

Hazardous Waste Identification & Minimization



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EPA Region 7



Agenda



- ✓ Background
- ✓ The Resource Conservation & Recovery Act
- ✓ Point of Generation
- ✓ EPA's 4 Step Process
- ✓ Waste Minimization
- ✓ EPA's Safer Choice Program
- ✓ Children's Mercy Cleaning Guide
- ✓ Technical & Compliance Assistance Resources
- ✓ SWAT and Backhaul Alaska efforts
- ✓ Santee Sioux's "Guide to Hazardous Household Products and Less Toxic Alternatives"



Love Canal 1978



Times Beach, MO



Chemical Releases on Tribal Lands 2006 - 2016

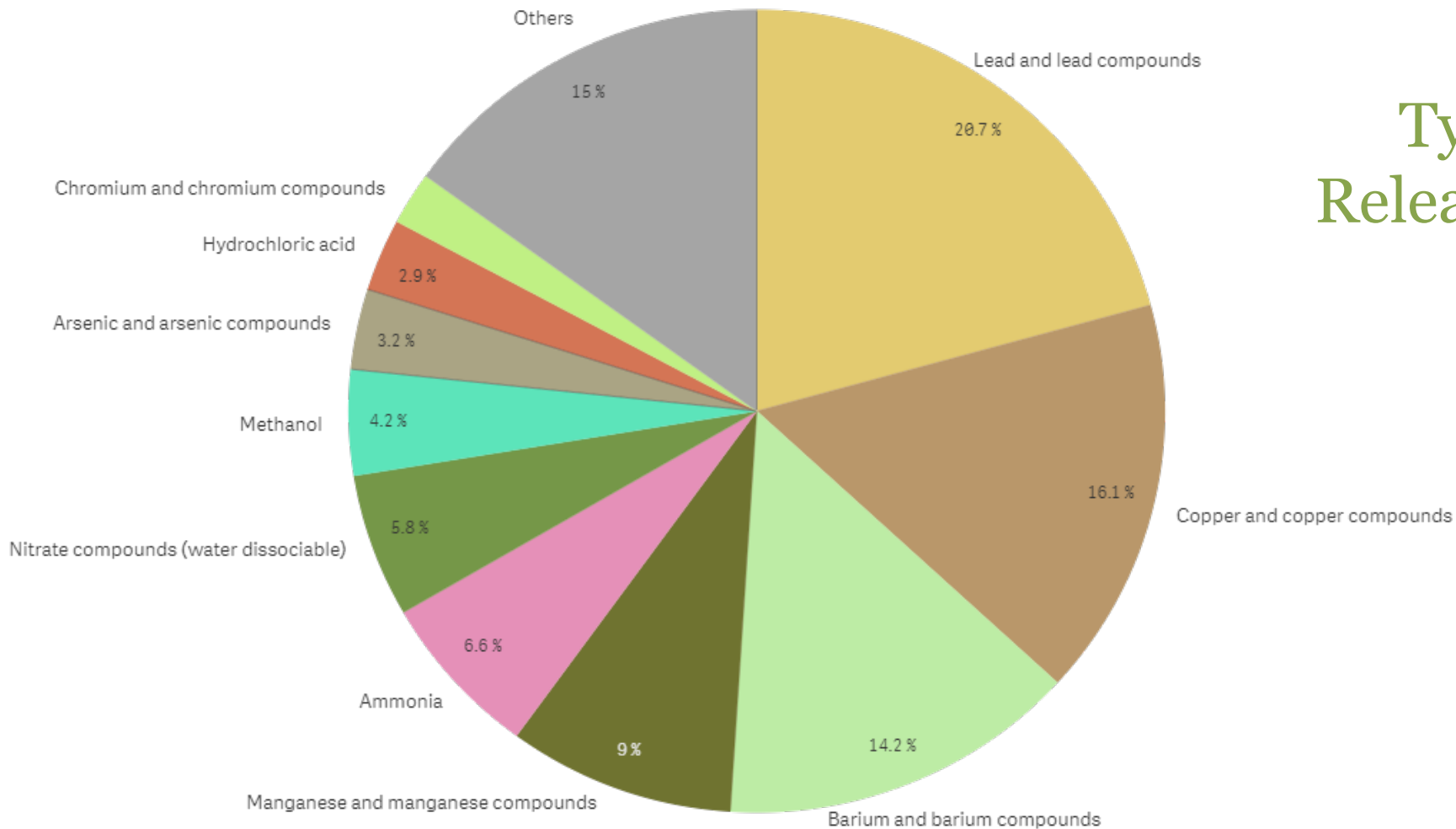


Releases by Media and Year



Total Releases by Chemical

Total Releases for 277 Tribes: 2,969,462,652 lbs



Types of Chemicals
Released on Tribal Lands
in 2016

50+ Year Old Chemicals

1960's



1950's



Is this what your chemical storage looks like?



This is the reality!



Are all these compounds really necessary?



