towels by removing the majority of ink from adhesive tape and screens with a scraper or spatula.

Handling tips for waste ink:

- If the ink is hazardous, dispose of it as hazardous waste.
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- Reduce the amount of waste ink you generate by buying only what you need and refusing samples you won't use. Track your inventory to prevent ink from exceeding its shelf life and suddenly becoming waste. Keep lids on containers to prolong the quality of the materials.
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- Reduce the need for solvents and shop towels by removing the majority of ink from adhesive tape and screens with a scraper or spatula.

E. EMPTY CONTAINERS

Containers holding compressed gases that are hazardous waste are considered empty when the pressure in the container approaches atmospheric pressure (40 CFR 261.7(b) (2))

Containers or liners holding non-acute hazardous waste (paint waste, thinner, and spray lubricants) are empty when:

- All wastes have been removed using common practices and
- No more than 1 inch of material remains in the container or
- No more than 3% by weight of the container remains for containers with a capacity of 110 gallons or less, and no more than 0.3% by weight remains for containers with a capacity greater than 110 gallons (40 CFR 261.7(b)(1)).

A container or inner liner holding acutely hazardous waste is empty when:

- the liner is removed or
- the container is triple rinsed with an appropriate solvent or
- An alternate method is used (40 CFR 261.7(b) (3)).

Residues removed from a container after it meets the definition of RCRA empty are not regulated as hazardous waste. Residues removed from a container that is not RCRA empty are regulated.

Notes:
