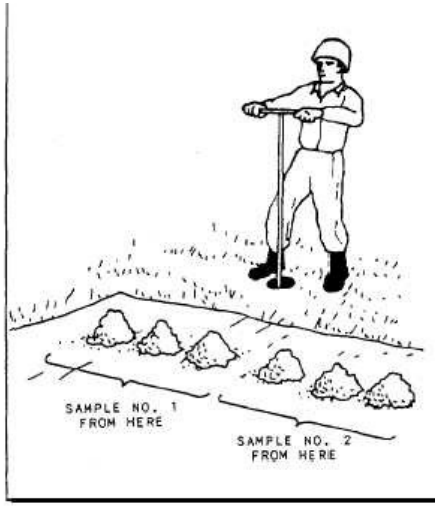
Waste Identification Part I

Department of Environmental Quality

Hazardous Waste Section
Division of Waste Management



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Spring 2023 Workshops

Waste Determinations

VSQG; SQG; LQG

- All generators of solid waste are required to make an accurate determination as to whether their waste is hazardous
- Characterizing waste is a tough requirement. EPA has tightened up certain requirements and revealed an estimated 20-30% incorrect waste determinations were being made.

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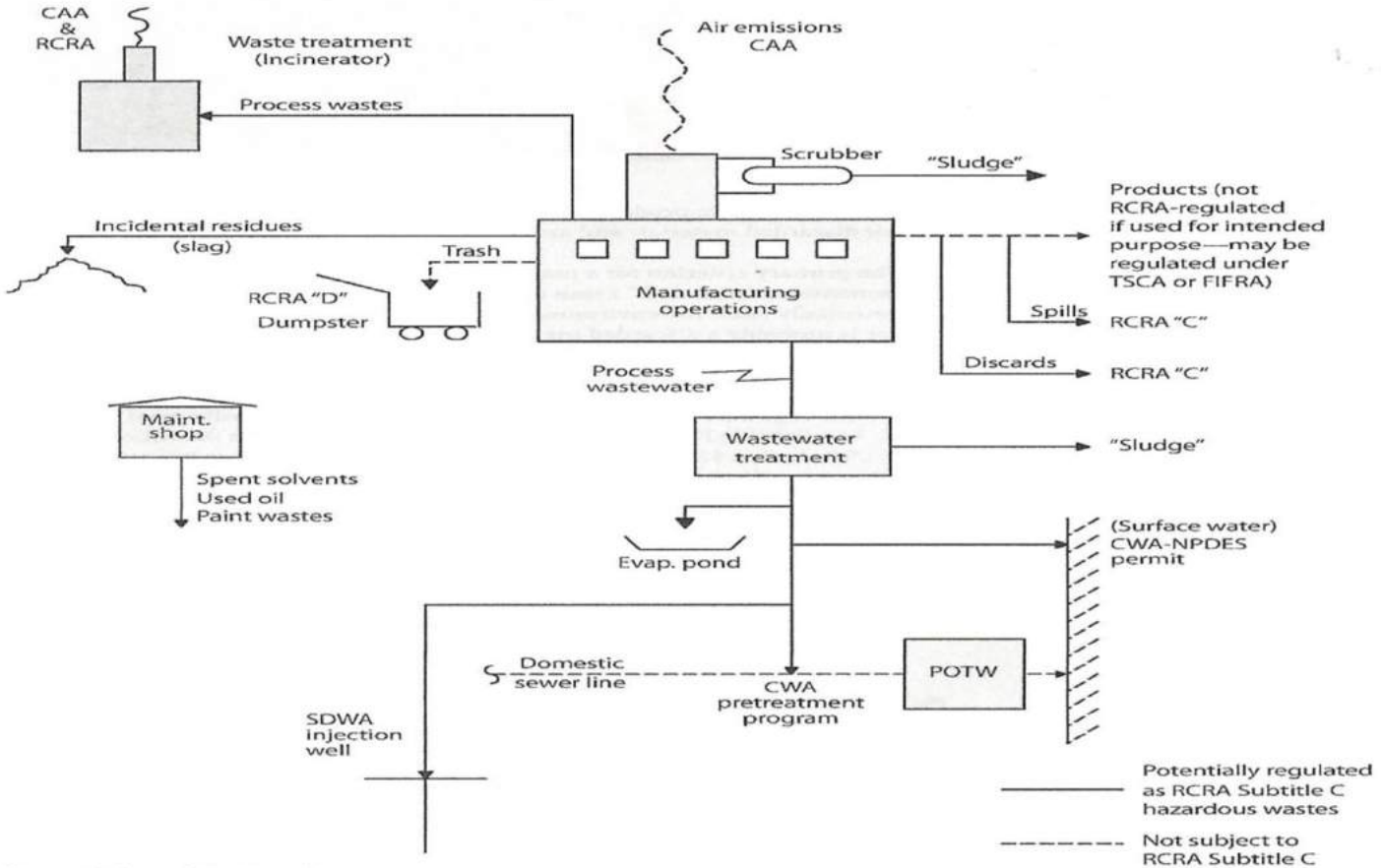
Regulatory Status of Discarded Materials from a Manufacturing Plant



Source: McCoy and Associates, Inc.

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Waste Determinations

To determine your generator category, count all waste generated in a calendar month:

Very Small Quantity Generator (VSQG)

½ Drum or
27 Gal. Or
220 lbs. Or
100 Kg

Small Quantity Generator (SQG)

½ to 5 Drums or
27-275 Gal. Or
220-2200 lbs. Or
100-1000 Kg.

Large Quantity Generator (LQG)

>5 Drums or
>275 Gal. or
>2200 lbs. or
>1000 Kg.

Key: 55 Gallon Drum = 440 lbs. = 200 Kg.

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What is a Hazardous Waste?

Solid waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment.

- A material must be considered a solid waste before it can be determined to be a hazardous waste. Any facility that generates a solid waste must determine if their waste is hazardous as required by 40 CFR 262.11
- A waste is a material that has been used or has otherwise served its intended purpose and, for whatever reason (e.g. contamination, spent) can or will no longer be used for its intended purpose
- **It is important to note that the definition of solid waste is not limited to wastes that are physically solid. Many solid wastes are liquid, semi-solid, or contained gaseous material**

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Definition of Hazardous Waste 40 CFR 261.3

A solid waste is hazardous waste if it is not excluded from regulation as a hazardous waste under 261.4(b) and it meets any of the following conditions:

- Exhibits a characteristic of a hazardous waste
- Has been named as a hazardous waste and listed as such in the regulation
- Is a mixture containing a listed waste and a solid waste
- Is a waste derived from the treatment, storage, or disposal of a hazardous waste

Key Thought: Before mixing hazardous waste with other wastes, consider the treatment and dilution implications.

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Two Types of Hazardous Waste

Acute hazardous waste – hazardous wastes that meet the listing criteria in 261.11(a)(2) and therefore are either listed in 261.31 of this chapter with the assigned hazard code of (H) or are listed in 261.33(e) of this chapter.

Non-acute hazardous waste – all hazardous waste that are not acute hazardous waste.

HAZARDOUS WASTE DETERMINATIONS

Waste Determinations

They are four “Pillars” that support any hazardous waste determination. We will be presenting the basic four key thought during this presentation.

Waste Determinations

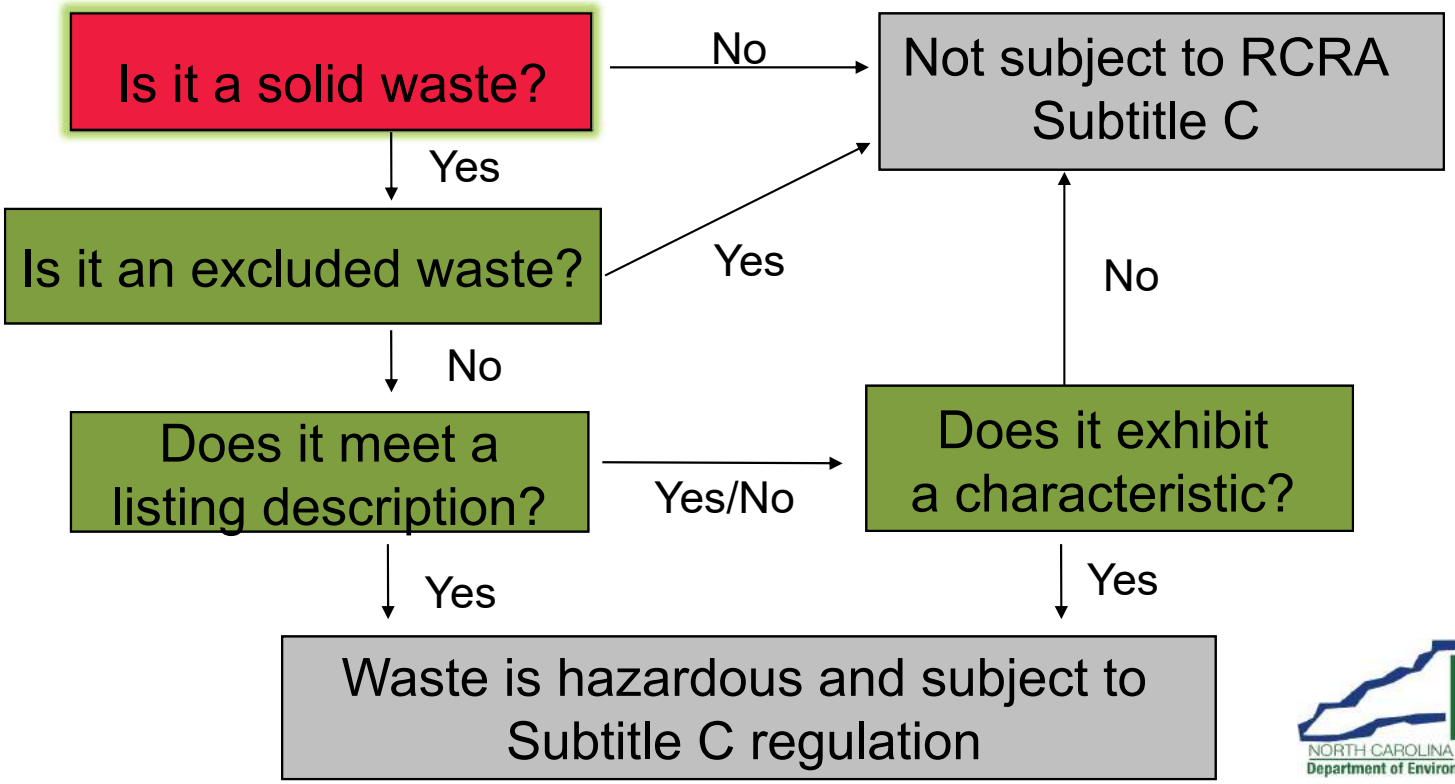
VSQG; SQG; LQG

KEY THOUGHT:

Always ask the "four questions" when making a hazardous waste determination.

1. Is it a solid waste? (40 CFR 261.2)
2. Is it exempt (exclusion)? (40 CFR 261.4)
3. Is it listed? (40 CFR 261.30)
4. Is it characteristic? (40 CFR 261.20)

Hazardous Waste Determination



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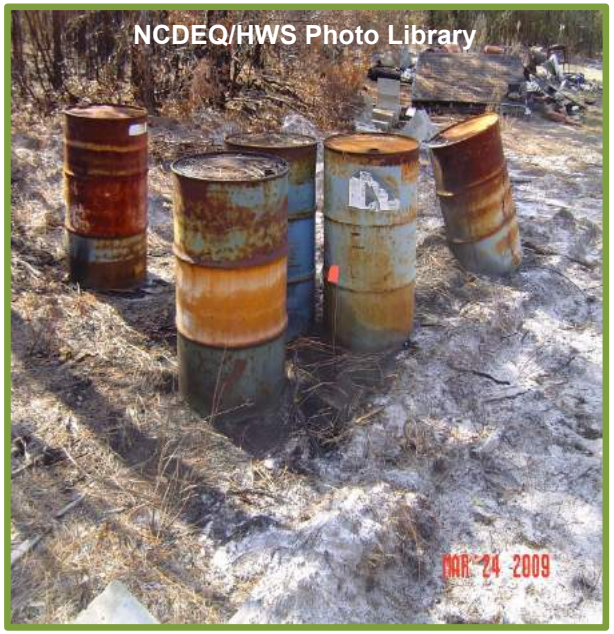
What is a Solid Waste?
40 CFR 261.2



- The primary criterion that must be met for a material to be a waste is that it is discarded:
  - Garbage, residue, sludge
  - Material abandoned, thrown away
  - Spent material, used for its intended purpose
  - Incidental residue
  - Sham recycled

Sham Recycling 40 CFR 261.2(b)(4)

Recycling must be legitimate: All recycling conducted under RCRA must be legitimate. The four legitimacy factors are:

- Factor 1: Materials must provide a <u>useful contribution</u> to the recycling process or to a product or intermediate.
  - (40 CFR 260.43(a)(1))
- Factor 2: Recycling must <u>produce a valuable product</u> or intermediate.
  - (40 CFR 260.43(a)(2))
- Factor 3: Materials must <u>be managed as valuable commodities.</u>
  - (40 CFR 260.43(a)(3))
- Factor 4: Products of recycling <u>don't contain significant</u> <u>concentrations of hazardous constituents.</u>
  - (40 CFR 260.43(b))

Sham recycling is basically deceptive or trick recycling.

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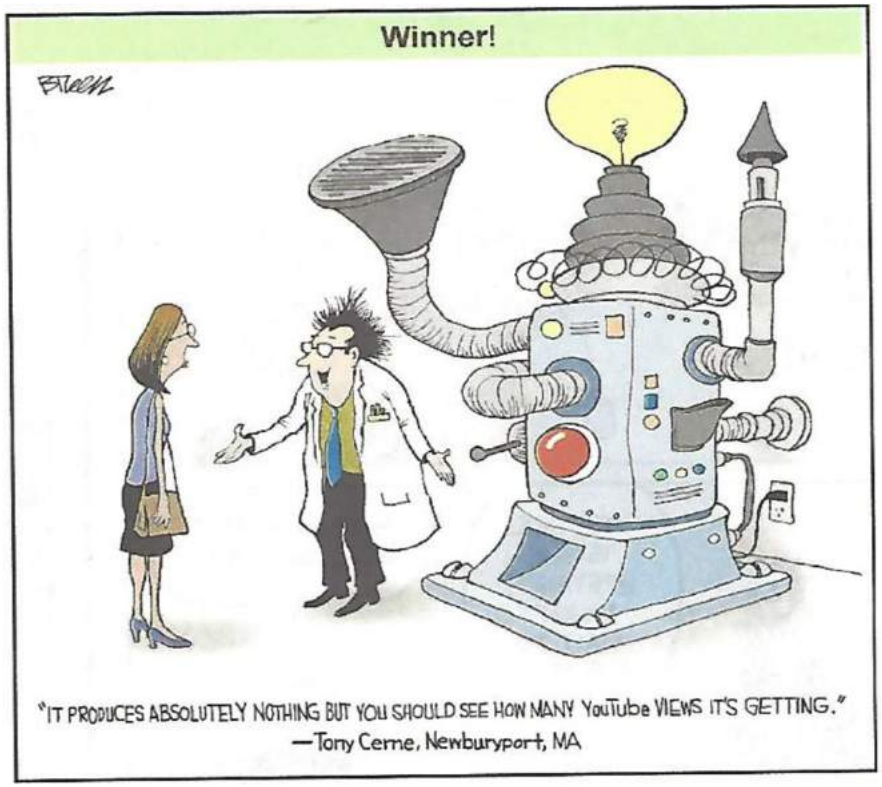
CRC1

Sham Recycling

Key Thought:
Materials that are recycled may still be subject to the RCRA program



Source:
Hickory Daily Record Comics May 2020

Slide 16

CRC1 Concepcion, Richard C, 6/1/2020

Inherently Waste-Like Material (40 CFR 261.2 (d)*

These are materials that are so hazardous they pose a substantial threat to human health and the environment even when recycled.

- Dioxin wastes with listed waste codes (F020, F021, F022, F023, F026, F028)
  - We don't know of anyone in USA who is recycling dioxin waste.

- Halogen-containing materials that are burned in halogen-acid furnaces
  - Certain facilities will burn materials that contain high concentrations of chlorinated or brominated compounds to produce products (e.g. HCl)

*These materials are solid wastes, even when they are recycled

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Example of How Solid Waste are Identified

Case study #1:

Unused benzene from a delivery truck spills on the ground and the facility owner decides not to clean up the spill.

Question:

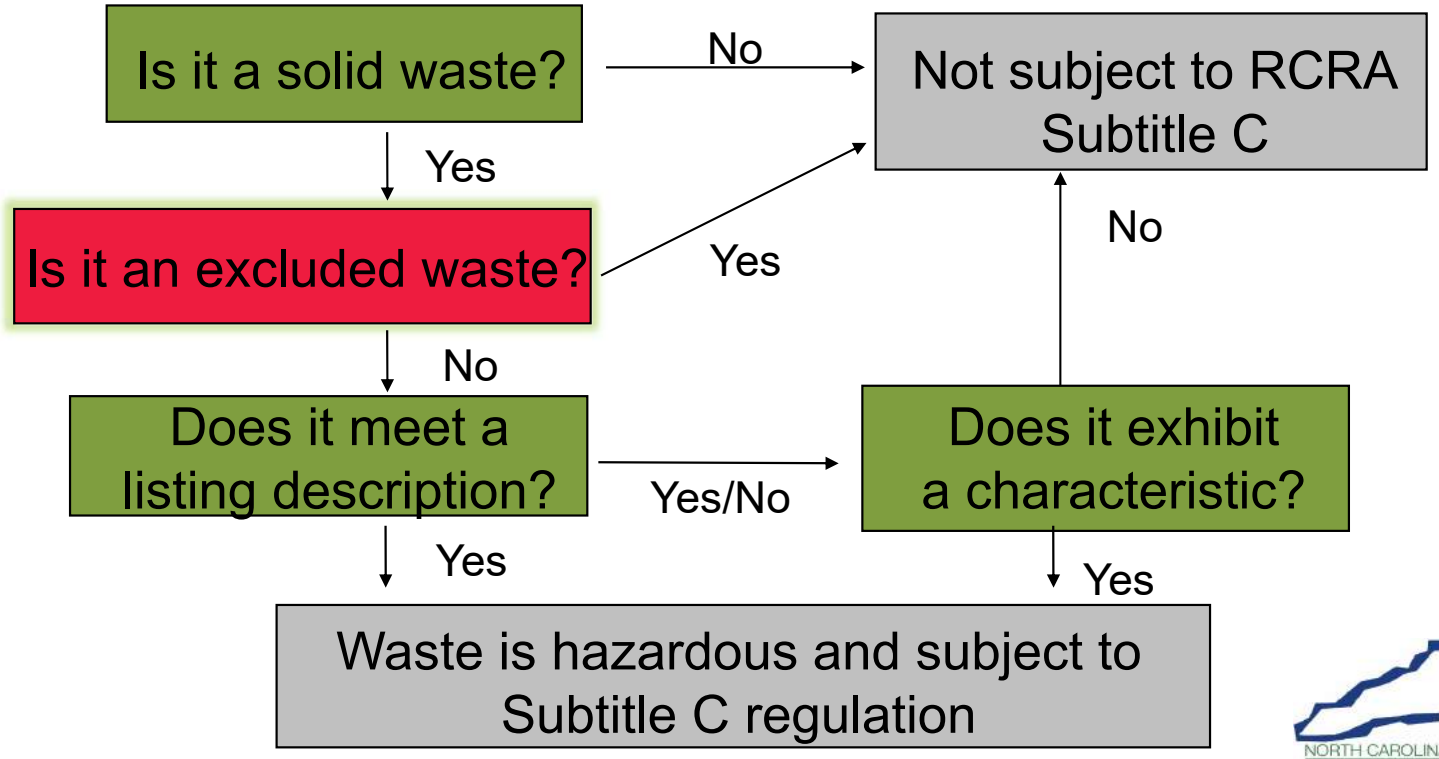
What is the status of the spilled benzene?