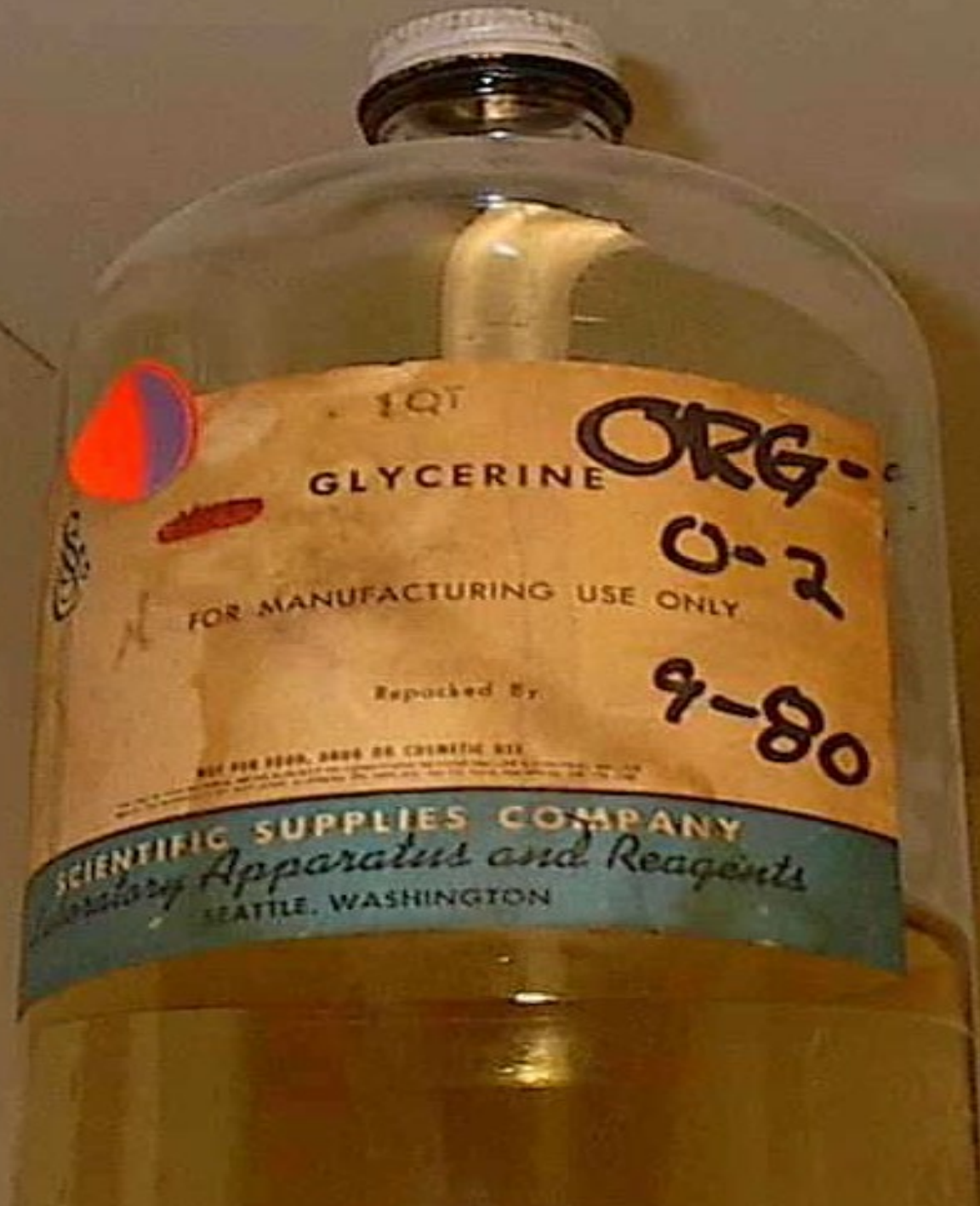


Mercury Released When Broken

HNO_3 Crystals

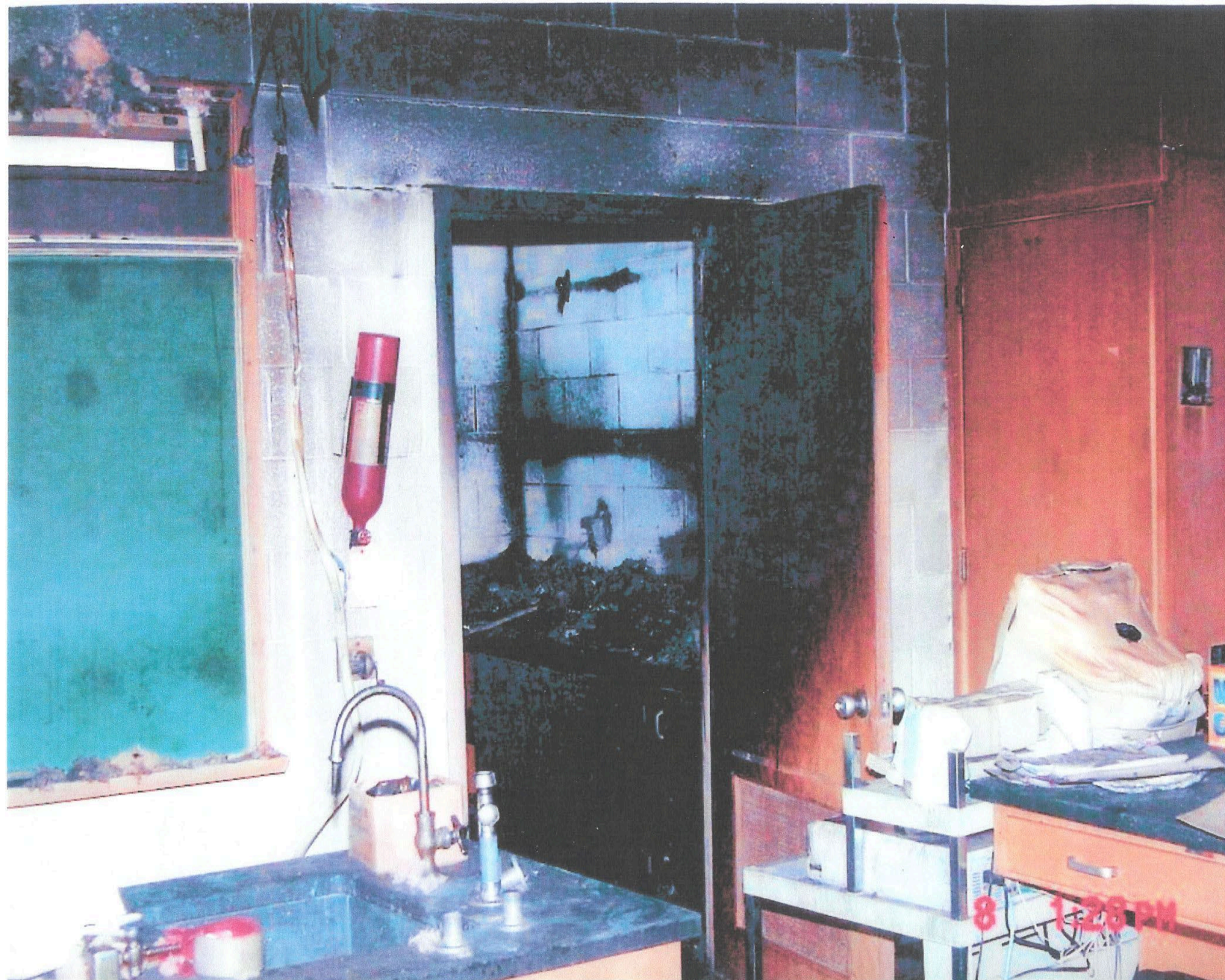


Beards, Nitric Gnomes



Hand-written word "Nitro"
In middle school
Tested and found nitroglycerine





School Lab Fire

School Lost Money





Property Destruction

No Injuries...
This Time





How did this happen?

