201: Waste Determinations – Beyond Basics

Overview

- Waste Determinations
  - General
    - What is it? Why is it important?
    - How and when do I start?
    - Definitions
  - Hazardous Waste Determination Process
    - Solid Waste
    - Exclusions and Exemptions
    - Characteristic and Listed
  - Putting it all together

Poll Question

1. How much experience or knowledge do you have regarding waste determinations?

- ❑ A little
- ❑ Moderate
- ❑ Expert

Poll Question

2. What is a waste determination?

- ❑ A TCLP test
- ❑ The act of determining the regulatory status
- ❑ Clearing out old stock/product
- ❑ An IDEM inspection report

Poll Question

3. Who does a waste determination?

- ❑ IDEM
- ❑ A laboratory
- ❑ The disposal facility/TSDF
- ❑ The generator

Waste Determination – What is it?

- Broadly

- Specifically
  - Hazardous waste
  - PCBs
  - Asbestos
  - Heat-generating waste
  - Pesticides
  - Restricted Waste (Indiana-specific)
  - Waste Tires

Waste Determination – What is it?

329 IAC 11-2-49.5

"**Waste determination**" is the means to determine the nature of a particular waste to establish if the waste must be stored, treated/processed and disposed as a hazardous waste (329 IAC 3.1), as waste PCB (329 IAC 4.1), or solid waste (329 IAC 10).

The regulatory status may be determined using either generator knowledge or testing by the methods in 40 CFR 262.11 Hazardous waste determination & recordkeeping.

Waste Determination – What is it?

329 IAC 11-2-49.5

- The waste is a hazardous waste under 40 CFR 262.11 and is regulated under 329 IAC 3.1 because of the following:

  (A) It is not excluded (40 CFR 261.4).
  (B) It is a listed waste (40 CFR 261, Subpart D).
  (C) It exhibits a characteristic specified in 40 CFR 261, Subpart C

- It is a waste containing PCBs (329 IAC 4.1)

- The waste may be processed under this article and disposed at a landfill (329 IAC 10)

Hazardous Waste Generator Improvement Rule

40 CFR 261.11

- Waste Determinations must be accurate
- Waste Determinations must be made at the point of generation
- Use of generator knowledge and testing

Why is it important?

Generators are the first critical link in ensuring safe management of hazardous waste.

The “cradle” in “cradle to grave”

#1 violation in RCRA

Ensuring proper disposal – Subtitle D Landfill or Subtitle C Facility

Estimated 20-30 % are incorrect (81 FR 85748)

How - Waste Determination Process

- Is it a solid waste?
- Is the waste exempt from the definition of hazardous waste (examples: household waste, coal ash, cement kiln dust)?
- Is the waste a “listed” hazardous waste?
- Does the waste exhibit any “hazardous waste characteristics”?
- Does the waste contain other regulated constituents? (underlying hazardous constituents, asbestos, PCBs, radioactive, etc.)

Waste Determinations – When & How?

IMPORTANT: A record of how the determination is made should be kept at the generator's site

1. At the point of generation
   a. When it was generated
   b. Prior to dilution, mixing or other alteration
2. Basis
   a. Acceptable knowledge – Waste origin, composition, process, chemical or physical characterization, chemical & physical properties
   b. Testing, e.g., toxicity – D004 – D043
3. Recordkeeping – results of sampling & testing; analytical methods and process by which the waste was generated

Point of Generation

And there is more to consider

- When you decide it is no longer functional.
- When it does not meet a need.
- When the user determines that a product is no longer useful to anyone, it becomes a solid waste.
- When generated before dilution mixing or other alteration.

Point of Generation

Particulate matter collection in drum from air pollution control device

When this filter can no longer collect overspray….

Mixed Solid Waste

Evaluating the viability of commercial chemical products

Will I discover some material, due to its placement in the cabinet, to be abandoned because it is no longer considered viable?

https://rcrapublic.epa.gov/files/14837.pdf

Testing – General

- Applicable test methods
  - RCRA
  - PCBs
  - Asbestos
  - Waste Classifications

- Other options?
  - Petition for alternative methods 260.21
  - 329 IAC 10-9-4

Ignitability

As an example of test methods

- ASTM D93-79 [1],
- ASTM D93-80 [1],
- ASTM D3278-78 [2],
- ASTM D8174-18 [3] or
- ASTM D8175-18 [1] as specified in SW-846 Test Methods 1010B or 1020C (40 CFR 260.11)

[1] Flash Point by Pensky-Martens Closed Cup Tester
[2] Setaflash Closed Tester
[3] Small Scale Closed Cup Tester

What is Generator Knowledge?

(Updated HWGIR)
262.11 (d)(1)

Acceptable knowledge may include:

- Process knowledge
- Knowledge of products, by-products and intermediate produced by the manufacturing process
- Chemical or physical characteristics of the wastes
- Information on the physical properties of the chemicals used or produced by the process
- Testing that illustrates the properties of the waste or its constituents

What is generator knowledge?

329 IAC 10-2-78.1

"Generator knowledge" means the relevant, accurate, and reliable information available to or developed by the generator about a waste that allows a person to determine the correct regulatory status of that waste. This information may include, but is not limited to, the following categories of information:

(1) Information provided by the manufacturer or supplier of the materials used in the process.

(2) Information provided in reference materials.

What is generator knowledge?

329 IAC 10-2-78.1 Continued

(3) Information describing the process that generates the waste.

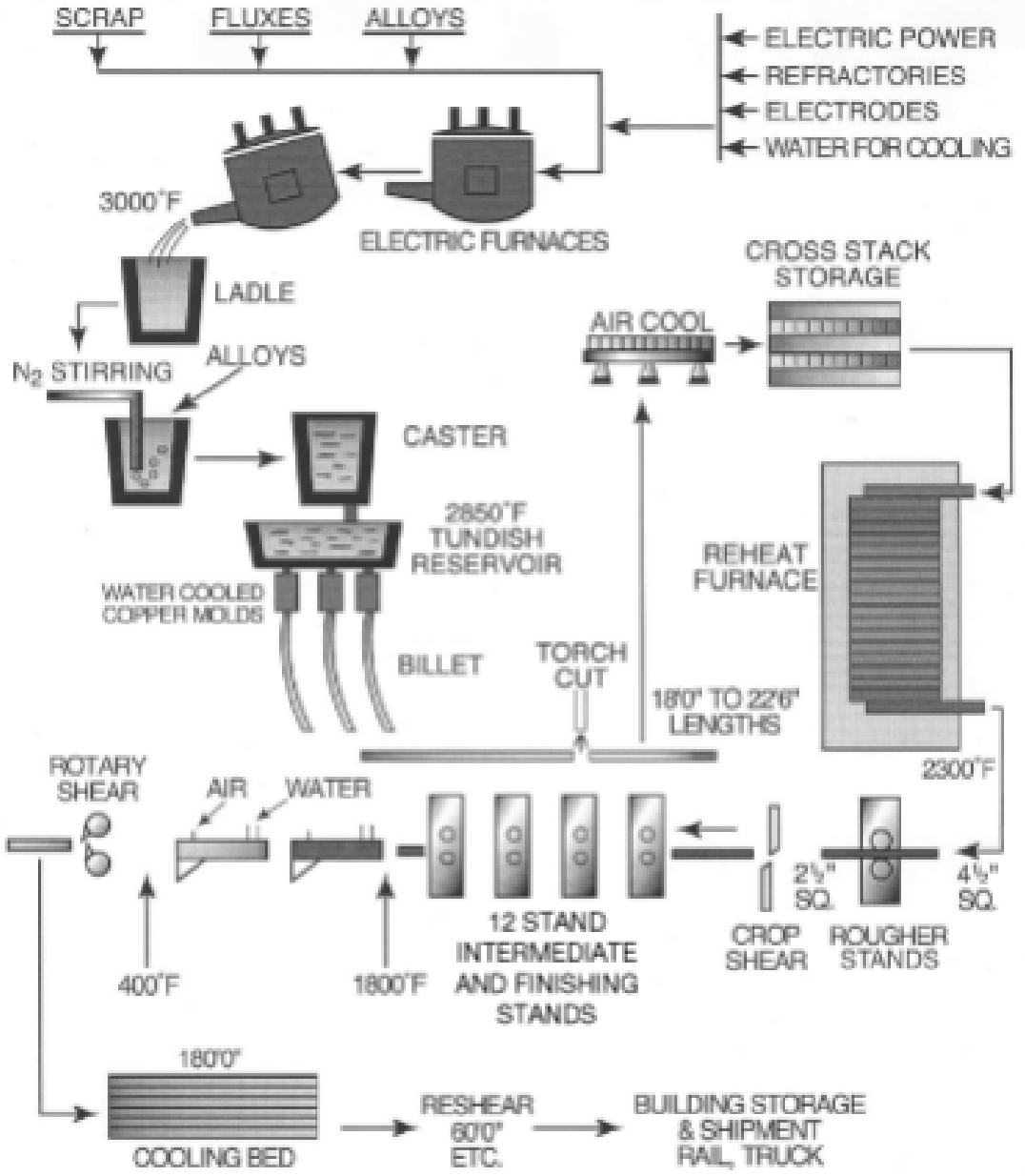
(4) Information describing the materials used in the process that generates the waste.

(5) Information describing principles of science, including chemistry and physics, applied to the raw materials and process used.

(6) Information developed through prior testing of the waste.