Answer to Question #1

If the owner decides not to clean up the spill, he/she has made the decision to "discard' the benzene. A discarded material is a **solid waste**.

If the owner does not "promptly" clean up the spill, it is considered a land disposal site subject to permitting requirements.

Hazardous Waste Determination



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Hazardous Waste Exclusions 40 CFR 261.4

40 CFR 261.4 has three sections that exclude or exempt certain secondary materials from being either a solid waste or HW

40 CFR 261.4(a) identifies materials that are not solid waste

40 CFR 261.4(b) identifies solid waste that are not HW

40 CFR 261.4(c) identifies HW which are exempted from certain regulations until the HW exits the unit(s) in which it was generated

Hazardous Waste Exclusions
40 CFR 261.4

Examples:

- **Clean Water Act** §261.4(a)(1)
  - Domestic sewage; NPDES Permit; Stormwater Permit; U.S. Army Corps of Engineers.
- **Clean Air Act** §50-94
- **Hazardous Secondary Material** being reclaimed §261.4(a)(20)
- **Shredded Circuit Boards** §261.4(a)(14)
- **Used Cathode Ray Tubes (CRT's)** §261.4(a)(22)

Solid Waste Exclusions that NOT Hazardous Waste
40 CFR 261.4(b)

Examples:

- **Household Waste** §261.4(*b*)(1)
- **Solvent Contaminated Wipes** 261.4(b)(18)(i)
- **Boiler Cleaning Solutions** §261.4(*b*)(4)(*ii*)(8)
- **Cooling Tower Blowdown** §261.4(b)(4)((ii)(E)
- **Coal Pile Run-Off** §261.4(b)(4)(ii)(A)

Exemptions

Hazardous wastes exempted from certain regulations

40 CFR 261.4(c)

Examples:

- **Analytical samples** §261.4(d)(1)
- **Airbag Waste** §261.4(j)(i)
- **Dredged Material** §261.4(g)
- **Spent lead acid batteries that will be reclaimed** §261.6(a)(2)((iv)
- **Hazardous scrap metal that will be recycled**
- §261.6(a)(2)(iii)

Is it Excluded?

- Domestic sewage and mixtures of domestic sewage (261.4(a)(1))
- Industrial point source discharges (261.4(a)(2))
- Irrigation return flows (261.4(a)(3))
- Certain radioactive secondary materials (261.4(a)(4))
- In-situ mining materials (261.4(a)(5))
- Pulping liquors (261.4(a)(6))
- Spent sulfuric acid (261.4(a)(7))
- Secondary materials reclaimed in a closed-loop process in tanks (261.4(a)(8))
- Spent wood preservatives (261.4(a)(9))
- Coke by-product wastes (261.4(a)(10))
- Splash condenser residues (261.4(a)(11))
- Oil-bearing hazardous secondary materials generated and recycled within the petroleum refining industry (261.4(a)(12))
- Excluded scrap metal (261.4(a)(13))
- Shredded circuit boards ((261.4(a)(14))
- Pulping condensates derived from Kraft mill steam strippers (261.4(a)(15))
- Mineral processing spent materials being recycled (261.4(a)(17))
- Petrochemical recovered oil (261.4(a)(18))
- Spent caustic solutions from petroleum refining (261.4(a)(19))
- Hazardous secondary materials used to make zinc fertilizers (261.4(a)(20))
- Zinc fertilizers made from hazardous secondary materials (261.4(a)(21))
- Used cathode ray tubes (CRTs) (261.4(a)(22))
- Hazardous secondary materials generated and reclaimed under the control of the generator (261.4(a)(23))
- Hazardous secondary materials transferred for the purpose of reclamation (261.4(a)(24)and (25))
- Solvent-contaminated wipes that are sent for cleaning and reuse. (261.4(a)(26))
- Higher-value solvents transferred for the purpose of remanufacturing (261.4(a)(27)

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Example of Exemptions */ Exclusions*

Case study #2:

If a laboratory disposes excess sample originally received from a sample collector and the excess sample exhibits a hazardous characteristic, who is the generator of the hazardous waste?

Answer to Question #2

The laboratory is the generator, and the waste must be managed and disposed just like any other hazardous waste.

Example of Exemptions / Exclusions

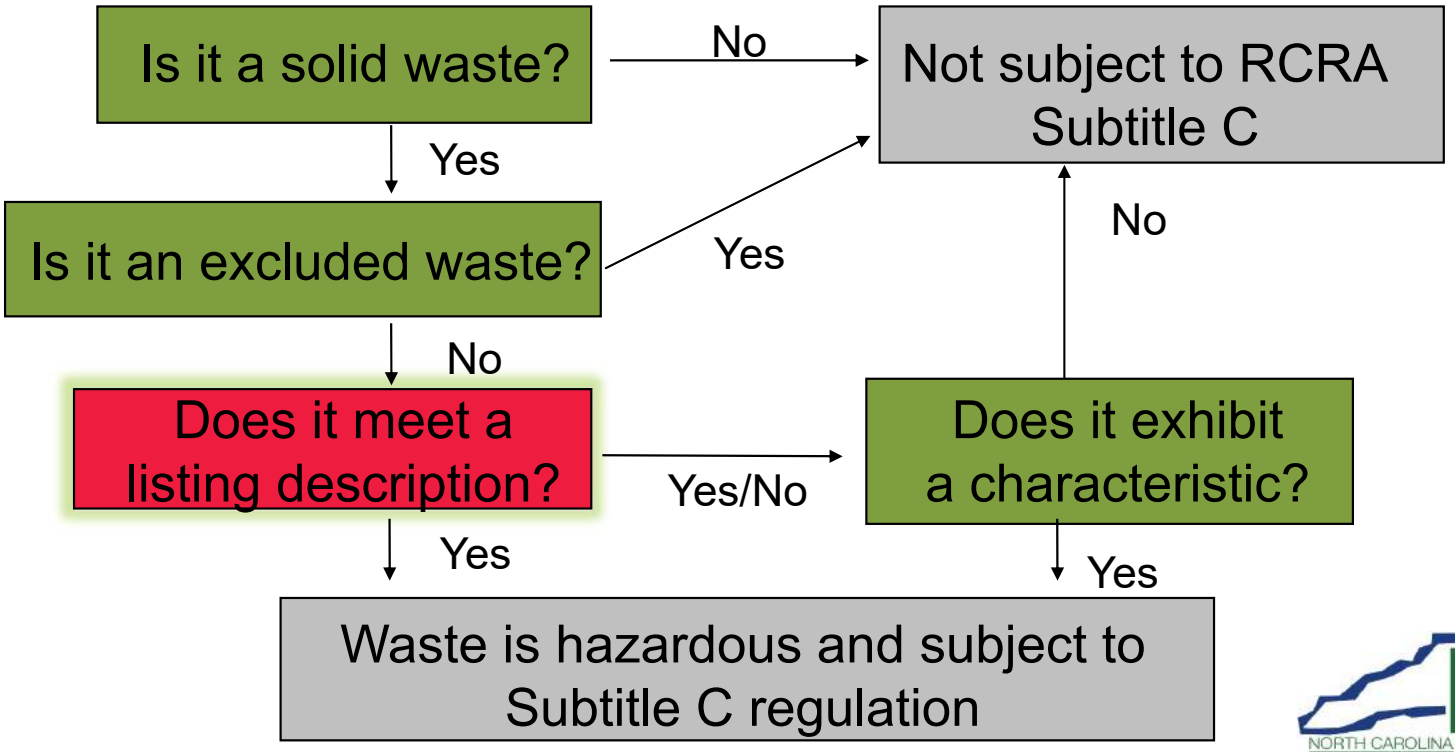
Case study #3:

Would metal wire, pellets, pins, and powder with high concentration of lead enjoy the scrap metal exemption when recycled?

Answer to Question #3

Scrap metal wire, pellets, pins, and powder meet the definition of scrap metal and would not be subject to RCRA regulation when recycled.

Hazardous Waste Determination



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Listed Hazardous Waste

A waste is determined to be a hazardous waste if it is specifically listed on one of four lists (the F, K, P and U lists) found in title 40 of the Code of Federal Regulations (CFR) in section 261.