Cause: Lack of Proper Waste Identification





Moral of The Story:
Identify & Understand
Your Waste

The Resource Conservation and Recovery Act



Resource Conservation and Recovery Act

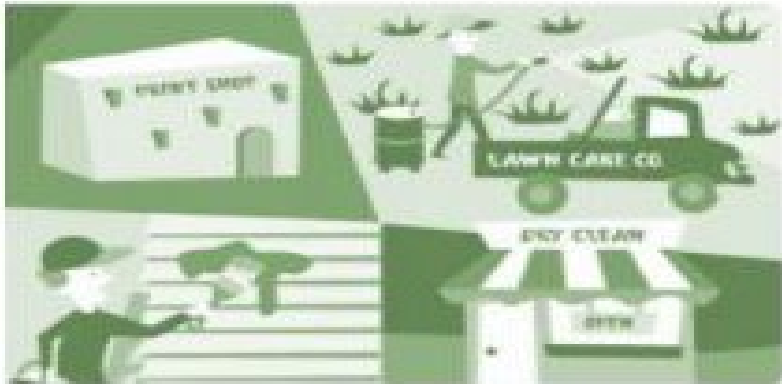


Goals:

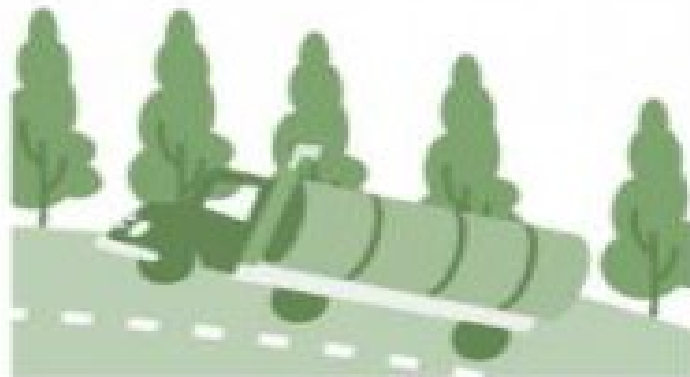
- Conserve energy and natural resources
- Reduce or eliminate the amount of waste generated
- Ensure that wastes are safely managed
- Protect human health and the environment from hazards posed by waste disposal



Hazardous Waste Generation



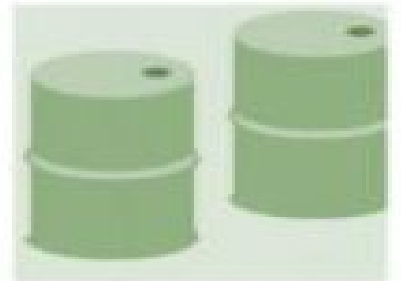
Hazardous Waste Transportation



Recycling



Treatment



Disposal



RCRA's Cradle-to-Grave Hazardous Waste Management System

Resource Conservation and Recovery Act

Subtitle Provisions

- A General Provisions
- B Office of Solid Waste; Authorities of the Administrator and Interagency Coordinating Committee
- C Hazardous Waste Management
- D State or Regional Solid Waste Plans
- E Duties of the Secretary of Commerce in Resource and Recovery
- F Federal Responsibilities
- G Miscellaneous Provisions
- H Research, Development, Demonstration, and Information
- I Regulation of Underground Storage Tanks
- J Standards for the Tracking and Management of Medical Waste

RCRA Subtitle C



Hazardous waste regulations (40 CFR 260 - 279)

Hazardous waste management from “cradle to grave”:

- Requires those who generate a solid waste to determine if it is hazardous (**262**)
- Identify the criteria to determine which solid wastes are hazardous (**261**)
- Manage hazardous wastes according to appropriate requirements



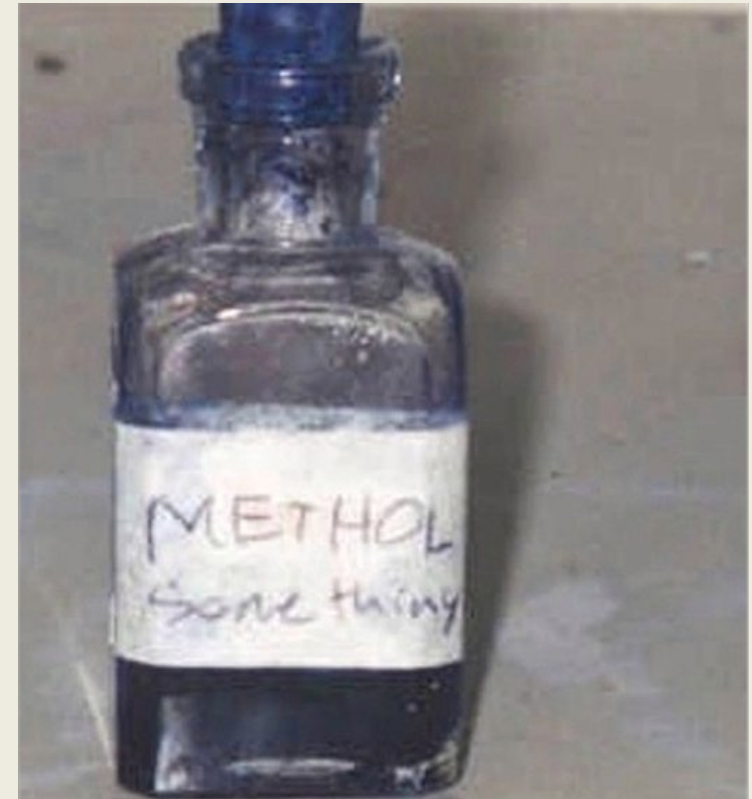
Waste Determination Requirements



Waste Determinations – 40 CFR 262.11:

- Anyone who produces or generates a waste must **accurately** determine if that waste is hazardous
- Required for each waste stream
- Determination is at the point of generation
- Keep records of HW determinations

RCRA's No. 1 Violation



When is something a waste?



28

Point of Generation:

- First point at which a material becomes a waste, both physically and chemically
- Location where material initially becomes a waste and is under the control of the operator of the waste generating process
- Before any alteration occurs, such as dilution or treatment
- Waste determination must be conducted at this point

Point of Generation?