Process Diagram

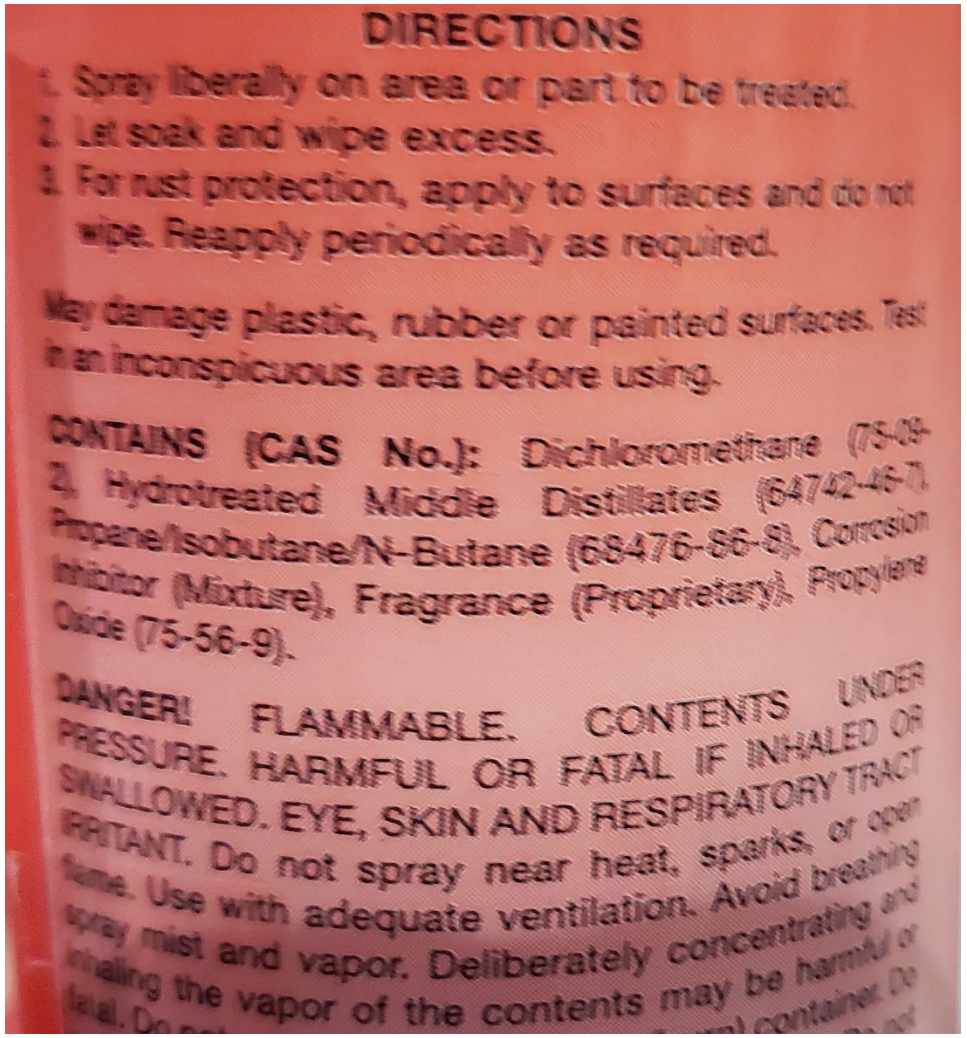
Source: AP-42 Section 12.5.1



Contents of the aerosol paint can

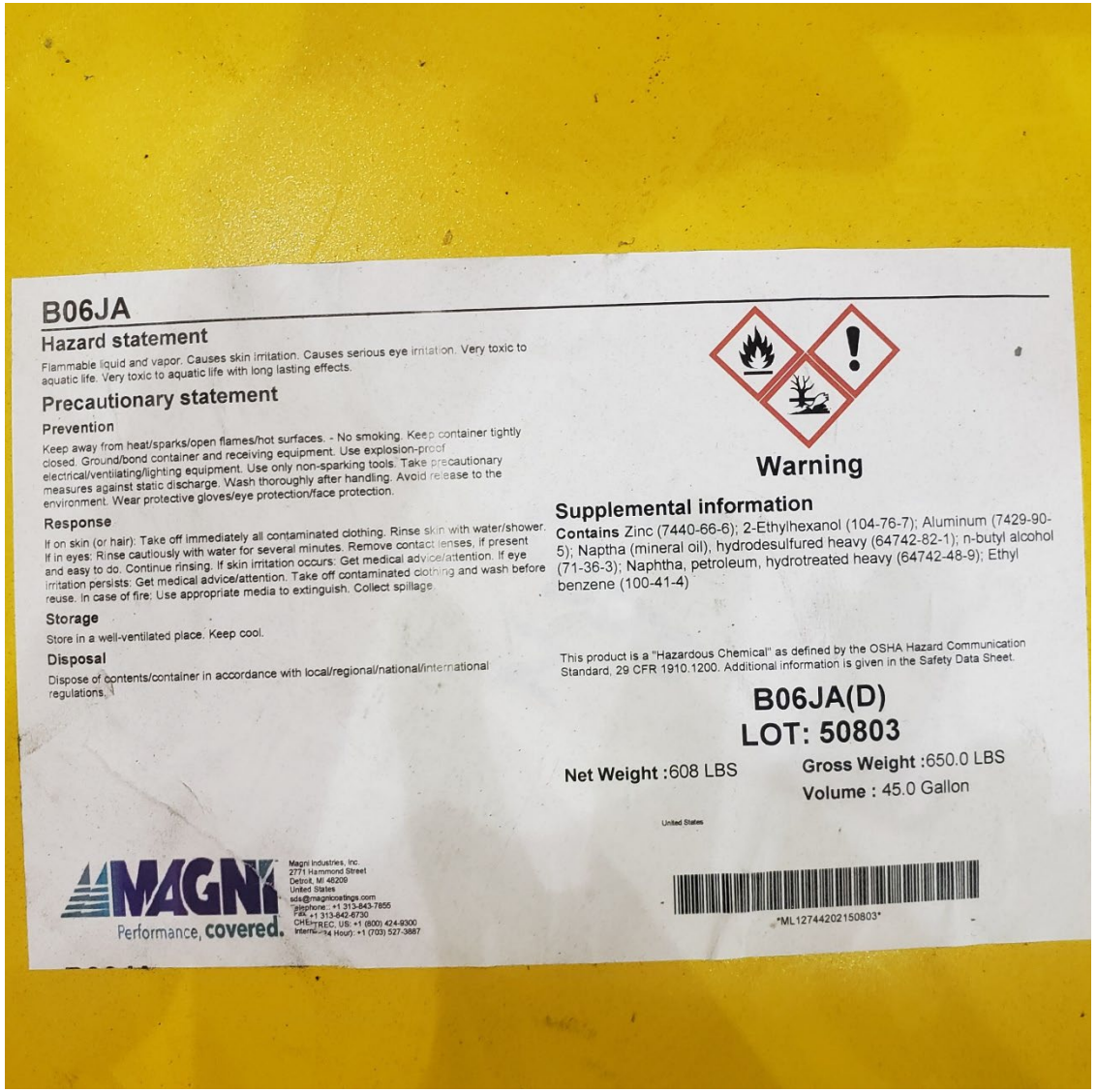
OLQ inspection, May 18, 2022

Penetrating Oil
Cleans & removes rust & corrosion – aerosol container



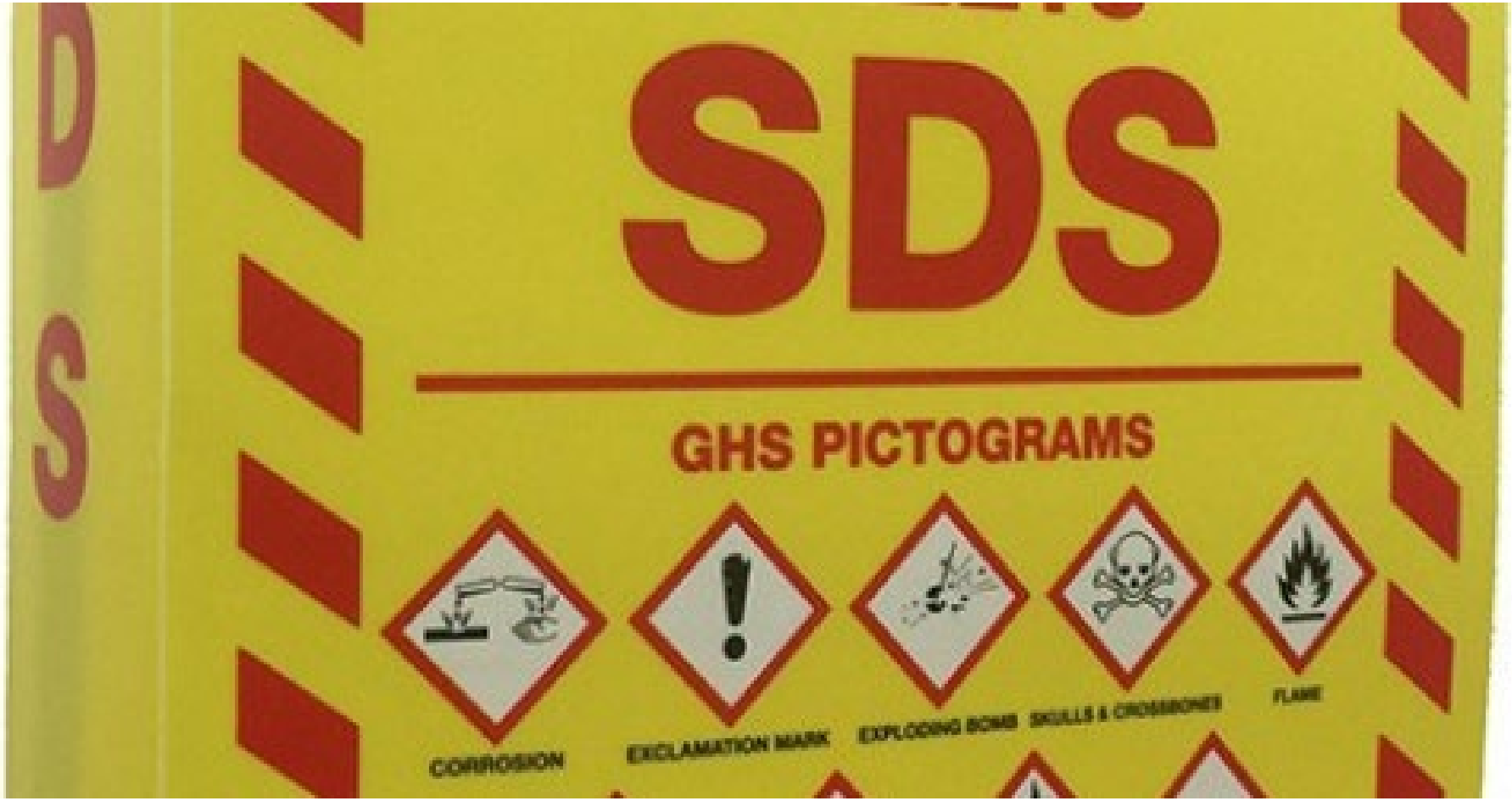
Labels

Contains Zinc, Aluminum, Naptha (mineral oil), etc.