- Generated from specific industrial sources
- Chemicals considered “acute” hazardous wastes (P-Listed or F-listed with a (H) hazard code)
- Chemicals considered “toxic” hazardous wastes
- Determination is based on knowledge, not testing

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Listed Hazardous Waste

There are four separate lists of hazardous waste

- F-list: Process waste from non-specific common sources §261.31
- K-list: Process waste from specific sources §261.32
- P-list: Unused Acutely hazardous chemicals §261.33
- U-list: Unused toxic chemicals §261.33

Listed Hazardous Waste

Hazard Codes Represent EPA's Basis for Listings 40 CFR 261.30(b)

- Ignitable waste – (I)
- Corrosive waste – (C)
- Reactive waste – (R)
- Toxicity characteristic waste – (E)
- Acute hazardous waste – (H)
- Toxic waste – (T)

Key Thought:
You must have knowledge of the waste or the process that generated it to assign listed codes

To indicate its reason for listing a waste, EPA assigns a hazard code to each waste listed on the F and K list.

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F – Listed Waste §261.31

Seven groups make up the F list:

- Spent solvent wastes (F001-F005)
- Heavy metal and cyanide wastes plating waste (F006-F012, F019)
- Dioxin-containing wastes (F020-F023, F026-F028)
- Chlorinated aliphatic hydrocarbons production wastes (F024)
- Wood preserving wastes (F032-F035)
- Petroleum refinery wastewater treatment sludges (F037 and F038)
- Multi-source leachate (F039)

The F001 – F005 Listings

Only apply if a before-use concentration threshold is exceeded

For mixtures of F001, F002, F004, and F005:

- If the total of <u>all</u> solvent constituents before use, is greater than or equal to 10 percent by volume, all appropriate listings apply to the spent solvent

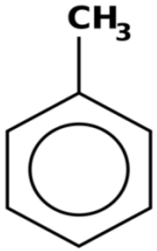
Common Spent Solvent Issues

- Solvent must be used to solubilize or mobilize
- Cleaning
- Degreasing
- Diluents
- Reaction and synthesis media
- Still bottoms from recycling spent solvents
- Solvent chemicals used as reactants or ingredients
- Process waste from liquid-liquid extraction
- Rinsewater following solvent cleaning

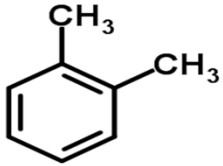
Example of F-Listed Waste

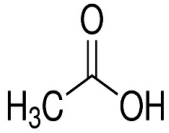
Case Study # 4

What is the regulatory status of spent solvent generated from using the solvent identified in the following SDS?



Name	CAS Number	[%]
Solvent petroleum	64742-89-8	45
Benzene, dimethyl,	1330-20-7	22.5
Benzene, methyl,	108-88-3	22.5
Acetic Acid	64-19-7	10





Answer to Question # 4

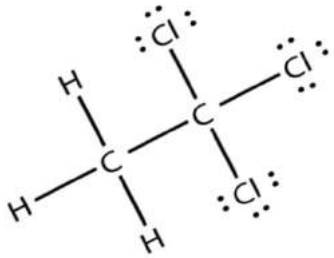
- In chemical nomenclature, the IUPAC nomenclature of organic chemistry is a method of organic chemical compounds as recommended by the International Union of Pure and Applied Chemistry.
- Benzene, dimethyl- is a synonym for xylene (on the F003 list), and Benzene, methyl- is a synonym for toluene (on the F005 list).
- Based on the F003 and F005 listing descriptions in §261.31, the spent solvent is a **F003, F005 listed Hazardous Waste.**
- Moral of the story: Environmental personnel need to get familiar with how to use Chemical Abstracts Service (CAS) number and chemical nomenclature.
- A useful web site that will help with this is call **List of Lists**, available at:

http://www.epa.gov/epcra/consolidated-list-lists

Example of F-Listed Waste

Case Study # 5

A product is used as a machining coolant during metal machining, drilling, etc. The coolant contains 80% 1,1,1-trichloroethane and 20% lubricating oil. What is the RCRA status of the coolant waste.



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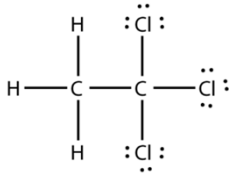
Answer to Question # 5

- The 1,1,1-trichloroethane is being used as an ingredient in product cutting oil…**not a solvent.** Assuming that it has not been mixed with **spent solvent**, the cutting-oil waste is neither F001 nor F002…



  - How do I managed the waste?
    - Used Oil Management Rules §279
      - Used oil
  - If it does not pass the halogen field testing kit used by the Used Oil Processing Facility
    - It has to be dispose as a Hazardous Waste under the D040 waste code if it exceeds a TCLP value of 0.5 mg/l
  - How do I managed a spill of the product?
    - Listed Hazardous Waste from Unused Toxic Chemicals §261.33
      - 1,1,1-trichloroethane waste code U-226

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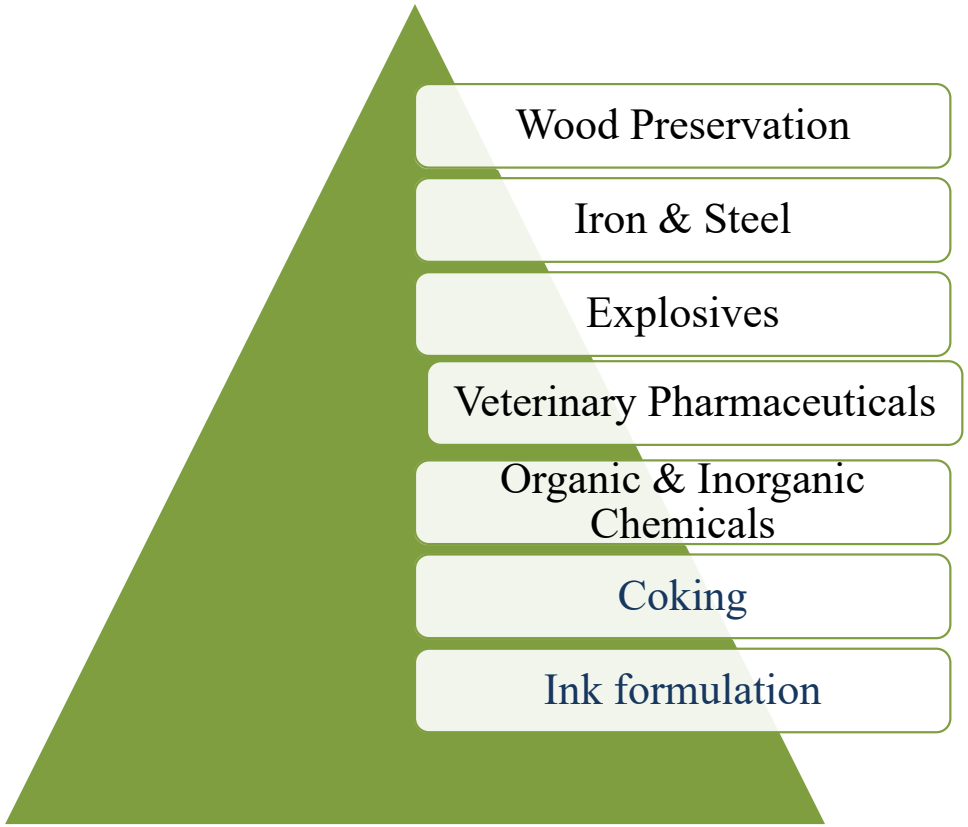
K-Listed Waste From a Specific Source



K-Waste is listed in §261.32 are known to result from specific manufacturing processes and are identified according to the industry that generates them. The listing descriptions associated with K-waste are very specific, clear, and self-explanatory.

P and U-Listed Waste §261.33

- Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof of **unused product**.
  - **P-listed waste** are unused product or chemicals that are intended for discard and are **acutely hazardous** with a Hazard Code of (H).
  - **U-listed waste** are unused product or chemicals that are intended for discard and are non-acutely hazardous waste, but toxic with a Hazard Code that can varied.
    - Ignitable waste (I)
    - Reactive Waste (R)
    - Corrosive Waste (C)

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Key Thought: Listed in—listed out…

Delisting Petition

If the waste is listed, the person may file a delisting petition under 15A NCAC 02I .0501 and 40 CFR 260.22 to demonstrate the waste from this particular site or operation is not a hazardous waste.