Example 1



Point of Generation?



Example 2



64

U.S. Environmental Protection Agency

30



Point of Generation?

EPA's 4 Step Process



1

Is the waste a
“solid waste”?

2

Is the waste
excluded from
RCRA?

3

Is the waste
“listed”?

4

Does the waste
exhibit a
characteristic?

Step 1: Is it a solid waste?

Definition of a Solid Waste :

“any garbage, refuse, sludge from a waste water treatment plant, water supply treatment plant, or air pollution control facility, **and other discarded material**, including solid, liquid, semisolid or contained gaseous material resulting from industrial, commercial, mining, agricultural operations, and community activities....”

Decision Diagram – Is it a solid waste?

Is material discarded by:

- Abandoned
- Inherently waste-like
- Military munition
- Recycled

IF YES, THEN

**MATERIAL IS A SOLID
WASTE, MAYBE**

IF NO, THEN

**MATERIAL IS NOT A
SOLID WASTE, MAYBE**

Abandoned hazardous waste



Activity Time!



IS YOUR WASTE A SOLID WASTE?



Waste Determination Process



Step 2:

- Is the waste a “solid waste”?
- Is the waste specifically excluded from RCRA regulations?
- Is the waste “listed”?
- Does it exhibit a characteristic of hazardous waste?

Regulatory Exclusions



Regulation of certain wastes as hazardous waste may be impractical or subject to regulation under another statute.

Six categories:

- Wastes excluded from being solid wastes
- Wastes excluded from being hazardous wastes
- Remaining four are conditional exclusions and only apply when the provisions established under each section are met

Solvent Contaminated Wipes Exclusion



	Solvent-Contaminated Reusable Wipes	Solvent-Contaminated Disposable Wipes																				
Includes	<ul style="list-style-type: none"> ➤ Wipes containing one or more F001-F005 listed solvents listed in § 261.31 or the corresponding P- or U- listed solvents found in § 261.33, including: <table border="0" style="margin-left: 20px;"> <tr> <td>- Acetone</td> <td>- Isobutyl alcohol</td> </tr> <tr> <td>- Benzene</td> <td>- Methanol</td> </tr> <tr> <td>- n-Butanol</td> <td>- Methyl ethyl ketone</td> </tr> <tr> <td>- Chlorobenzene</td> <td>- Methyl isobutyl ketone</td> </tr> <tr> <td>- Creosols</td> <td>- Methylene chloride</td> </tr> <tr> <td>- Cyclohexanone</td> <td>- Tetrachloroethylene</td> </tr> <tr> <td>- 1,2-Dichlorobenzene</td> <td>- Toluene</td> </tr> <tr> <td>- Ethyl acetate</td> <td>- 1,1,2- Trichloroethane</td> </tr> <tr> <td>- Ethyl benzene</td> <td>- Trichloroethylene (<i>*For reusable wipes only.</i>)</td> </tr> <tr> <td>- 2-Ethoxyethanol</td> <td>- Xylenes</td> </tr> </table> ➤ Wipes that exhibit a hazardous characteristic resulting from a solvent listed in part 261. ➤ Wipes that exhibit only the hazardous characteristic of ignitability when containing one or more non-listed solvents. 		- Acetone	- Isobutyl alcohol	- Benzene	- Methanol	- n-Butanol	- Methyl ethyl ketone	- Chlorobenzene	- Methyl isobutyl ketone	- Creosols	- Methylene chloride	- Cyclohexanone	- Tetrachloroethylene	- 1,2-Dichlorobenzene	- Toluene	- Ethyl acetate	- 1,1,2- Trichloroethane	- Ethyl benzene	- Trichloroethylene (<i>*For reusable wipes only.</i>)	- 2-Ethoxyethanol	- Xylenes
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- 2-Ethoxyethanol	- Xylenes																					
Does not include	<ul style="list-style-type: none"> ➤ Wipes that contain listed hazardous waste other than solvents. ➤ Wipes that exhibit the characteristic of toxicity, corrosivity, or reactivity due to non-listed solvents or contaminants other than solvents. 	<ul style="list-style-type: none"> ➤ Wipes that contain listed hazardous waste other than solvents. ➤ Wipes that exhibit the characteristic of toxicity, corrosivity, or reactivity due to non-listed solvents or contaminants other than solvents. ➤ Wipes that are hazardous waste due to the presence of trichloroethylene. 																				

Household Hazardous Waste Exclusion



40 CFR 261.4(b)(1) - HHW Exclusion

Wastes covered by the household hazardous waste exclusion must satisfy two criteria:

1. The waste must be generated by individuals on the premise of a temporary or permanent residence.
2. The waste stream must be composed primarily of materials found in wastes generated by consumers in their homes.



Where to find exemptions & exclusions:

- Most found in 40 CFR 261.4(a) and (b)
 - 261.4(a) – Exclusions from the definition of solid waste
 - 261.4(b) – Exclusions from the definition of hazardous waste
- Additional exclusions can be found in 40 CFR 261.4(c) to (h)

Activity Time!



IS YOUR WASTE EXCLUDED OR EXEMPTED?



Waste Determination Process



Step 3:

- Is the waste a “solid waste”?
- Is the waste specifically excluded from RCRA regulations?
- Is the waste “listed”?
- Does it exhibit a characteristic of hazardous waste?

“Listed” Hazardous Waste



Lists include industrial waste streams & waste commercial chemical products which:

- Exhibit one or more hazardous waste characteristics
- Contain hazardous constituents
- F, K, P, or U waste codes



F “Listed” Hazardous Wastes

F001-F005

Spent Solvent Wastes

F006-F012, F019

Wastes from electroplating and other metal finishing operations

**F020-F023,
F026-F028**

Dioxin-bearing wastes

F024-F025

Wastes from the production of certain chlorinated aliphatic hydrocarbons

F032, F034, F035

Wastes from wood preserving

F037-F038

Petroleum refinery wastewater treatment sludges

F039

Multisource leachate

K “Listed” Hazardous Wastes



K-list are source-specific wastes (13 categories): K001 – K181

1. Wood preservation
2. Inorganic pigment manufacturing
3. Organic chemicals manufacturing
4. Inorganic chemicals manufacturing
5. Pesticides manufacturing
6. Explosives manufacturing
7. Petroleum refining
8. Iron & steel production
9. Primary aluminum production
10. Secondary lead processing
11. Veterinary pharmaceuticals manufacturing
12. Ink formulation
13. Coking