Safety Data Sheets

Hard, electronic or online



Waste Determinations – Where it all starts

Definition of Solid Waste

Sounds easy but which definition?

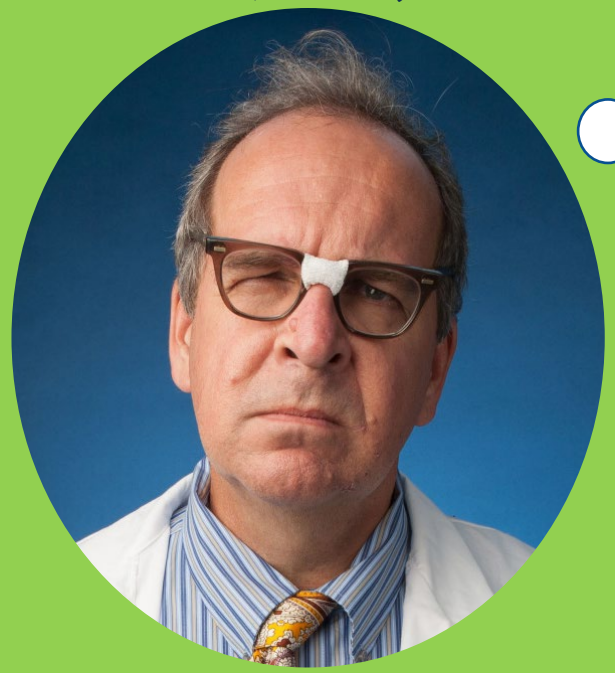
Federal Statute
(US Code)

Federal Administrative
Code (CFR)

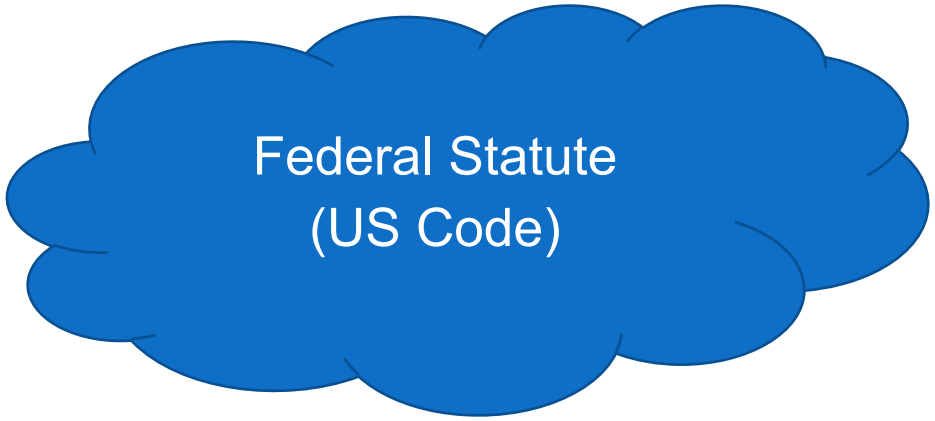
Indiana
Administrative
Code (IAC)

Indiana Statute
(Indiana Code)

Other ???



Definition of Solid Waste - 42 U.S.C. § 6903(27)



Synonyms of "**solid waste**"

Garbage,

Refuse,

Sludge (from wastewater & water treatment & air pollution control device),

Discarded material (regardless of physical state - solid, liquid, semisolid, or contained gaseous)

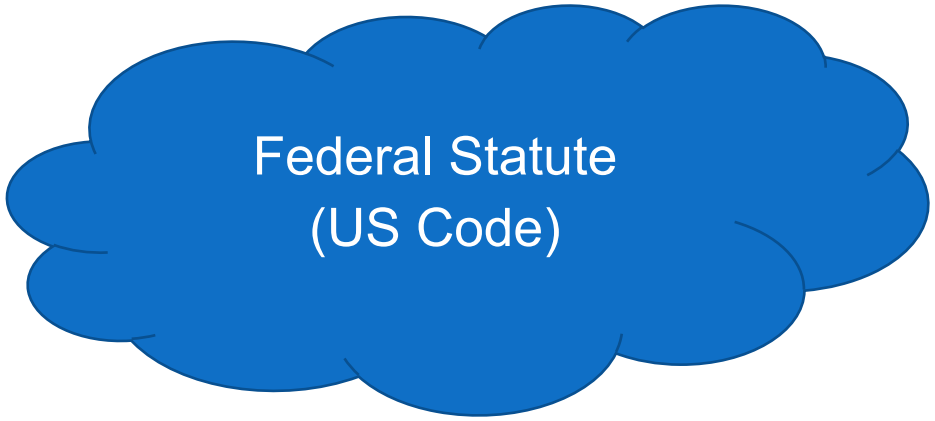
From

industrial, commercial,

mining, agricultural operations and

community activities….

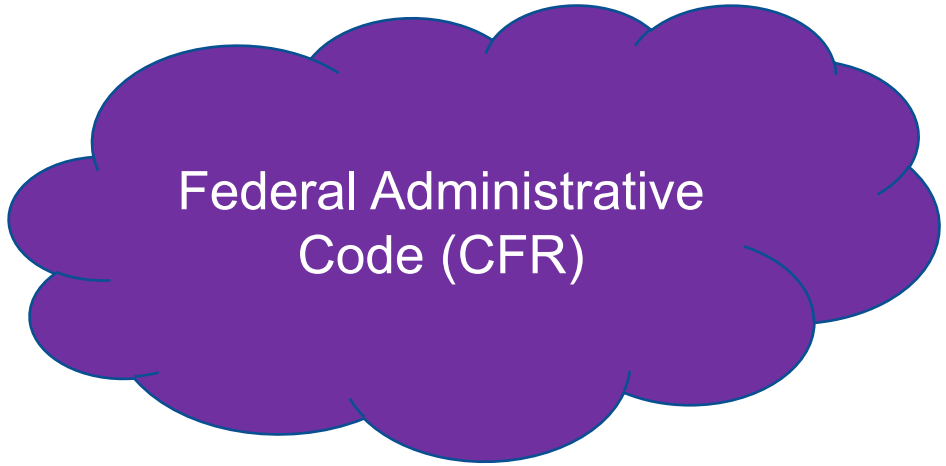
Definition of Solid Waste - 42 U.S.C. § 6903(27)



Does **not** include…

- Solid or dissolved material in domestic sewage
- Solid or dissolved materials in irrigation return flows
- Industrial discharges which are point sources subject to permits under section 1342 of title 33
- Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954

40 CFR 261.2



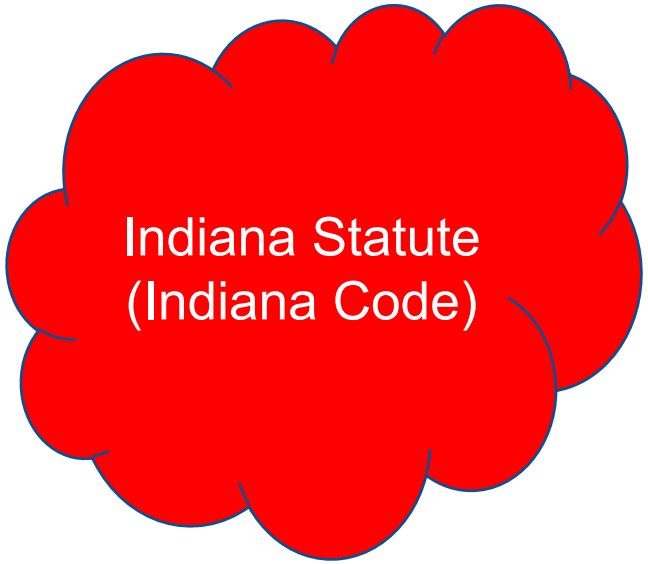
A *solid waste* is any discarded material that is not excluded under § 261.4(a) or that is not excluded by a variance granted under §§ 260.30 and 260.31 or that is not excluded by a non-waste determination under §§ 260.30 and 260.34.

40 CFR 258.2

Federal Administrative Code (CFR)

Solid waste means any garbage, or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved materials in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges that are point sources subject to permit under 33 U.S.C. 1342, or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923).

IC13-11-2-205



(a) "Solid waste", for purposes of IC 13-18-12, IC 13-19, IC 13-21, IC 13-20-22, and environmental management laws, except as provided in subsection (b), means any garbage, refuse, sludge from a waste treatment plant, sludge from a water supply treatment plant, sludge from an air pollution control facility, or other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, or agricultural operations or from community activities. The term does not include:

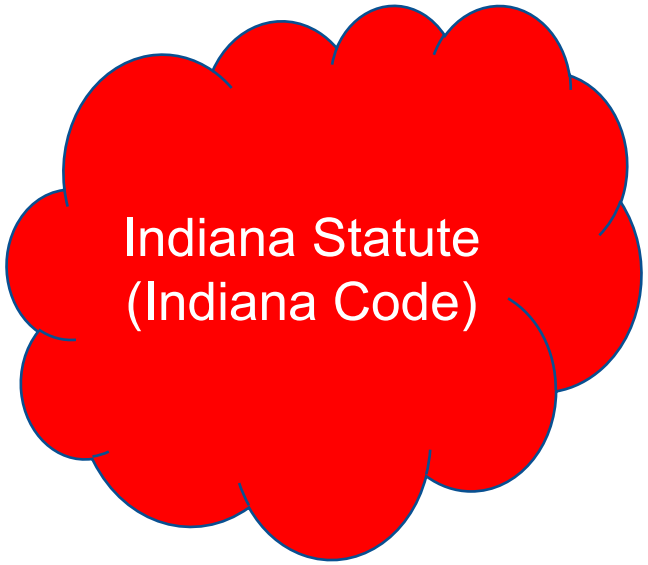
(1) solid or dissolved material in:
  (A) domestic sewage; or
  (B) irrigation return flows or industrial discharges;
that are point sources subject to permits under Section 402 of the Federal Water Pollution Control Act Amendments (33 U.S.C. 1342);

(2) source, special nuclear, or byproduct material (as defined by the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.));

(3) manures or crop residues returned to the soil as fertilizers or soil conditioners as part of a total farm operation;

(4) vegetative matter at composting facilities registered under IC 13-20-10; or

IC13-11-2-205



(5) material that is discarded if:
(A) the material is not:
(i) spent lead acid batteries regulated under IC 13-20-16 and 329 IAC 3.1-11.1;
(ii) salvaged from mobile homes regulated under 329 IAC 11.6;
(iii) alternative fuels regulated under 329 IAC 11.7;
(iv) used oil regulated under 329 IAC 13;
(v) waste tires regulated under IC 13-20-14 and 329 IAC 15;
(vi) electronic waste regulated under 329 IAC 16;
(vii) legitimate use of iron and steelmaking slags, as described in 329 IAC 11-3-1(11);
(viii) legitimate use of foundry sand, as described in 329 IAC 11-3-1(12); or
(ix) engineered wood waste burned as a fuel, as described in 329 IAC 11-3-1(20);
(B) the material is otherwise:
(i) determined under 40 CFR 262.11 to be nonhazardous; or
(ii) exempted or excluded from regulation as a hazardous waste under 40 CFR 261; and
(C) the material is used:
(i) by a manufacturer as an ingredient in or a component of a product; or
(ii) as a commodity in a process that results in a product.