- VSQG
- SQG
- LQG

- Waste analysis plan
- Need at least 5 to 7 rounds of sampling (quarterly)
- All Underline Hazardous Constituents must be included
  - Appendix VIII (40 CFR 261, ~ 239 compounds)

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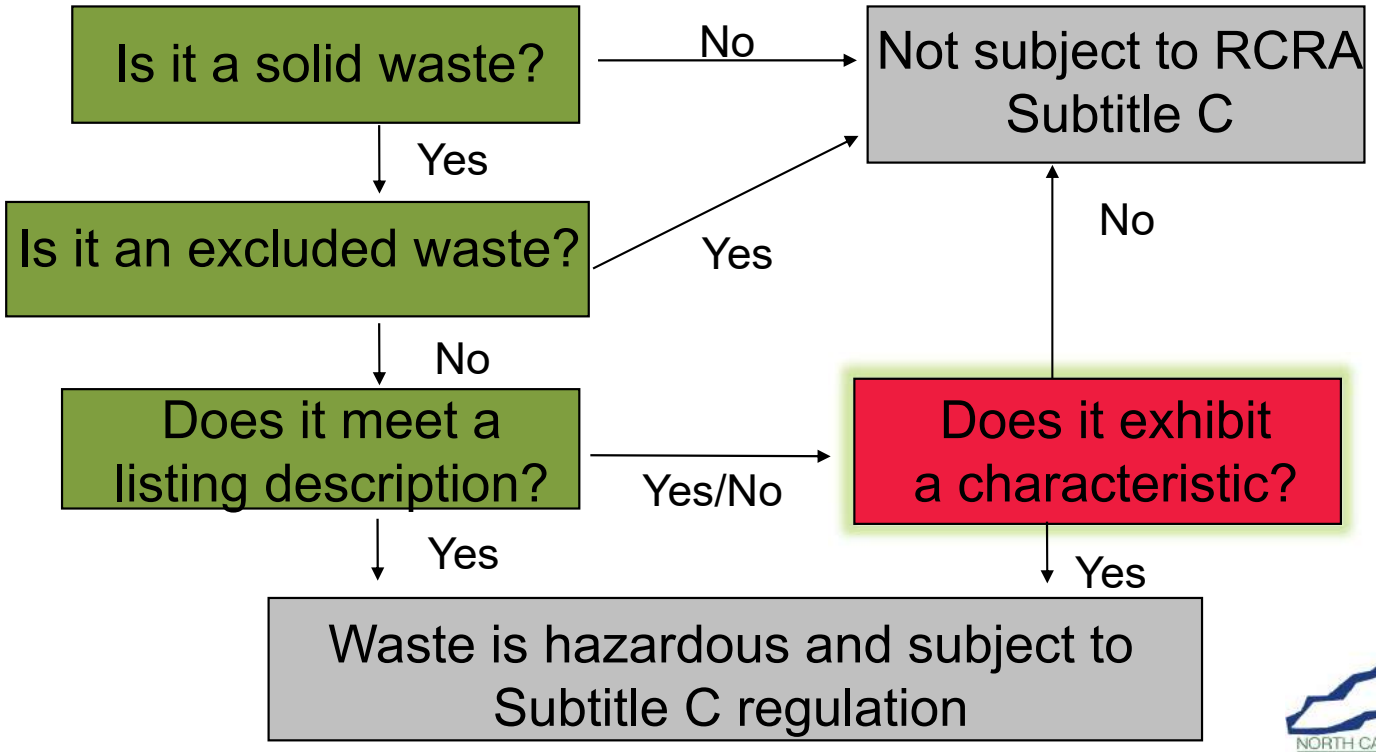
Hazardous Waste Determination



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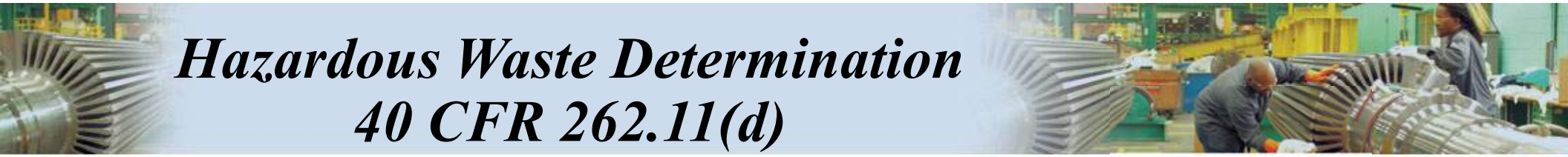
Hazardous Waste Determination 40 CFR 262.11(d)



- Acceptable knowledge may include: (Redefined)
  - process knowledge (e.g., information about chemical feedstocks and other inputs to the production process)
  - knowledge of products, by-products, and intermediates produced by the manufacturing process
  - chemical or physical characterization of wastes
  - information on the chemical and physical properties of the chemicals used or produced by the process or otherwise contained in the waste
  - testing that illustrates the properties of the waste
  - other reliable and relevant information about the properties of the waste or its constituents

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Point of Generation
40 CFR 262.11(a)

For each solid waste, the waste determination is made:

- At the **point of generation**, before dilution, mixing or other alteration of the waste occur.
- AND at any time in the course of management that the waste has, or may have, changed its properties as a results of exposure to the environment or other factors that may change the properties of the waste such that the RCRA classification of the waste may change

☑ VSQG
☑ SQG
☑ LQG

➢ *The "**point of generation**" refers to the location where **wastes** initially accumulate and is under the control of the operator of the **waste**-generating process. ...*

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Point of Generation Examples

- For wastewater generated in a pulp and paper mill bleach plant…
  - At the outlet of the plant prior mixing with other wastewater streams.
- For solvents used in parts washers…
  - When the part washer apparatus is removed from the container.
- For baghouse dust generated from a manufacturing operation…
  - When the waste is removed from the baghouse hoppers.
- For P- or U-listed chemicals…
  - When they are intended to be discarded…
- For waste filter cake being placed into a roll-off box, on the conveyor belt…
  - As the waste inters the roll-off box.

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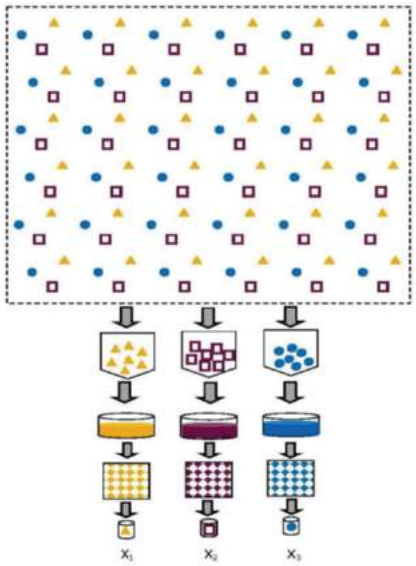
Point of Generation Example Remediation Sites

- For contaminated soil or ground water…
  - When the soil is excavated, or the ground water is pumped out of the ground.



Point of Generation
RCRA Organic Emission Standards

- For RCRA Organic Air Emissions Standards Part AA/BB/CC)
  - TCLP analysis is **NOT** used for waste determination, Volatile Organic Concentrations in the waste stream use Air Method 25D
  - **Point of Origination**
  - The **point** of waste **origination** means the **point** where a solid waste produced by a system, process, or waste management unit is determined to be a **hazardous waste** as defined in 40 CFR part 261

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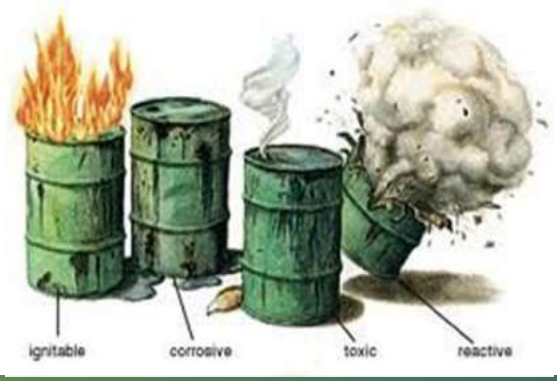
Characteristic Hazardous Waste

- Ignitability Waste — D001
- Corrosive Waste — D002
- Reactive Waste — D003

} ICR Parameters

- Toxic Waste — D004-D043 → Toxicity Parameters

Key Thought:
A waste is characteristic if it exhibits a generic property independent of its source.



Waste codes listed in 40 CFR 261.24 for Toxic Chemicals of Concern

TCLP Metals and Volatile Organic Compounds, Pesticides, Semi-Volatile Organic Compounds and Herbicides

Metals

Contaminant	EPA HW #	Regulatory Level
Arsenic	D004	5.0 mg/L
Barium	D005	100.0 mg/L
Cadmium	D006	1.0 mg/L
Chromium	D007	5.0 mg/L
Lead	D008	5.0 mg/L
Mercury	D009	0.2 mg/L
Selenium	D010	1.0 mg/L
Silver	D011	5.0 mg/L

Pesticides

Contaminant	EPA HW #	Regulatory Level
Chlordane	D020	0.03 mg/L
Endrin	D012	0.02 mg/L
Heptachlor (and its epoxide)	D031	0.008 mg/L
Lindane	D013	0.4 mg/L
Methoxychlor	D014	10.0 mg/L
Toxaphene	D015	0.5 mg/L

Herbicides

Contaminant	EPA HW #	Regulatory Level
2,4-D	D016	10.0 mg/L
2,4,5-TP (Silvex)	D017	1.0 mg/L