P & U “Listed” – Commercial Chemical Products



For a waste to be considered a P or U listed waste, it must meet the following criteria:

1. The waste must contain one of the chemicals listed on the P or U list
2. The chemical in the waste must be unused
3. The chemical in the waste must be in the form of a commercial chemical product

Includes:

- Residues, contaminated soil, water, or debris resulting from cleanup of spills
- Containers that are not RCRA empty
- Rinsate from rinsing empty containers



P “Listed” Hazardous Wastes



P listed wastes = ACUTELY hazardous wastes:

- Possess extremely hazardous properties that make them lethal in small quantities
- More stringent regulatory requirements
- P001 – P205



U “Listed” Hazardous Wastes



U listed wastes = non-acute toxic hazardous wastes:

- Chemicals that are ignitable, corrosive or reactive (ICR)
- Includes about 472 distinct materials
- U001- U411



261.33(f)

Activity Time!



IS YOUR WASTE A “LISTED” WASTE?



Waste Determination Process



Step 4:

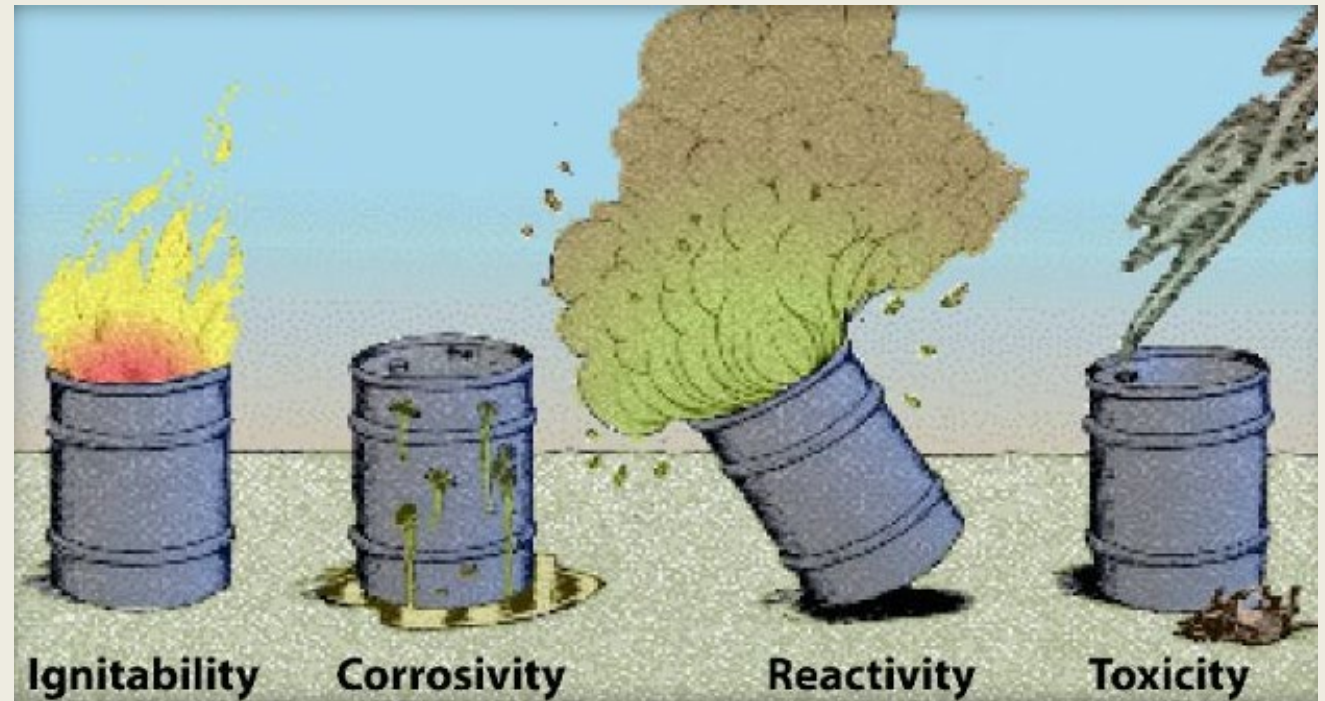
- Is the waste a “solid waste”?
- Is the waste excluded from RCRA regulations?
- Is the waste “listed”?
- Does it exhibit a characteristic of hazardous waste?

Characteristic Wastes



EPA established **4 hazardous waste characteristics:**

1. Ignitability
2. Corrosivity
3. Reactivity
4. Toxicity



I Can Remember That!

Characteristic Wastes



1. Ignitability (D001)

- Readily catch fire and sustain combustion
- Spontaneously combustible
- Flash point less than 60°C (140°F)

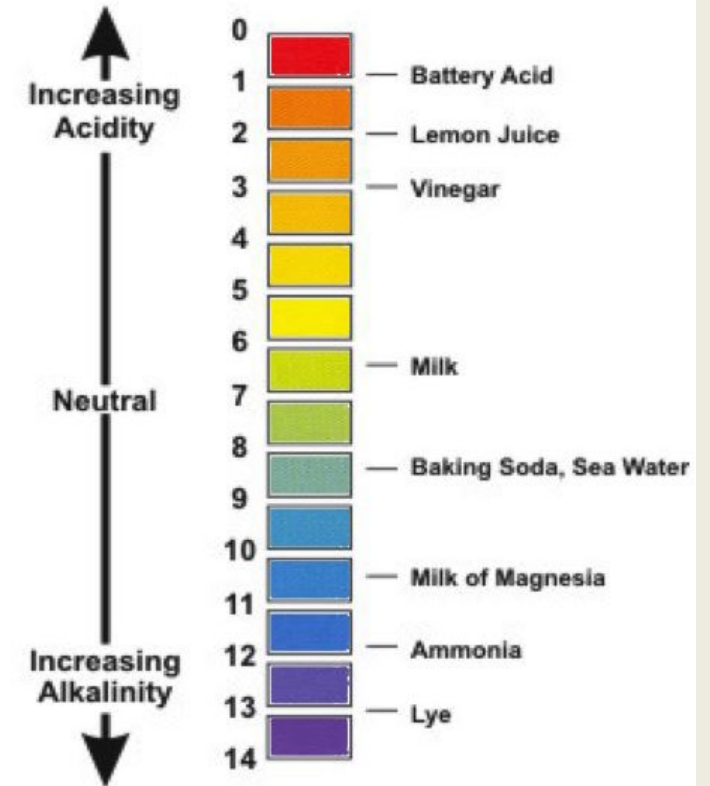


Characteristic Wastes



2. Corrosivity (D002)

- Aqueous solution with a pH less than or equal to 2 (strong acid)
- Aqueous solution with a pH greater than or equal to 12.5 (strong base)
- Corrodes steel at a rate greater than $\frac{1}{4}$ " or 6.35 mm per year at 55°C