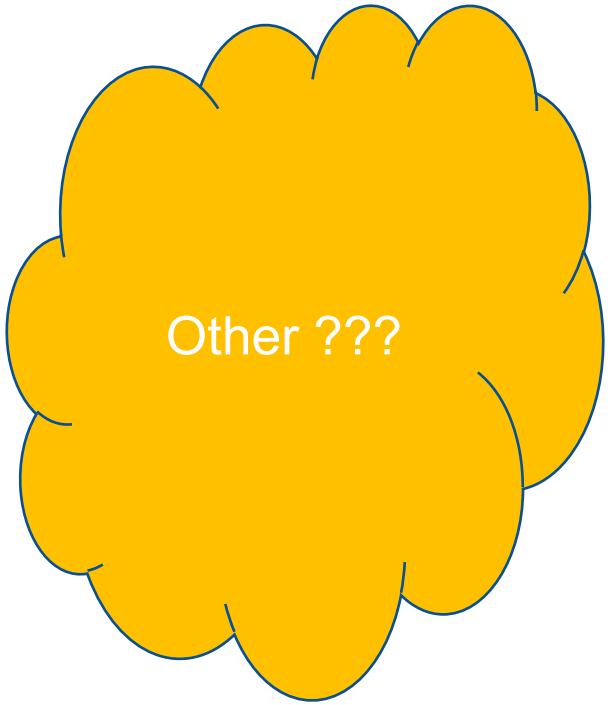
329 IAC 10-2-174

IC 13-11-2-205 *and* the following examples of other discarded material:

(1) Ash residue. (2) Contaminated sediments. (3) Commercial solid waste. (4) Construction/demolition waste. (5) Hazardous waste. (6) Household waste. (7) Infectious waste. (8) Liquid waste. (9) Pollution control waste. (10) Municipal solid waste. (11) Regulated hazardous waste. (12) Residential waste. (13) Industrial process waste

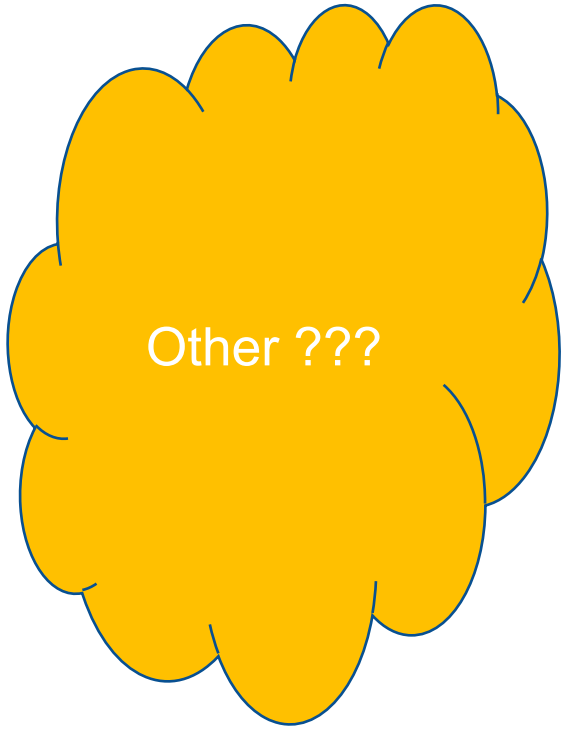
Definition of Waste

https://en.wikipedia.org/wiki/Waste

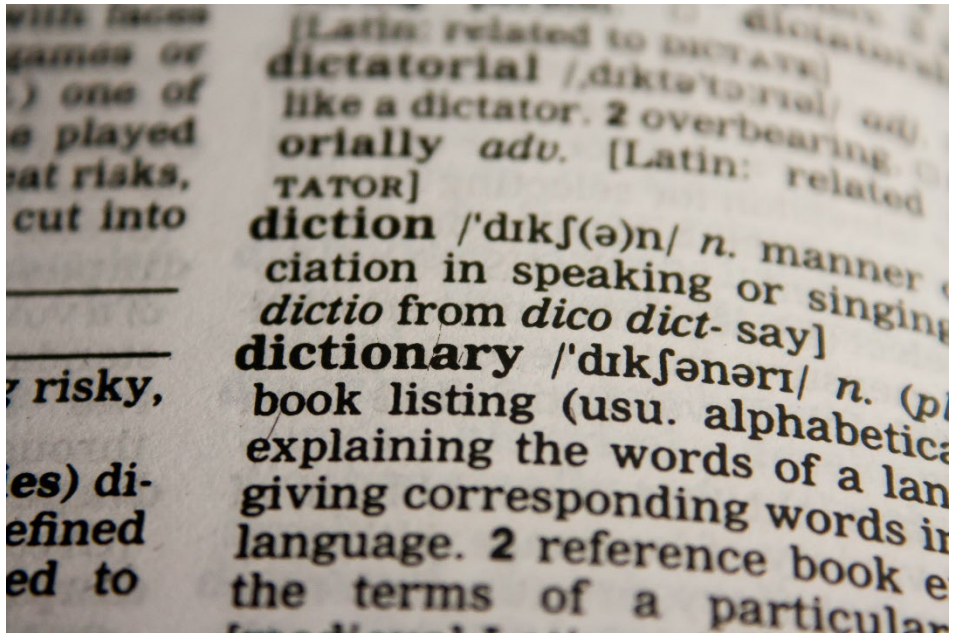


- ***Waste*** is any substance which is discarded after primary use, or is worthless, defective and of no use.
- A ***by-product*** by contrast is a joint product of relatively minor economic value.
- A ***waste*** product may become a by-product, joint product or resource through an invention that raises a waste product's value above zero.

Other Sources For Definitions?



- Merriam Webster
- Black's Legal Dictionary


dictatorial /dɪktə'tɔrɪəl/ adj.
like a dictator. 2 overbearing.
orially adv. [Latin: related
TATOR]
diction /'dɪkʃ(ə)n/ n. manner
ciation in speaking or singing
dictio from dico dict- say]
dictionary /'dɪkʃənərɪ/ n. (pl
book listing (usu. alphabetica
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What is **NOT** a solid waste?
Let's look at some examples.

Amber Colored Glass Bottles

- It is a solid waste.
- It is not likely to be hazardous waste.
- Glass can be used to make glass.
- Crushed glass is a type of aggregate.

Corrugated Has Value

- It is a solid waste.
- It is not likely to be hazardous waste [1].
- Wood fiber content can be reclaimed to make the same or a similar product.

[1] Unless contamination would make it so, e.g., overspray containing a Chromium based paint.

Wood Pallets

- It is a solid waste.
- It is not likely to be hazardous waste [1].
- Reuse.
- Repurpose.
- Reduce in size – absorbent material

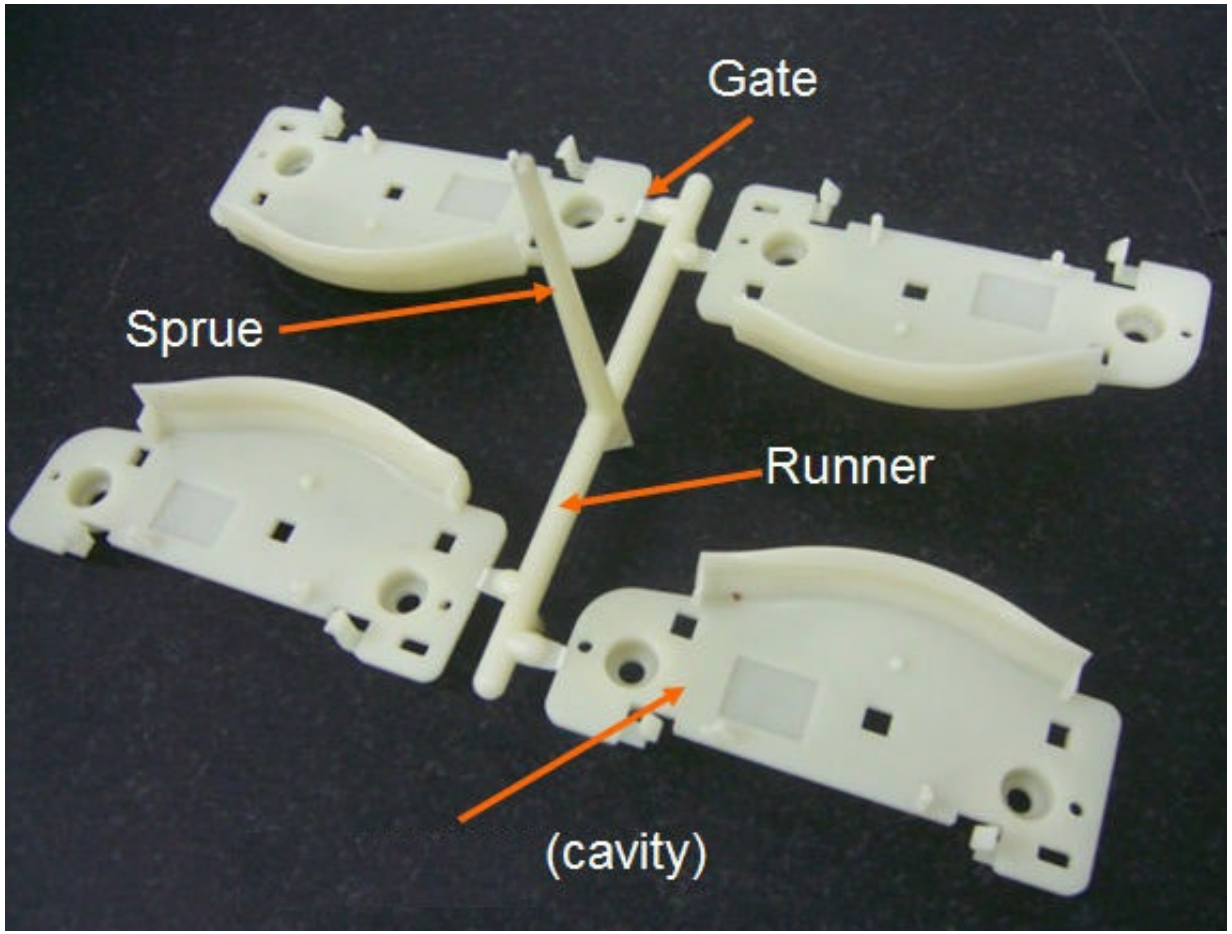
[1] Unless contamination would make it so, e.g., spillage of a Chromium based paint.