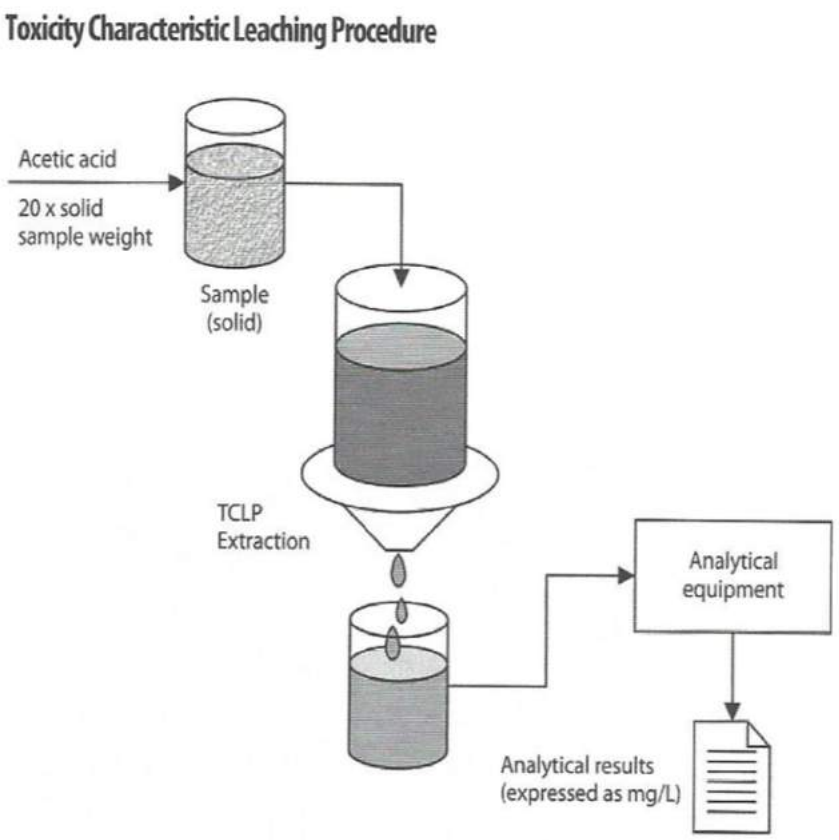
Volatile Organic Compounds

Contaminant	EPA HW #	Regulatory Level
Benzene	D018	0.5 mg/L
Carbon tetrachloride	D019	0.5 mg/L
Chlorobenzene	D021	100.0 mg/L
Chloroform	D022	6.0 mg/L
1,2-Dichloroethane	D028	0.5 mg/L
1,1-Dichloroethylene	D029	0.7 mg/L
Methyl ethyl ketone	D035	200.0 mg/L
Tetrachloroethylene	D039	0.7 mg/L
Trichloroethylene	D040	0.5 mg/L
Vinyl chloride	D043	0.2 mg/L

Semi-Volatile Organic Compounds

Contaminant	EPA HW #	Regulatory Level
o-Cresol	D023	200.0 mg/L
m-Cresol	D024	200.0 mg/L
p-Cresol	D025	200.0 mg/L
Cresol	D026	200.0 mg/L
1,4-Dichlorobenzene	D027	7.5 mg/L
2,4-Dinitrotoluene	D030	0.13 mg/L
Hexachlorobenzene	D032	0.13 mg/L
Hexachlorobutadiene	D033	0.5 mg/L
Hexachloroethane	D034	3.0 mg/L
Nitrobenzene	D036	2.0 mg/L
Pentachlorophenol	D037	100.0 mg/L
Pyridine	D038	5.0 mg/L
2,4,5-Trichlorophenol	D041	400.0 mg/L
2,4,6-Trichlorophenol	D042	2.0 mg/L

Hazardous Waste Determination 40 CFR 262.11(d)(1)



- A test other than a test method set forth in subpart C of 40 CFR part 261, or an equivalent test method approved by the Hazardous Waste Section under 40 CFR 260.21, may be used as part of the person's knowledge to determine whether a solid waste exhibits a characteristic of hazardous waste.

Ignitability / D001
40 CFR 261.21

Old Definition

- Liquid other than an aqueous solution containing less than 24 percent alcohol by volume and has flash point less than 60 °C (140 °F)
- Liquid identified by paint filter test or pressure filtration
- Solid that burns vigorously due to friction, moisture absorption, or spontaneous ignition
- Ignitable compressed gas
- Oxidizer or organic peroxide

New Definition
September 2020

- Liquid, other than a solution containing less than 24 percent alcohol by volume and at least 50 percent water by weight, that has a flash point less than 60 °C (140 °F)

(Redefined)

Corrosivity / D002
40 CFR 261.22

- Aqueous with a pH $\leq$ 2 or $\geq$ 12.5
  - Aqueous means at least 20% water by volume
  - It less the 20% aqueous, use next method

- A liquid and corrodes carbon steel at a rate >0.25 in/yr.

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Reactivity / D003
40 CFR 261.23

- Normally unstable and readily undergoes violent change w/o detonating
- Reacts violently with water
- Forms potentially explosive mixtures with water
- Generates toxic gases when mixed with water
- Cyanide or sulfide bearing waste that can generate toxic gases
- Forbidden explosive per DOT regulations
- No test methods available for determining reactivity

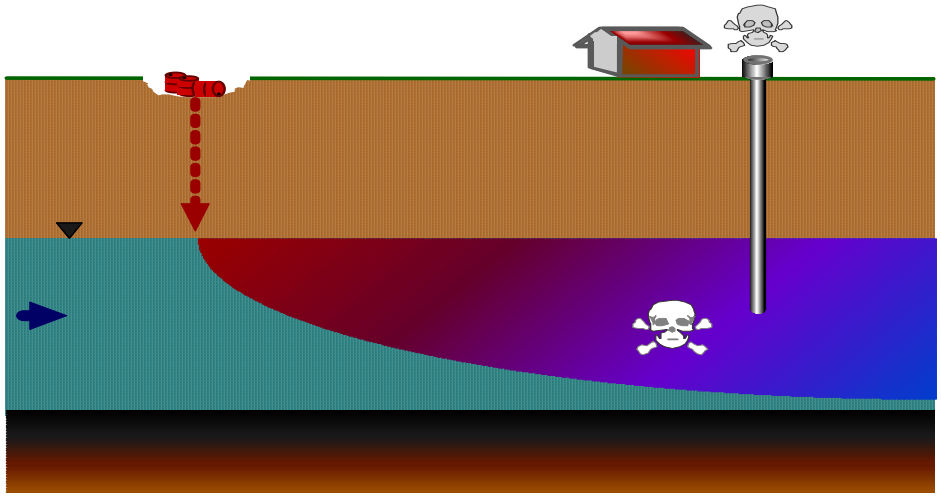
Interested parties can contact EPA's National Enforcement Investigation Center (NEIC) at 303-462-9000.

Reactivity / D003
40 CFR 261.23

D003 Reactive Waste	D003 Reactive Waste
Aluminum alkyls	Sodium
Ammonium Fulminate	Sodium-potassium alloy
Gold cyanide	Sodium sulfide
Lead azide	Silver cyanide
Lithium	Silver picrate (dry)
Nitroglycerine	Trinitrotoluene
Potassium sulfide	White Phosphorous
Pentaerythrite tetranitrate	Zinc Powder

Toxicity / D004-D043
40 CFR 261.24

Wastes that are hazardous due to the toxicity characteristic are harmful when ingested or absorbed. Toxic wastes present a concern as they may be able to leach from waste and pollute groundwater.



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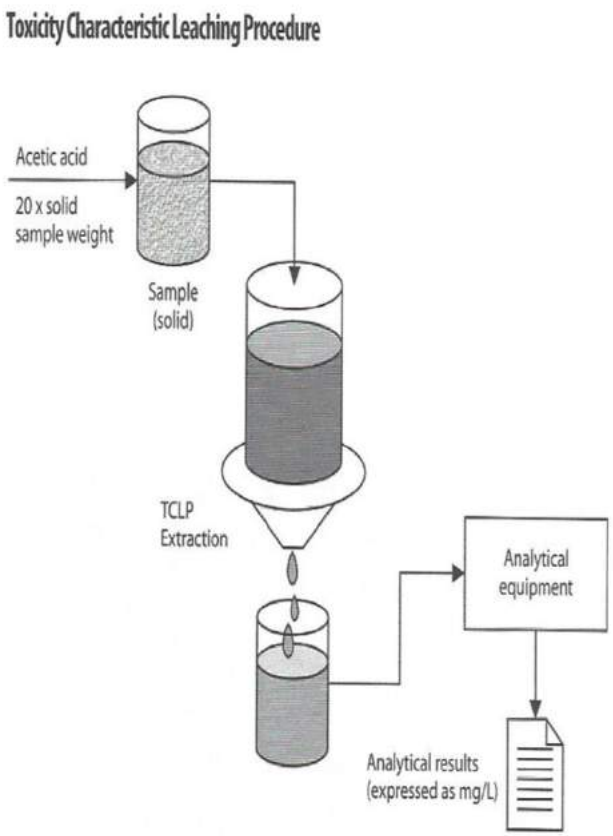
Toxicity / D004-D043
40 CFR 261.24

- Based on Toxicity Characteristic Leaching Procedure (TCLP)
- It simulates the processes that would occur in a landfill if industrial waste are co-disposed with other types of waste
- A sample of waste is mixed with twenty times the sample weight of acetic acid and the resulting mixture is then agitated for 18 hours
- Extract leachate with an acid
- At the end of the agitation period, the acidic liquid phase, call the extract is analyzed
- If any of the 40 constituents are present above the regulatory level of slide 51 of this presentation, the waste is a hazardous waste, and it carries the waste code associated with that constituent.



Toxicity / D004-D043
40 CFR 261.24

- What about liquid wastes.
  - Liquid waste is filter (<0.5% filterable solids)
  - Analyze for total concentration of toxic characteristic parameter
  - Compare results directly to regulatory levels
  - If any of the 40 constituents are present above the regulatory level of slide 51 of this presentation, the waste is a hazardous waste and it carries the waste code associated with that constituent.