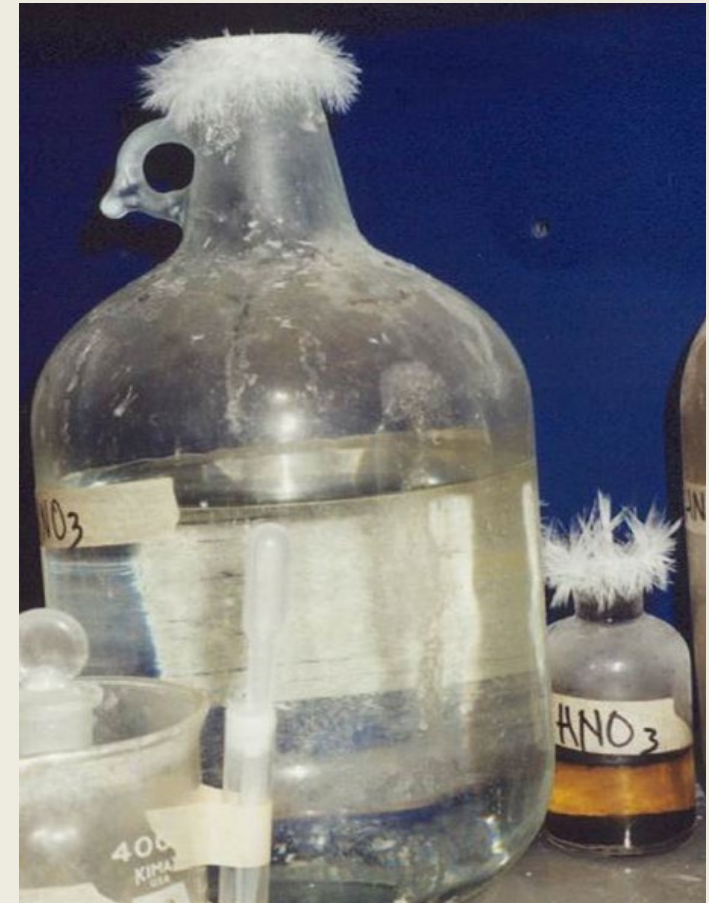


Characteristic Wastes



3. Reactivity (D003)

- Unstable & readily undergoes violent change without detonation
- Reacts violently with water
- Forms potentially explosive mixtures with water
- Capable of detonation, explosive decomposition, or reaction at standard temperature and pressure
- It generates toxic gases, vapors, or fumes in dangerous quantities when mixed with water

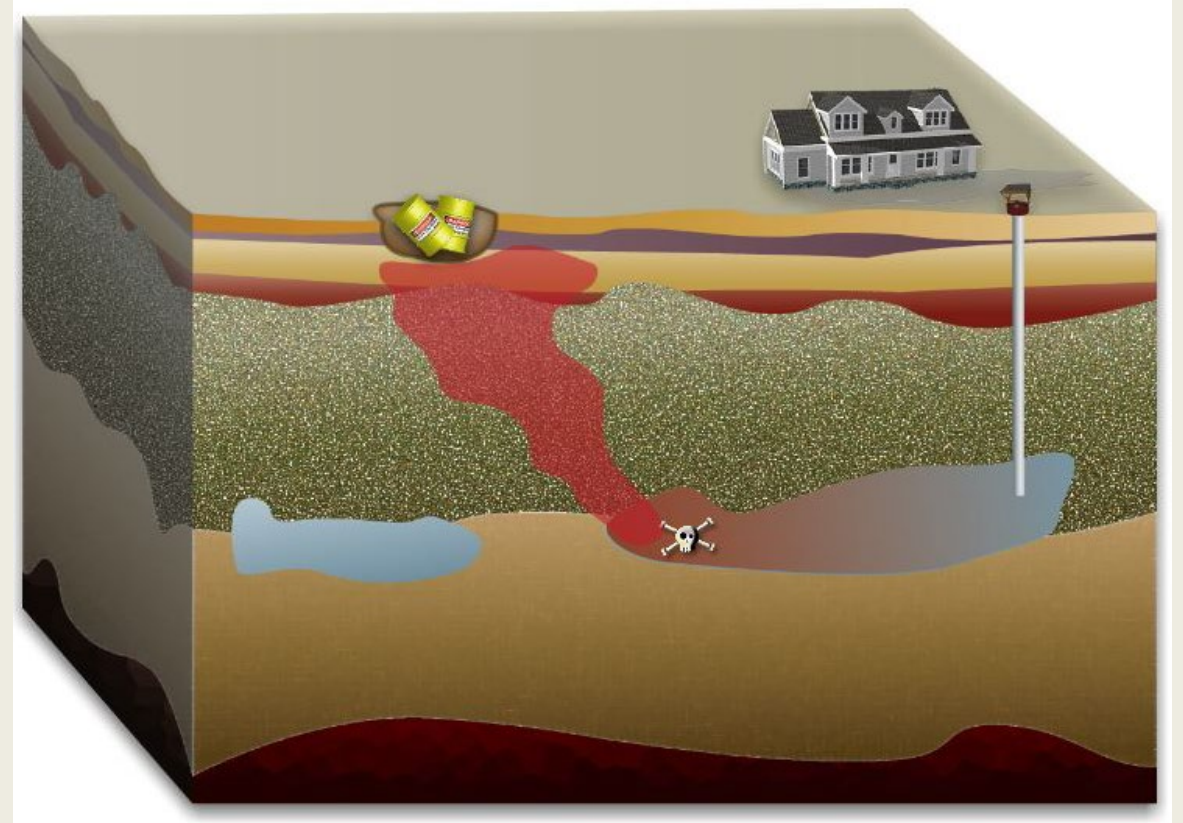


Characteristic Wastes



4. **Toxicity** (D004 – D043)