Scrap metal from a stamping process

Metal turnings & cutting oil

Metal turnings & cutting oil

Post Industrial Recycling



During the process of injection molding, some thermoplastic material is left over.

It can usually be recovered through granulation and can be used again by blending it with virgin plastic.

Post Industrial Recycling can include purge from the manufacturing process.

It can generally be shredded/granulated and used again by blending it with virgin plastic. Red is an especially valuable color.

Discontinued Products

Shredded & granulated then pelletized for use as a feed stock

Post Consumer Recycling (PCR)

PCR may include contamination making it less valuable and more costly to recycle effectively.

Reduce/Reuse

1. Many students are downloading a textbook to a laptop computer or similar electronic device.

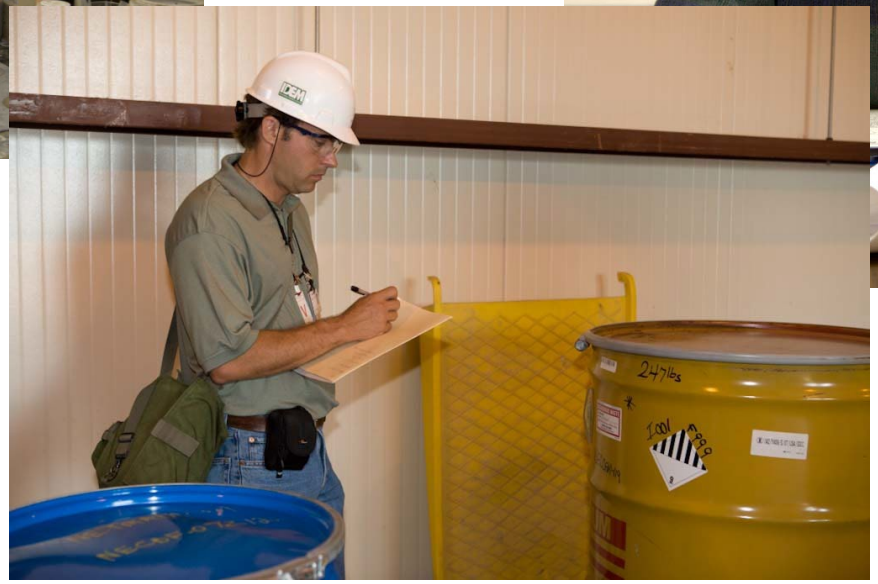
2. Gently used historical texts contain valuable information and can continue to be used.

3. Many reuse centers facilitate the collection & distribution of gently used materials.

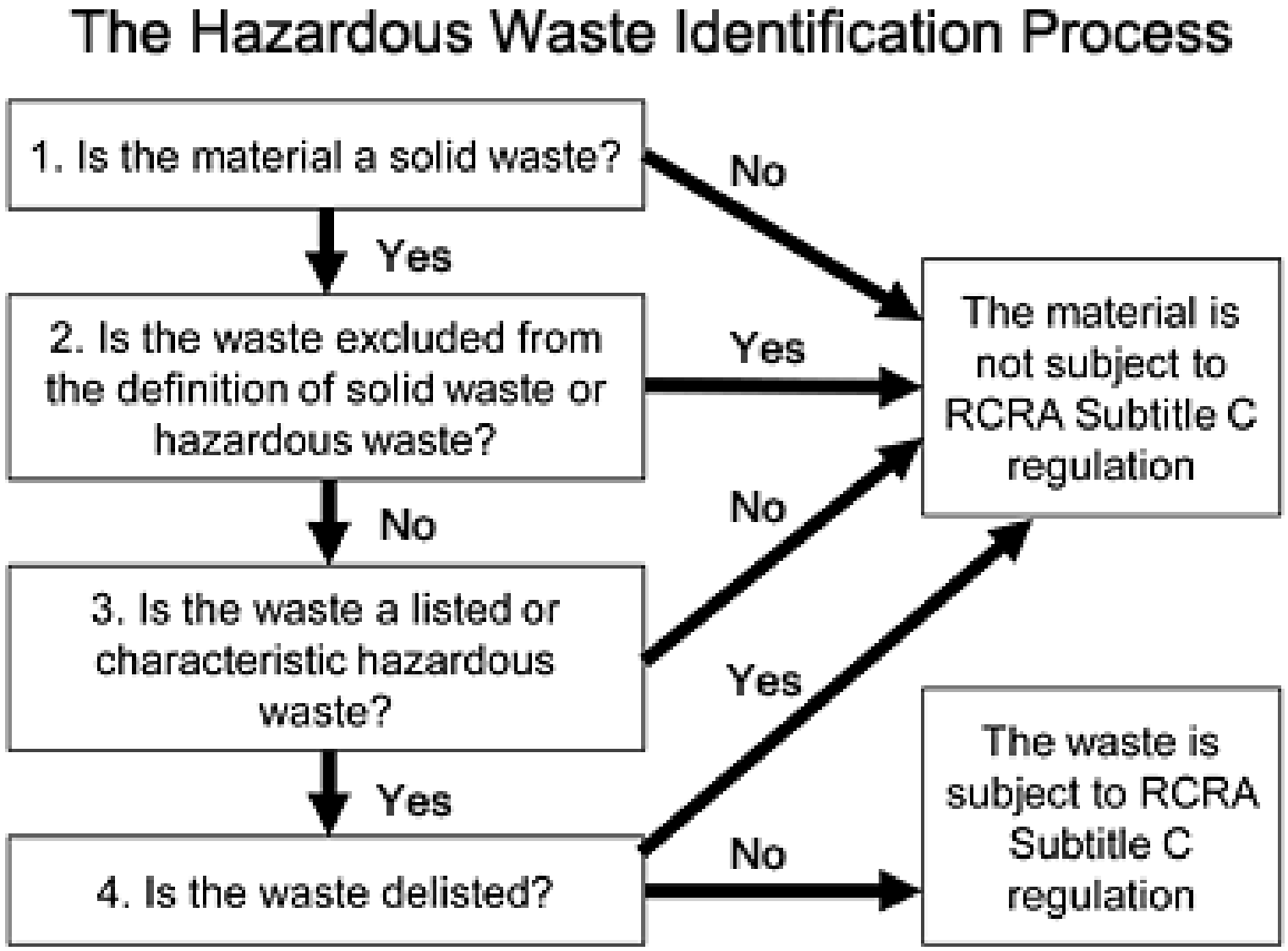
Spare boiler used for spare parts

Some common materials including paint, fuel, pesticides, disinfectants, motor oil, etc. ***can*** become solid waste

Hazardous Waste Determination Process



Let's look at the hazardous waste determination process more closely



Are my solid wastes considered hazardous waste?

40 CFR 262.11

EVERYONE who generates a waste must

- make a hazardous waste determination
- unless explicitly excluded from the hazardous waste rules

A Hazardous Waste must **FIRST** be a Solid Waste

40 CFR 261.2 Definition of Solid Waste

- A ***solid waste*** is any material (liquid, solid or compressed gas) which can no longer function for its intended purpose
- A ***solid waste*** is any discarded material that is not excluded under § 261.4(a) or
- that is not excluded by a variance granted under §§ 260.30 and 260.31 or
- that is not excluded by a non-waste determination under §§ 260.30 and 260.34.

[1] ***solid waste*** does **not** refer to physical state – solid, semi-solid, liquid or contained gaseous material

What is a discarded material?

Any material which is:

- Abandoned,
- Recycled,
- Considered inherently waste-like (e.g., dioxin wastes), or
- A military munition identified as a solid waste in § 266.202.