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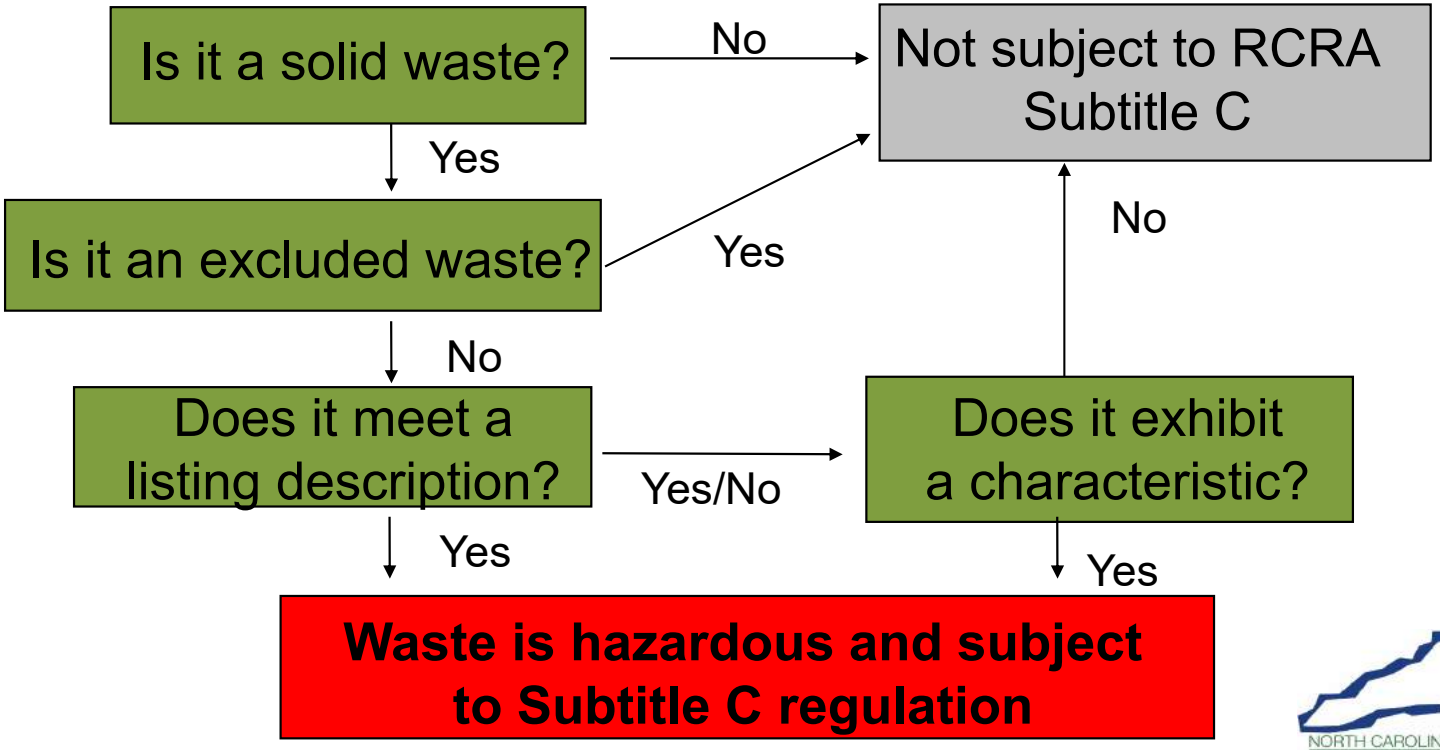
Hazardous Waste Determination



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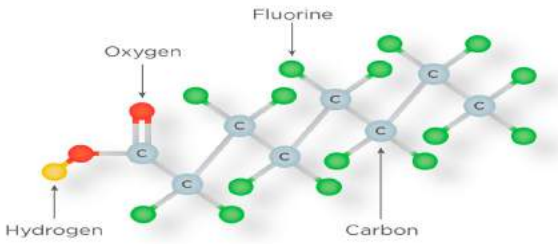
Other Contaminants to Be Aware of

- Polychlorinated Biphenyl PCB's are regulated under Toxic Substances Control Act (TSCA) of 1976. EPA Region 4 regulates PCB's in North Carolina.

- Asbestos are regulated under TSCA and North Carolina Department Health and Human Services.

- Emerging Contaminants, e.g. per and poly-fluoroalkyl substances (PFAS)
  - Ms. Amy Delinsky, PhD. Env. Chemist, 919.896.1505
  - Mr. Mark Webb, Env. Specialist, 984.459.0084



Emerging Contaminants PFAS

- PFAS Substances:
  - More than 25,000 compounds
  - Compounds that repeal water, stains and grease.
  - Wide variety of chemical structures
  - Chain of aliphatic organic compound surrounded by fluorine atoms
  - Used in homes, businesses, and industry since the 1940
  - Detected in soil, water, fish and air samples
  - Resist decomposition in the environment and in the human body

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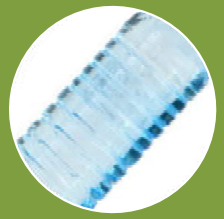
Emerging Contaminants PFAS

Targeting the mayor five (5) types of industries that intersect Water, Waste and Air.

Solid Waste Landfill

Pharmaceutical Manufacturing



Plastic & Resin Manufacturing

Semiconductor Industry

Organic Chemical Manufacturing

Emerging Contaminants PFAS

- North Carolina is ahead of all EPA regions (10) related with studies conducted over PFAS compounds.
- Besides the TCLP waste determination, the HW Section may required testing waste for PFAS compounds
  - EPA method 537.1; ~18 compounds
  - EPA method 1633; ~40 compounds
- Health advisory levels (HALs): June 2022 EPA releases drinking water
  - PFOA: .004 ppt (interim)
  - PFOS: .02 ppt (interim)
  - GenX: 10 ppt (final)
  - PFBS: 2,000 ppt (final)

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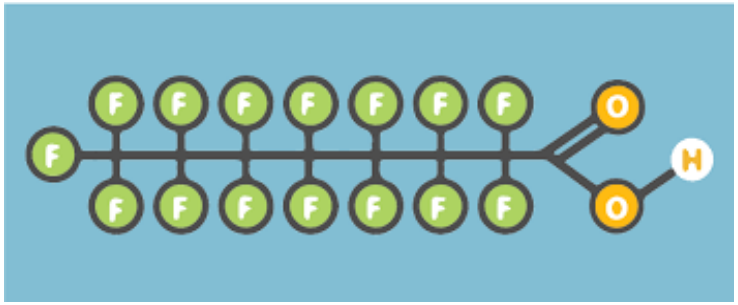
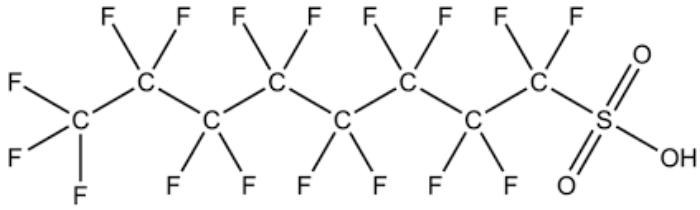
Emerging Contaminants PFAS

- **PFOA… what does that stand for?**
  - **P = Per**
  - **F = Fluorine**
  - **O = Oct in organic chemistry is 8**
  - **A = Acidic organic radical**
  - **Perfluroocanoic acid**



- **PFOS…**
  - **P = Per**
  - **F = Fluorine**
  - **O = Oct in organic chemistry is 8**
  - **S = Sulfonic organic radical**
  - **Perflurooctanesufonic acid**



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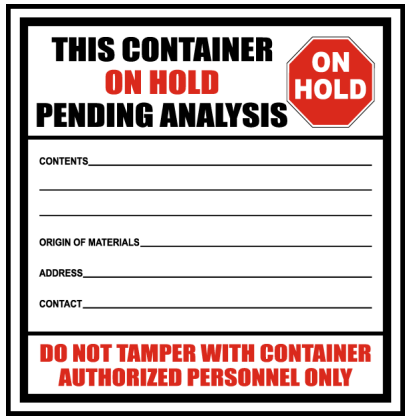
Example of Characteristic Waste

Case Study # 6

A waste mixture has a flash point of 120º F and TCLP results showing the following data:

Parameter	Concentration	TCLP regulatory limit
Ignitability	120º F	<140º F
Cadmium	0.7 mg/l	1.0 mg/l
Chromium	8.1 mg/l	5.0 mg/l
Lead	5.1 mg/l	5.0 mg/l



What is the regulatory status of the mixture when sent for incineration?

Reminder: *Compliance with HW requirements must occur beginning at the point of generation. Not when test results come back*

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Answer to Question # 6

- The regulation in §261.24 state that the toxicity characteristic applies if " the extract from a representative sample of the waste contains any of the contaminants listed in the table of slide 57 of this presentation

Parameter	Concentration	TCLP regulatory limit	Waste Code
Ignitability	**120º F**	<140º F	**D001**
Cadmium	0.7 mg/l	1.0 mg/l	Non-HW
Chromium	**8.1 mg/l**	5.0 mg/l	**D007**
Lead	**5.1 mg/l**	5.0 mg/l	**D008**

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Example of Characteristic Waste

Case Study # 7

Due to a very difficult matrix sample and due to analytical interference to run a TCLP, leachate value (*mg/l*) for the parameter of chromium concentration.

The laboratory was able to analyze for total chromium, total value (*mg/kg*).

The result came out to be 80 *mg/kg*.

Is the waste hazardous?

Answer to Question # 7

The waste will **not** be a hazardous waste for chromium…

-Sample must be 100% solid matrix

-80 mg/kg / 20 = 4 mg/l

MTLC: Maximum Theorical Leachate Concentration

- 5.0 mg/l us the TCLP regulatory level for Cr
- The waste is not a hazardous waste.

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Unknown Waste

- How do I manage a waste that I have no knowledge how it was generated?