Identifies wastes likely to leach dangerous concentrations of certain known toxic chemicals into groundwater



261.24(a)

D Toxicity Codes

EPA HW Number	Contaminant	CAS Number	Regulatory Level (mg/L)
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-Dichloroethane	107-06-2	0.5
D029	1,1-Dichloroethylene	75-35-4	0.7
D030	2,4-Dinitrotoluene	121-14-2	0.13
D012	Endrin	72-20-8	0.02
D031	Heptachlor (and its epoxide)	76-44-8	0.008

EPA HW Number	Contaminant	CAS Number	Regulatory Level (mg/L)
D032	Hexachlorobenzene	118-74-1	0.13
D033	Hexachlorobutadiene	87-68-3	0.5
D034	Hexachloroethane	67-72-1	3.0
D008	Lead	7439-92-1	5.0
D013	Lindane	58-89-9	0.4
D009	Mercury	7439-97-6	0.2
D014	Methoxychlor	72-43-5	10.0
D035	Methyl ethyl ketone	78-93-3	200.0
D036	Nitrobenzene	98-95-3	2.0
D037	Pentachlorophenol	87-86-5	100.0
D038	Pyridine	110-86-1	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

Last Activity Time!



IS YOUR WASTE A CHARACTERISTIC WASTE?



Kansas Waste Determination App





ERG & WISER Apps

Take Home Message

- ▶ Identifying wastes correctly prevents contamination & emergency situations
- ▶ An effective way to identify wastes is through EPA's 4 step process for waste determinations



Okay, so you have a
hazardous waste, now what?

Answer: Correct management
under RCRA & waste
minimization

Hazardous Waste Minimization



Waste minimization is a reduction in both toxicity and volume, which can result in an increase in employee safety and benefits our environment. Waste reduction practices also reduce costs and save money.



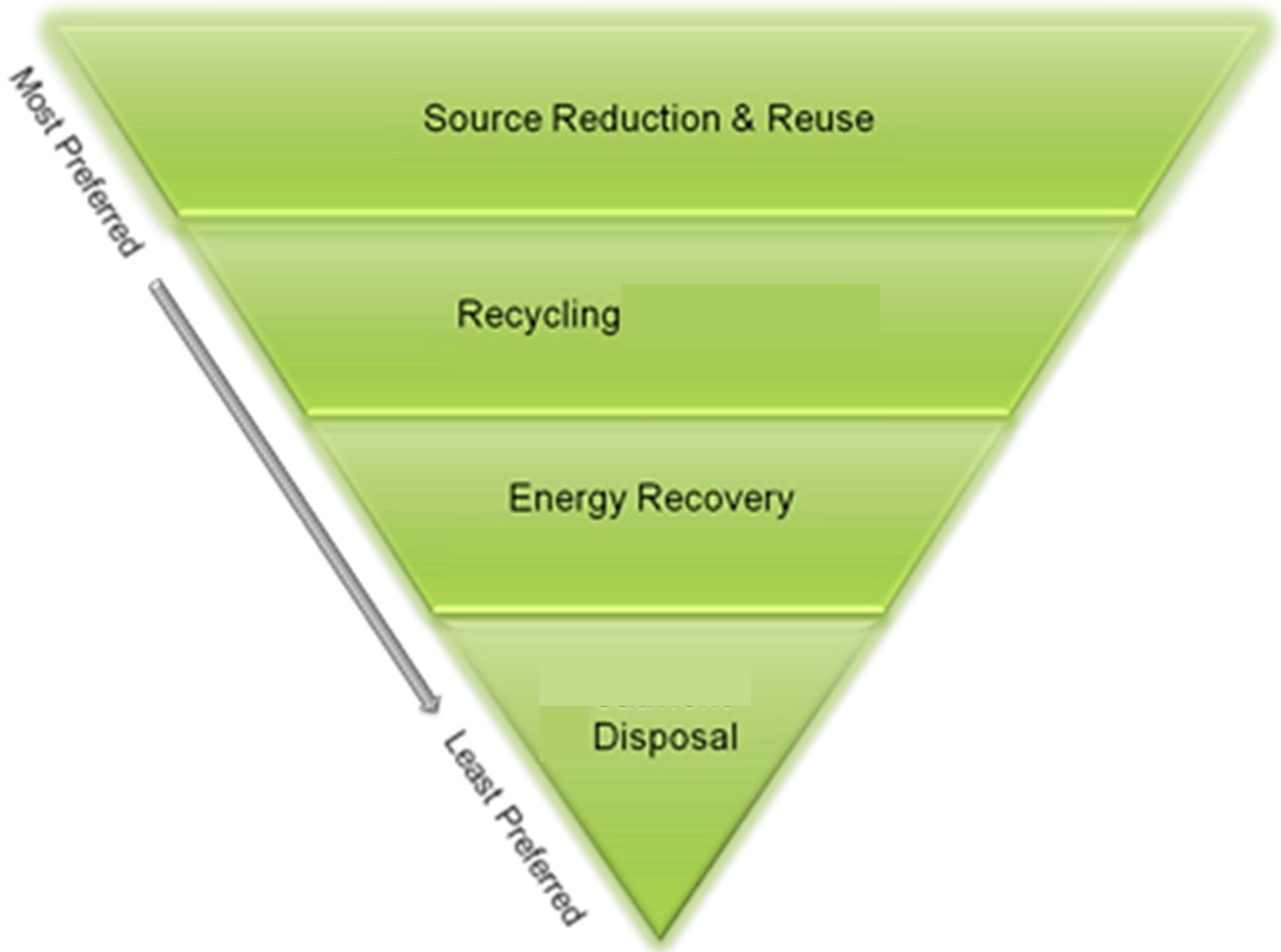
Benefits of Hazardous Waste Minimization



Source reduction, environmentally sound recycling, reuse, and reclamation practices have helped many organizations reduce:

- The quantity and toxicity of hazardous and solid waste generation
- Raw material and product losses
- Raw material purchase costs
- Waste management recordkeeping and paperwork burden
- Waste management costs
- Workplace accidents and worker exposure
- Compliance violations
- Environmental liability