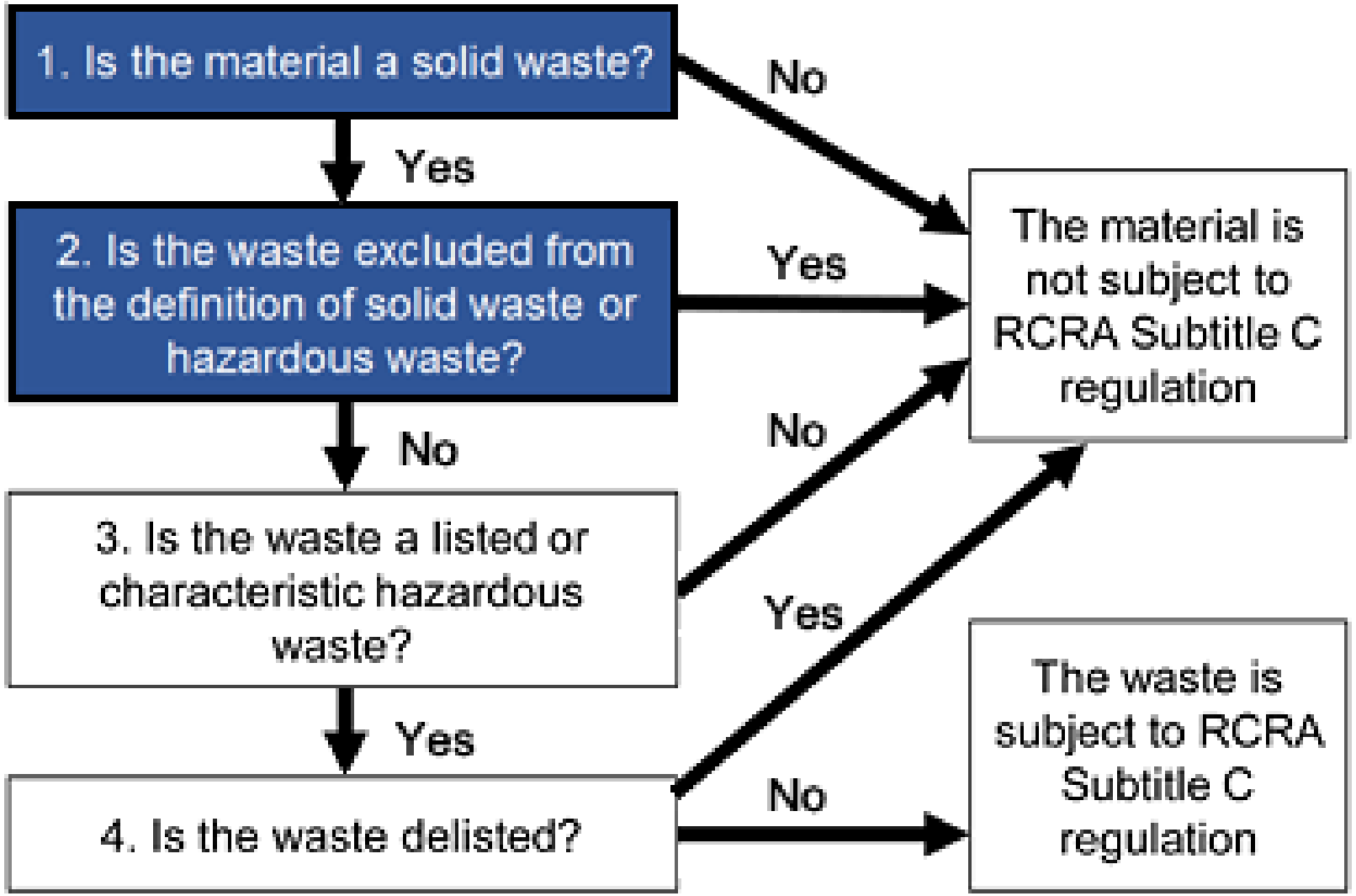
What does it mean to be abandoned?

- Disposed,
- Burned or incinerated,
- Accumulated, stored, or treated (but not recycled) before or in lieu of being abandoned by being disposed of, burned or incinerated, or
- Sham recycled – collecting solid waste with no intent to reclaim one or more valuable components

What is disposal?

- Applied to or placed on the land
- Combined with other ingredients to be applied to or placed on the land
- Excludes commercial chemical products applied to the land as part of their ordinary manner of use

The Hazardous Waste Identification Process



40 CFR 261.4 Exclusions

(a) Materials which are not solid wastes

1. Domestic sewage
2. Industrial wastewater
3. Irrigation return flows
4. Special nuclear or by-product material
5. Materials subjected to in-situ mining
6. Pulping liquors
7. Spent Sulfuric Acid used to produce virgin Sulfuric Acid

40 CFR 261.4 Exclusions

(a) Materials which are not solid wastes

8. Secondary materials that are reclaimed & returned to the original process
9. Spent wood preserving solutions
10. EPA Hazardous Waste Nos. K060, K087, K141 – K145, K147 & K148
11. Non-wastewater splash condenser dross residue
12. Oil-bearing hazardous secondary materials
13. Excluded scrap metal
14. Shredded circuit boards

40 CFR 261.4 Exclusions

(a) Materials which are not solid wastes

15. Condensates derived from kraft mill steam strippers reserved

16. Spent materials generated within the primary mineral processing

17. Petrochemical recovered oil

18. Spent caustic solutions from petroleum refining liquid treating

19. Hazardous secondary materials (HSM) used to make zinc fertilizers

20. Zinc fertilizers made from hazardous wastes or HSM

21. Used cathode ray tubes (CRTs)

40 CFR 261.4 Exclusions

(a) Materials which are not solid wastes

23. HSM generated and legitimately reclaimed

24. HSM that is generated and then transferred to another person for reclamation

25. HSM that is exported from the United States

26. Solvent-contaminated wipes

40 CFR 261.4 Exclusions

(a) Materials which are not solid wastes

27. HSM that is generated and then transferred to another person for remanufacturing provided that the HSM is ***Toluene***, ***Xylenes***, ***Ethylbenzene***, ***1,2,4-Trimethylbenzene***, ***Chlorobenzene***, ***n-Hexane***, ***Cyclohexane***, ***Methyl t-Butyl Ether***, ***Acetonitrile***, ***Chloroform***, ***Chloromethane***, ***Dichloromethane***, ***MIBK***, ***NN-Dimethylformamide***, ***Tetrahydrofuran***, ***n-Butyl Alcohol***, ***Ethanol*** and/or ***Methanol***.

Legitimate Recycling Involving a Hazardous Secondary Material

1. Contributes valuable ingredients to a product or intermediate; or
2. Replaces a catalyst or carrier in the recycling process; or
3. Is the source of a valuable constituent recovered in the recycling process; or
4. Is recovered or regenerated by the recycling process; or
5. Is used as an effective substitute for a commercial product.

The recycling process must produce a valuable product or intermediate

The product or intermediate is valuable if it is:

1. Sold to a third party; or

2. Used by the recycler or the generator as an effective substitute for a commercial product or as an ingredient; or

3. Intermediate in an industrial process

The hazardous secondary material must be managed as a valuable commodity

1. It must be managed like raw material.

2. It must be contained.

3. Any hazardous secondary material released to the environment & not recovered immediately will be considered discarded.

Liquid released from plastic tote when tote tipped over Generator unsure of contents; waste analysis pending

March 11, 2020

Why Might a Hazardous Secondary Material be Considered Valuable

- Scarcity
- Supply-demand balance
- Stocks and rate of use
- Actual or anticipated supply disruption
- Earnings, market performance, expectations
- Investment level

Factors that influence the price of Al, Cd, Co, Cu, Fe, Ni, Pb, Rare Earth Elements, and Zn -
https://pubs.usgs.gov/of/2008/1356/pdf/ofr2008-1356.pdf
https://www.usgs.gov/centers/national-minerals-information-center/recycling-statistics-and-information

Vacuum distillation is one method of reclaiming solvent from spray gun cleaning as well as the solvent from paint that cannot be used.

Waiting to be distilled

Condensed solvent flowing directly into one of four drums to be used later

Inventory Management

FIFO (First In, First Out) - Inventory that is purchased first is used before inventory that is purchased later.

LIFO (Last In, First Out) – Inventory that is purchased last is used before inventory that is purchased earlier.

JIT (Just In Time) – Inventory that is purchased and received only as needed.

Inventory Management

In-Process inventory is work that has begun production in a manufacturing company but that has not yet been completed.

Obsolete inventory is old or outdated and is not suitable for sale or use in production.

MRO (Maintenance, Repair & Operating) inventory includes materials needed for maintaining equipment & spare parts. It also includes janitorial supplies.

Inventory Management System – knowledge of what you have, where it is located and how to manage it can help to reduce the unnecessary generation of solid waste as well as hazardous waste

Beware of

- Sham recycling
- Speculative accumulation
- Use on the land/use constituting disposal

https://www.epa.gov/hw/legitimate-hazardous-waste-recycling-versus-sham-recycling
Purpose & applicability of speculative accumulation provision - https://rcrapublic.epa.gov/files/13755.pdf

Legitimate VS Sham

Legitimate: Lead-contaminated foundry sands reused in foundry molds

Sham: Lead-contaminated foundry sands reused as playground sand

Example: Ugly Paint

Hazardous spent solvent contaminated with ink from screen printing process designated by generator as “ugly paint” or “used thinner” (depending on solids content).

According to the owner, he was using the ugly paint on a concrete slab for an advertisement that would be visible by airplanes. The “advertisement” was never completed. (*see picture, right*)

The facility had no records of anyone taking the free ugly paint or used thinner. Feed material for these “products” are stored outside in containers covered with corrugated plastic.

“Advertisement” painted with “ugly paint”

40 CFR 261.4 Exclusions

(b) Solid wastes which are not hazardous wastes

1. Household waste
2. Solid wastes returned to the soils as fertilizers
3. Mining overburden
4. Fly ash, bottom ash, slag waste & flue gas emission control waste
5. Drilling fluids & produced waters
6. Toxicity characteristic solely for Chromium

40 CFR 261.4 Exclusions

(b) Solid wastes which are not hazardous wastes

7. Solid waste from the extraction, beneficiation, processing of ores and minerals
8. Cement kiln dust waste, except as provided by § 266.112
9. Solid waste which consists of discarded arsenical treated wood
10. Petroleum contaminated media and debris
11. Injected groundwater that is hazardous only
12. Used ChloroFluoroCarbon (CFC) refrigerants from totally enclosed….
13. Non-terne plated used oil filters

40 CFR 261.4 Exclusions

(b) Solid wastes which are not hazardous wastes

14. Used oil re-refining distillation bottoms

15. Leachate or gas condensate collected from landfills

16. Reserved

17. Solid waste that would otherwise meet the definition of low-level mixed wastes

18. Solvent-contaminated wipes

Exclusions of Interest in Indiana

261.4 (b)

1. Household waste

"Household waste" means any material (including garbage, trash and sanitary wastes in septic tanks) derived from households (including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds and day-use recreation areas).

Exclusions of Interest in Indiana

261.4 (b)

4. Fly ash, bottom ash, slag waste & flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels, except as provided by § 266.112 of this chapter for facilities that burn hazardous waste.