Unknown Waste

- A hazardous waste determination per 40 CFR 262.11 must be performed using representative samples of each container of unknown materials; using EPA approved test methods to determine if they exhibit any of the following hazardous waste characteristics:

- Ignitibility (40 CFR 261.21) Oxidizers per 40 CFR 261.21(a)(4)
- Corrosivity (40 CFR 261.22)
- Reactivity (40 CFR 261.23)
- Toxicity (40 CFR 261.24): Run a TCLP for all 40 constitutes listed in 40 CFR 261.24. This includes RCRA metals, pesticides, herbicides, volatile organics, and semi volatile organics.
- Tentatively Identified Compounds: The ten (10) highest results under volatile and semi-volatile organics compounds should be submitted (only for spills)

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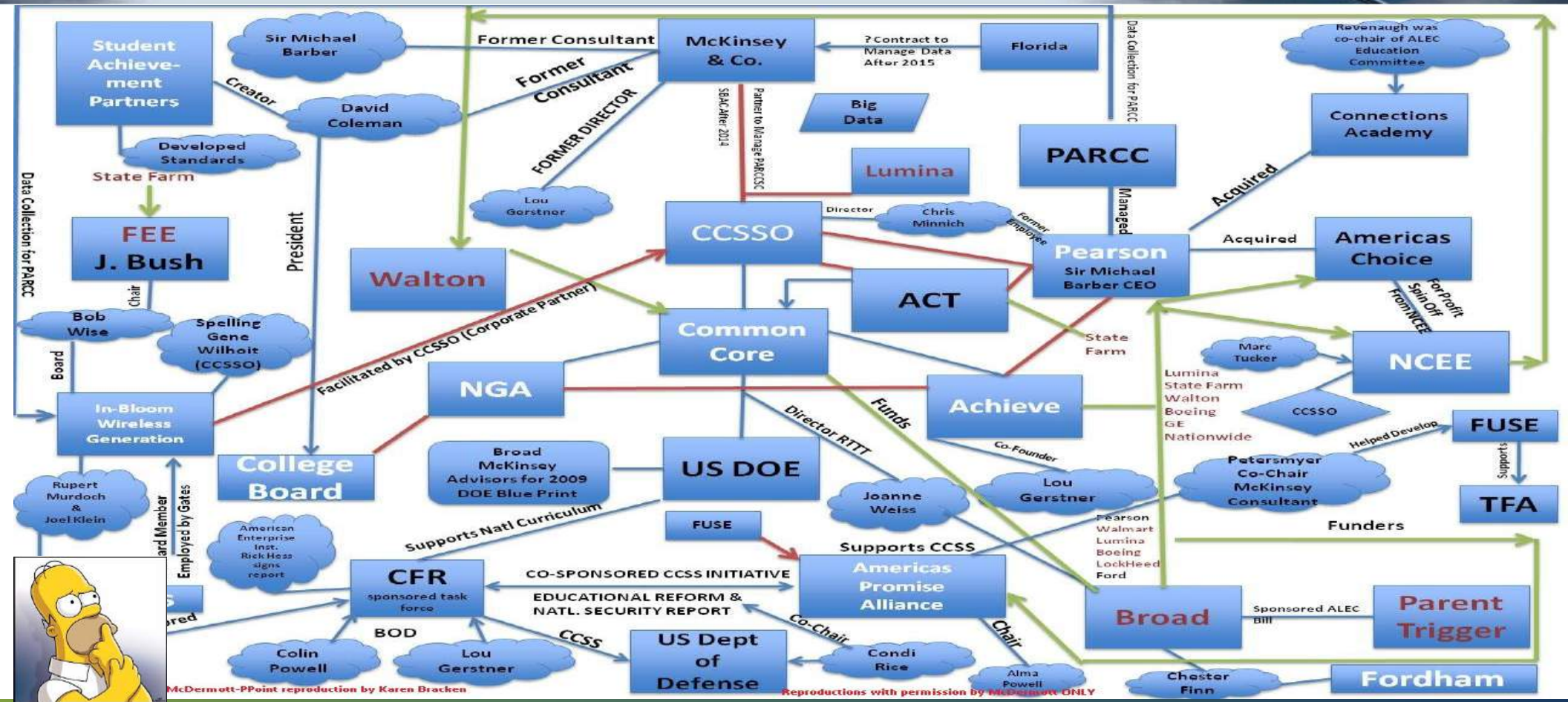
Waste Determination Issues 2023 (A)

- During a CEI, waste analysis records were requested for a container that has oily rags.
- The facility did not have any records.
- A TNOV was issue for not having a accurate waste determination.
- Facility sends a sample for TCLP analytical.
  - Sample pass, but almost trigger the parameter of tetrachloroethylene (0.7 mg/l).
- Tetrachloroethylene was used as a solvent.
  - Oily rags contaminated with used solvent (F002).
  - For the past 3-years oily rags were dispose from the facility as non-hazardous waste
- Used Oil container was contaminated also with F002.
  - For the past 3-years used oil was managed improperly.
  - Including the oily rags and used oil containers that should have been remove as F002, the facility category went from SQG to LQG.

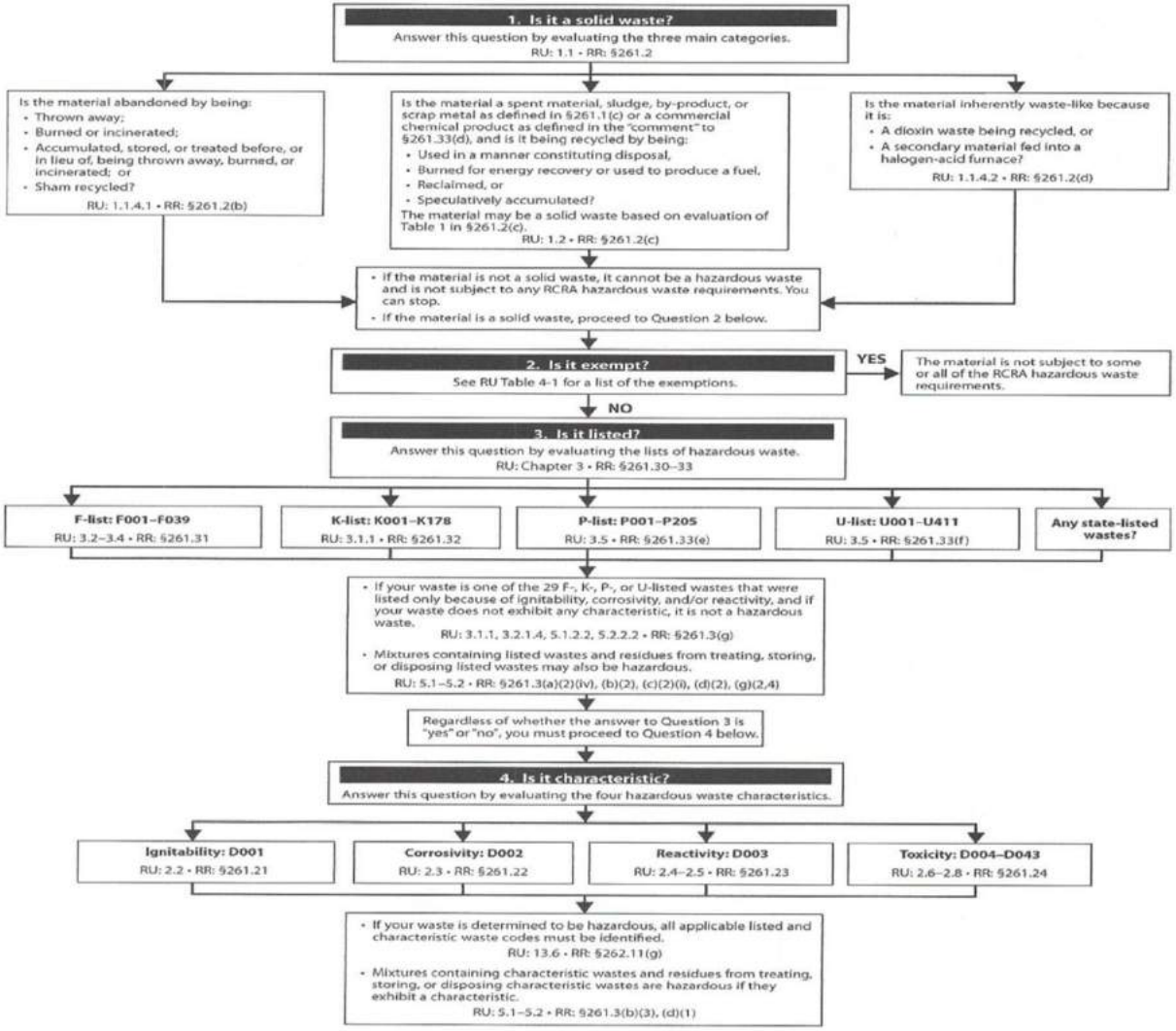
Waste Determination Issues 2023 (B)

- During a CEI, waste analysis records where requested for a waste stream that was being dispose as **Non-RCRA Regulated Material**
- Facility indicated that the TSDF did the waste determination for them based on the SDS
- Copy of the SDS was requested
  - **SDS indicated "Trade Secret" concentration of 50%, unknown acute toxicity or mixture consists of ingredients of unknown toxicity**
- A TNOV was issue for not having a accurate waste determination.
- Facility sends a sample for TCLP analytical.
- The results confirmed that the waste is non-hazardous.

Flowchart Determining Hazardous Waste



Road Map for Determining If Your Material Is a Hazardous Waste



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Questions?