Waste Management Hierarchy



Minimization Methods



- **Change Purchasing Practices** - Buy only what you will use, share chemicals with other departments, and consider centralizing purchasing
- **Substitution** - Use less toxic chemicals to reduce exposure and amount of hazardous waste generated'
- **Process Changes** - Evaluate operations to determine if hazardous wastes are needed, improve efficiencies, and modify/upgrade equipment
- **Inventory Management** - Review stock regularly to prevent materials from exceeding expiration date or becoming unusable and avoid duplicate purchasing
- **Waste Separation** - Separate hazardous and non-hazardous wastes. Ex. HHW
- **Proper Waste Management** - Label containers, separate incompatibles, practice good housekeeping procedures, and provide employee training



Safer Choice Program



epa.gov/saferchoice

Experienced Product Review Program



EPA's Safer Choice designed to provide safer chemical/cleaner choices for consumers/schools

- Focus is safer chemistry
- Helps consumers, businesses, and institutions find products with safer ingredients for human health and the environment
- Voluntary program leveraging EPA expertise in assessing chemical safety- > 15 years experience reviewing products



A Family of Labels



epa.gov/saferchoice



epa.gov/dfesaferchoice



epa.gov/saferchoice

Safer Choice Product Types



■ Household Cleaning

- All-Purpose Cleaners, Appliance Cleaners & Rinse Aids
- Automatic Dishwasher Products
- Carpet Cleaners/Floor Care
- Degreasers
- Dish Detergents & Soaps
- Granite/Stone/Wood/Leather Cleaners
- Kitchen/Countertop Cleaners
- Laundry Detergents, Fabric Softeners & Pre-Treaters
- Odor Removers
- Pet Care Products
- Toilet Bowl Cleaners
- Tub/Tile Cleaners
- Upholstery Cleaners

- Window/Glass Cleaners

■ Health & Beauty

- Hand Soaps
- Shampoos
- Conditioners
- Lotions

■ Automotive & Outdoor

- Athletic Field Paint
- Car Care Products
- Outdoor Furniture Cleaners
- Oven/Grill/Barbeque Cleaners
- Parts Washers
- Tire Additives
- Vehicle/Parts Wash Additives

Safer Choice Resources for Communities



Don't want to buy new products? Make your own!



Safer Cleaning



An A to Z Resource Guide of Safe Alternatives to Household Cleaning and Maintenance Supplies

- Originally Compiled by Sam Umscheid, MSW

Published through a Partnership with

The Center for Children's Environmental Health,
Dept. of Allergy, Asthma, and Immunology,
Children's Mercy Hospital, Kansas City, Missouri

Safer Cleaning Guide Developed by Children's Mercy in KC features:

- Easy-to-make, easy-to-use recipes and instructions
- Cheap, homemade cleaning products such as:
laundry products, pest removal, bathroom cleaners, mold removal, glass cleaner, furniture polish, rug cleaners, and spot removal

Compliance Assistance Centers



[Compliance Assistance Centers](#) help businesses, colleges and universities, local governments, tribes, and federal facilities understand and comply with environmental requirements and save money through pollution prevention techniques.



EPA Pollution Prevention Program



74

EPA promotes source reduction to eliminate or reduce pollution at its source. Pollution prevention as the preferred alternative to pollution control and waste disposal.

Need help? Call the Pollution Prevention hotline at: (202) 566-0799

Did you know?

Our Pollution Prevention grant program reduces millions of pounds of pollution, a million metric tons of carbon dioxide equivalents and nearly a billion gallons of water use every year.

Compliance Assistance Resources



The Technical Assistance Directory is a comprehensive list of waste management technical assistance providers that are available to tribes:
<https://www.epa.gov/tribal-lands/tribal-waste-management-technical-assistance-directory>

EPA Compliance Assistance



76

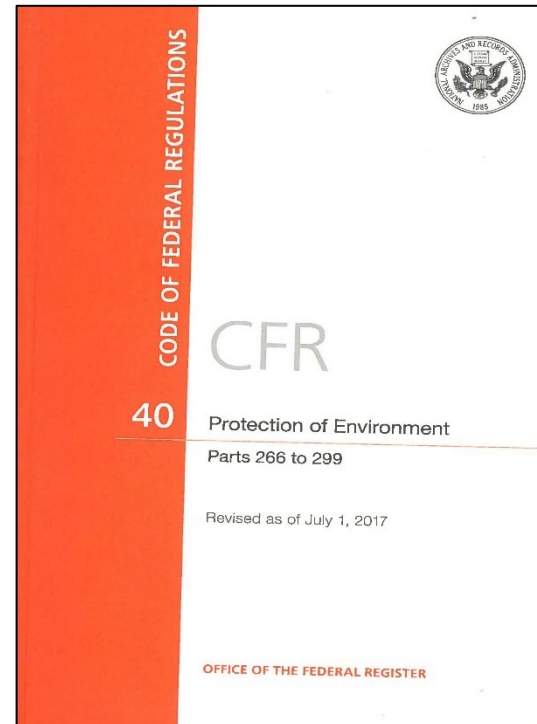
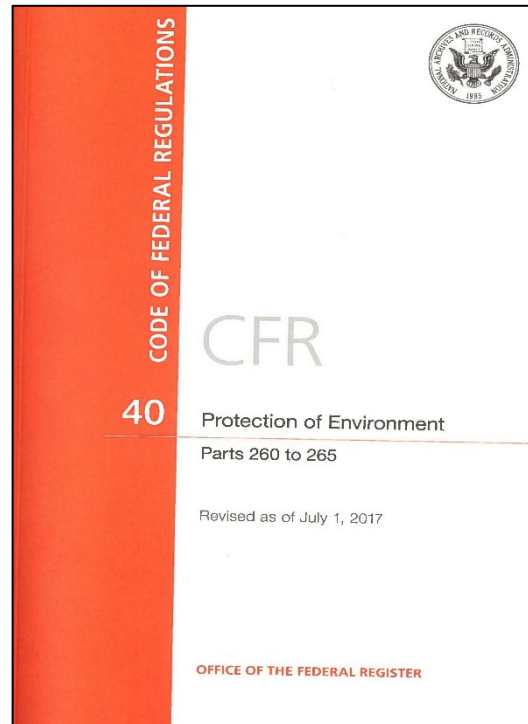
- RCRAonline & ECHO
- Call us! It's part of our job

Emergency numbers:

- **EPA Region 7 Environmental Action Line:
1-800-223-0425**

RCRA Regulations

40 CFR §§ 239 - 282



Thank you!

<https://wcms.epa.gov/ks/hazardous-waste-resources-tribal-nations-midwest>



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