Exclusions of Interest in Indiana

261.4 (b)

7. Solid waste from the extraction, beneficiation, processing of ores and minerals

- Iron blast furnace slag (ii)(M)
- Basic oxygen furnace and open-hearth furnace slag from carbon steel production (ii)(R)

Does not include…

Exclusions of Interest in Indiana

261.4 (b)

8. Cement kiln dust waste, except as provided by § 266.112 for facilities that burn or process hazardous waste.

10. Petroleum contaminated media and debris that fail the TCLP test for D018 through D043 only.

13. Non-terne plated used oil filters if the filters have been gravity hot-drained.

Exclusions of Interest in Indiana

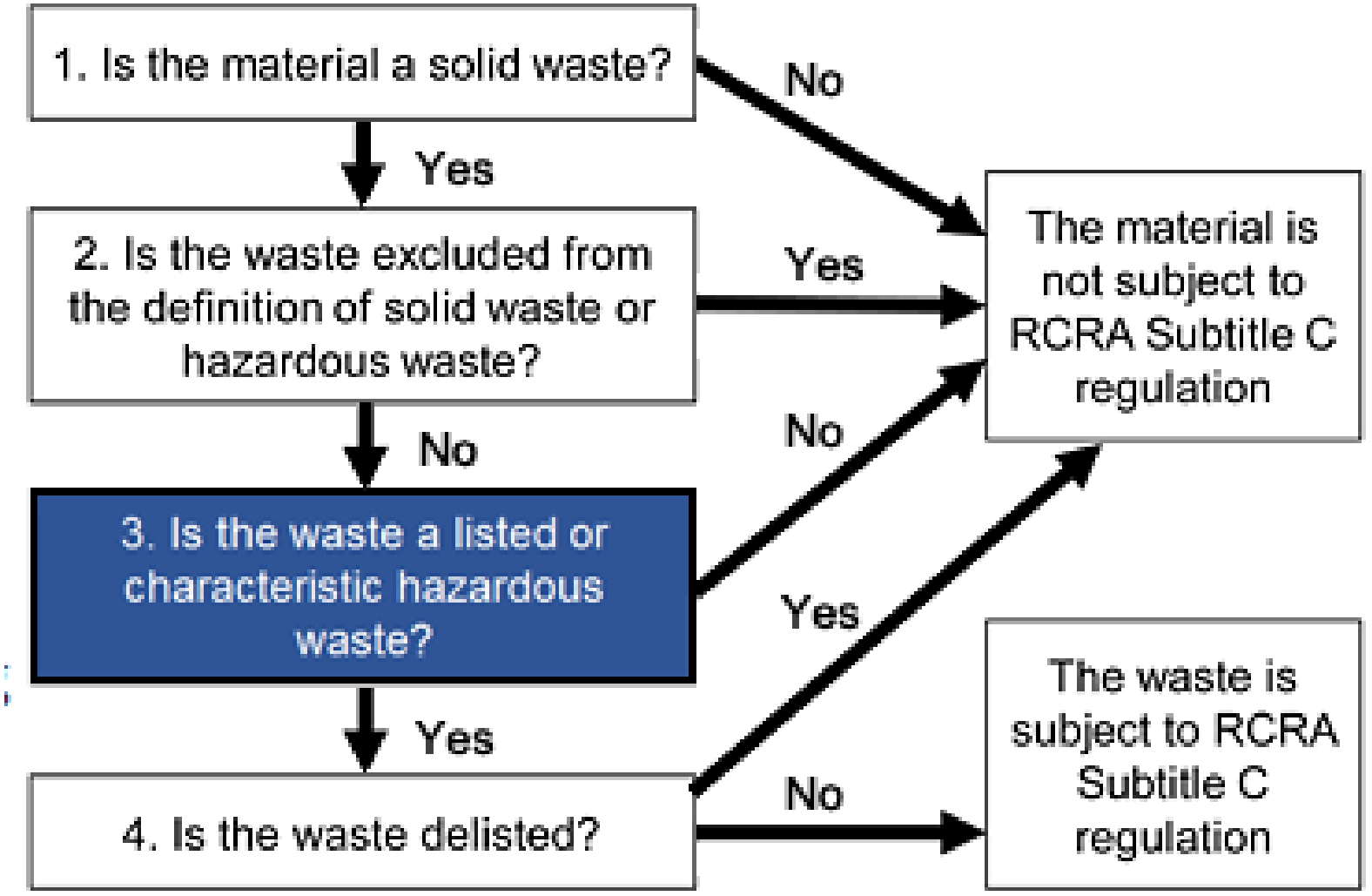
261.4 (b)

18. Solvent-contaminated wipes

- Solvent-contaminated wipes that are sent for disposal
- Does not include hazardous waste due to the presence of trichloroethylene
- Storage up to 180 days
- No free liquids
- Documentation
- Permitted landfill or combustor

https://www.in.gov/idem/ctap/files/hw_info_contaminated_wipes.pdf

The Hazardous Waste Identification Process



Hazardous Waste

consists of two broad categories:

Characteristic hazardous waste

- Ignitability – **D001**
- Corrosivity – **D002**
- Reactivity – **D003**
- Toxicity – **D004 to D043**

Hazardous Waste

consists of two broad categories:

Listed Hazardous Waste

- F-listed – **F001-F039**
  - Hazardous wastes from nonspecific sources
- K-listed – **K001-K181**
  - Hazardous wastes from specific sources
- P & U listed – **P001-P205, U001-U411**
  - Commercial chemical products, manufacturing intermediates, or off-specification commercial chemical products.

Characteristic hazardous wastes

Ignitability

(hazardous waste code D001)

- A liquid waste having a flash point < **140°F** (**60°C**)
- An oxidizer or ignitable compressed gas (DOT defined)
- “spontaneously combustible” materials
- **Examples include** waste Iso Propyl Alcohol & gasoline
- Mixing & usage may cause the flash point to change in value.

Characteristic hazardous wastes

Corrosivity

(hazardous waste code D002)

- Liquid wastes with a pH less than or equal to **2.0** (acid)
- Liquid wastes with pH equal to or greater than **12.5** (alkaline)
- Liquid wastes that corrode steel at rate greater than 0.25 in./yr.

pH of Common Items

	14.0	Strong Bases, NaOH, KOH
	12.5	**RCRA Hazardous Waste**
BASIC	12.0	Household ammonia
	10.0	Detergents and Baking Soda
	8.0	Seawater
	7.4	Blood
NEUTRAL	7.0	Pure water
	6.0	Rain
	4.0	Beer
	3.0	Orange juice, vinegar, wine, acid rain
ACIDIC	**2.0**	**RCRA Hazardous Waste**, lemon juice, stomach acid
	1.0	Strong acids, HCl, HF, HNO_3, H_2SO_4
	0.0	Very acidic

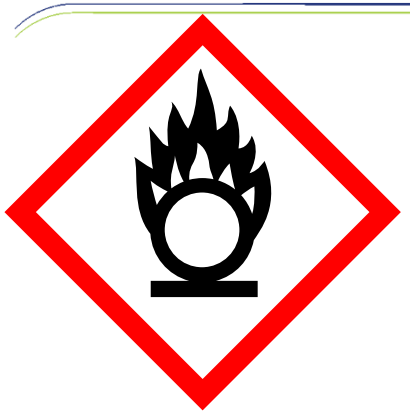
NaOH = Sodium hydroxide (lye or caustic soda), **KOH** = Potassium hydroxide (lye or caustic potash)

HCl = Hydrochloric acid (muriatic acid), **HF** = Hydrofluoric acid, **HNO_3** = Nitric acid, **H_2SO_4** = Sulfuric acid

Elementary Neutralization Units

- Used for neutralizing wastes that are hazardous only because
  - They exhibit the corrosivity characteristic or
  - They are listed solely for the characteristic of corrosivity.
- Neutralized immediately upon generation
- Not counted towards monthly hazardous waste generator status

https://www.epa.gov/hw/frequent-questions-about-hazardous-waste-identification#elementary1



Characteristic hazardous wastes

Reactivity

(hazardous waste code D003)

- It is normally unstable
- It reacts violently with water
- It forms potentially explosive mixtures with water
- It generates toxic gases when mixed with water
- It is a cyanide or sulfide bearing waste
- **Examples include** reactive metals[1] (e.g., magnesium shavings, fire starter); water reactive chemicals[2] & explosives

[1] https://en.wikipedia.org/wiki/Water-reactive_substances
[2] https://eta-safety.lbl.gov/sites/default/files/Water%20Reactive%20Chemicals%20-%20common%20list.pdf

Characteristic hazardous wastes

Toxicity

(hazardous waste codes D004 through D043)

Wastes determined by laboratory analysis (**TCLP -** Toxicity Characteristic Leaching Procedure) of 40 specified constituents (primarily heavy metals, organic compounds, and pesticides/herbicides) any one which are above a threshold concentration listed in **40 CFR 261.24**.

Examples include waste paint booth filters including overspray which contained chromium (**D007**); spent cleaners which collect certain constituents such as lead (**D008**) or chromium during use.

TCLP Thresholds

Common Metals

TCLP Parameter	Regulatory Limit	EPA Hazardous Waste Number
Metals		
Arsenic	5.0 mg/L	D004
Barium	100.0 mg/L	D005
Cadmium	1.0 mg/L	D006
Chromium	5.0 mg/L	D007
Lead	5.0 mg/L	D008
Mercury	0.2 mg/L	D009
Selenium	1.0 mg/L	D010
Silver	5.0 mg/L	D011

Common Organic Constituents

Volatile Organic Compounds (VOCs)		
Benzene	0.5 mg/L	D018
Carbon Tetrachloride	0.5 mg/L	D019
Chlorobenzene	100.0 mg/L	D021
Chloroform	6.0 mg/L	D022
1,2-Dichloroethane	0.5 mg/L	D028
1,1-Dichloroethylene	0.7 mg/L	D029
Methyl Ethyl Ketone (MEK)	200.0 mg/L	D035
Tetrachloroethylene	0.7 mg/L	D039
Trichloroethylene	0.5 mg/L	D040
Vinyl Chloride	0.2 mg/L	D043

Listed hazardous wastes

Must meet the description associated with the listing

Example: F005

- The following spent non-halogenated solvents: Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane;
- All spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and
- Still bottoms from the recovery of these spent solvents and spent solvent mixtures

Online Look-up F and K lists

Use the table below to search for and sort by hazardous wastes listed on the F and K lists:

Show 10 entries Search:

Industry and EPA Hazardous Waste Number	Description	Hazard Code*
F001	The following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(T)

https://www.epa.gov/hw/defining-hazardous-waste-listed-characteristic-and-mixed-radiological-wastes#FandK

Online Look-up U and P lists

Use the table below to search for and sort by hazardous wastes listed on the P and U lists:

Show 10 entries Search:

Hazardous Waste No.	Chemical Abstract No.	Substance**
P001	[1]81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations greater than 0.3%
P001	[1]81-81-2	Warfarin, & salts, when present at concentrations greater than 0.3%

https://www.epa.gov/hw/defining-hazardous-waste-listed-characteristic-and-mixed-radiological-wastes#PandU

Listed hazardous wastes

Non-specific "F-listed"

(hazardous waste codes Fxxx) – some examples

Halogenated or non-halogenated solvents or solvent mixtures containing, before use, a total of 10% vol. or more of one of the listed solvents ***such as***:

- **F001** – TCE (Trichloroethylene) used in degreasing
- **F002** – Methylene Chloride
- **F003** – Acetone (*listed solely for ignitability*)
- **F004** – Cresols and/or
- **F005** - Toluene

Listed hazardous wastes

Non-specific "F-listed"

(hazardous waste codes Fxxx) – some examples

Electroplating operations

- **F006** – Wastewater treatment sludges (***6 exceptions***)
- **F007** – Spent Cyanide plating bath solutions
- **F008** – Plating bath residues from the bottom of plating baths in which Cyanides are used
- **F009** – Spent stripping & cleaning bath solutions in which Cyanides are used

Listed hazardous wastes

Non-specific "F-listed"

(hazardous waste codes Fxxx) – some examples

Metal heat treating in which cyanides are used

- **F010** – Quenching bath residues from oil baths
- **F011** – Spent Cyanide solutions from slat bath pot cleaning
- **F012** – Quenching wastewater treatment sludges

Listed hazardous wastes

Non-specific "F-listed"

(hazardous waste codes Fxxx)

Chemical Conversion Coating of Aluminum

- **F019** – Wastewater treatment sludges ***except*** from Zirconium Phosphating in Aluminum can washing when such phosphating is an exclusive conversion coating process

"ICR" Only Listed Waste

A listed hazardous waste solely because it exhibits one or more characteristics of ignitability, corrosivity or reactivity (ICR) is **not** a hazardous waste, if the waste no longer exhibits any characteristic of hazardous waste.

https://www.epa.gov/hw/frequent-questions-about-hazardous-waste-identification#derived

Zinc electroplating

F006 exception – zinc plating (segregated basis) on carbon steel

Waste associated with electroplating

- Spent rinse bath
- Spills into secondary containment
- Spent electroplating bath

How do I reduce the waste generated?

- Countercurrent rinsing
- Reduce water usage for rinsing
- Filtration
- Ion exchange

Other ideas from STERC (Surface Technology Environmental Resource Center)

https://www.sterc.org/epa_p2_project.php

Storage of F006 filter cake in dumpster under tarp and roof

Listed hazardous wastes

Specific "K-listed"

(hazardous waste codes Kxxx) – some examples

Iron and Steel

K061 – Emission control dust/sludge from the primary production of steel in electric furnaces

K062 – Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (SIC Codes 331 and 332)

Inorganic Chemicals

K071 – Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used

Listed hazardous wastes

Commercial Chemical Product or Manufacturing Intermediate

Acutely toxic “P-listed”
and
“U-listed”
(hazardous waste codes Pxxx & Uxxx)

- Pure unused commercial chemical product
- All formulations in which the chemical is the sole active ingredient
- Hazardous waste when they are discarded…includes off-specification species, container residues, and spill residues

P listed Waste

Listed based on extremely hazardous properties

1 kg – Large Quantity Generator threshold (single P listed waste

U listed Waste

Listed based on toxic properties

100 kg – Small Quantity Generator threshold

U Listed Pharmaceutical Hazardous Waste Examples

U034	Chloral Hydrate (CIV), CAS # 302-17-0
U151	Mercury
U182	Paraldehyde (CIV), CAS # 123-63-7
U188	Phenol, aka Benzenol, antiseptic & disinfectant, oral anesthetic – Chloraseptic
U200	Reserpine, aka Raudixin, Serpalan, Serpasil, anti-hypertensive drug
U201	Resorcinol, aka Resorcin, used to treat acne, dermatitis, eczema

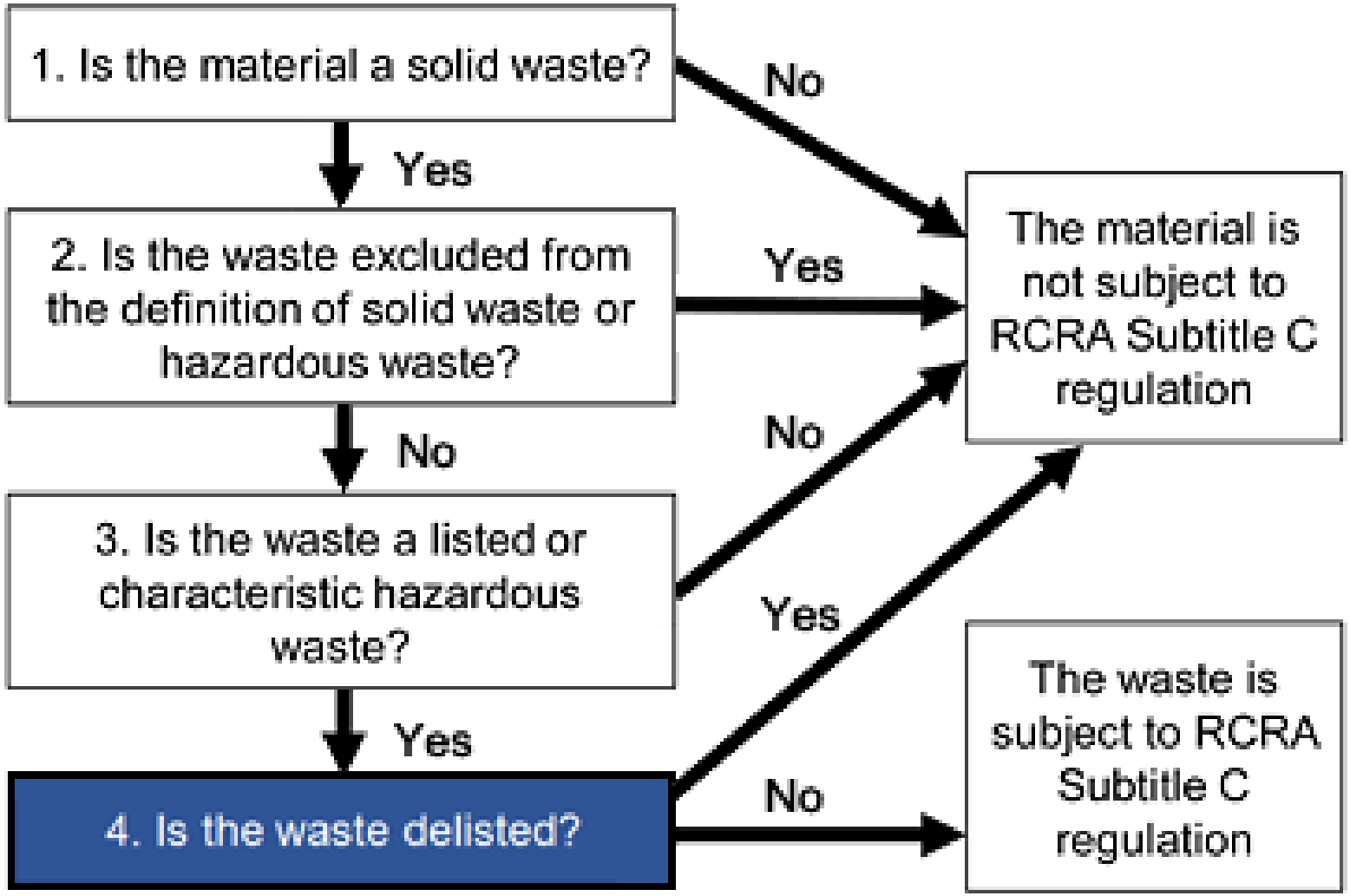
One 275-gallon tote of hazardous waste Resorcinol (U201) was not dated with the accumulation start date as required.

December 11, 2019

P Listed Pharmaceutical Hazardous Waste Examples

P001	Warfarin, Coumadin, anticoagulant used to prevent blood clots, rat poison
P012	Arsenic Trioxide, used to treat leukemia, injectable solution
P042	epinephrine, adrenalin, injection used to treat life threatening allergic reactions caused by bites, stings, foods, etc.
P046	Phentermine (CIV), Ionamin, tablets, short term regimen of weight loss based on exercise
P081	Nitroglycerin, sublingual tablets to treat coronary artery disease - angina

The Hazardous Waste Identification Process



Hazardous Waste Delisting

- The generator of a listed hazardous waste can petition to have their specific waste “delisted.”

- As part of the process, the generator must demonstrate that the waste does not pose a hazard to human health or the environment.

Hazardous Waste Delisting

- If the U.S. EPA region or state grants a delisting petition, the delisted waste will not be regulated as a listed hazardous waste.
- Delisted wastes can be found in 40 CFR 261, Appendix IX and at 329 IAC 3.1-6.
- The delisting process is site-specific, expensive, and often takes a great deal of time.

Do I need to re-evaluate?

- When the process and/or raw materials change
- Based on generator knowledge and testing

Are The Following Materials Considered Hazardous Waste?

Based on an OLQ inspection report – October 2015

- ~17 drums, one-300-gallon tote & ~ 12-15 five-gallon pails stored in a wire storage cage.
- All these items were stored near the receiving dock in the warehouse just west of the used oil tank.
- Some containers were labeled, "**Unknown Liquid**" and/or "**Unknown Yellow and White Crystal**".
- The facility representative stated that containers received from other related plants may not contain a usable material or product.
- Labels on some of the containers indicated the material had been stored since 2012.

Are The Following Materials Considered Hazardous Waste?

Based on an OLQ inspection report – November 2016

- **Several waste streams are combined in the grinding sludge**.
- Absorbents such as floor dry or rags are added to the liquid wastes to absorb free liquids before including them in the cubic yard boxes used for grinding sludge shipments.
- Documentation of one shipment of chrome tank bottoms and four shipments of non-hazardous grinding sludge were found during the inspection and/or were subsequently submitted by the facility.
- No other disposal records were found for the separate waste streams.

Making a Waste Determination – "Bad Cad" implies it is not a Viable Material

Summary – Lessons learned

- **Don't rely entirely on your waste disposal company**
- It is your (the generator's) responsibility to make the waste determination
- You (the generator) sign the manifest confirming that the information is correct
- Waste disposal company may not know very much about your processes and may miss listed and characteristic hazardous waste
- **You pay the fines, not the vendor!**

Manage Your Waste or Your Waste Will Manage You

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