HAZARDOUS WASTE IDENTIFICATION FUNDAMENTALS

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Tu-B3

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Training Topics

1. Hazardous waste laws
2. Is it a waste?
3. Is it excluded or exempted?
4. Is it a listed hazardous waste?
5. Does it display a characteristic of hazardous waste?
6. The mixture and derived-from rules
7. The meaning of Appendix X
8. Self-classification options

Hazardous Waste Laws

Where to find waste classification statutes and regulations:

- Federal

- California

Hazardous Waste Laws

Where to find waste classification statutes and regulations:

- Federal
  - _____ (RCRA) – Title 42 U.S. Code, Ch. 82, Subchapter III
- California

Hazardous Waste Laws

RCRA §1004(5) defines hazardous waste:

- A solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may
  - (a) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or
  - (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

Hazardous Waste Laws

Where to find waste classification statutes and regulations:

- Federal
  - _____ (RCRA) – Title 42 U.S. Code, Ch. 82, Subchapter III
  - 40 CFR Parts 260-279, especially Part 261
- California

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  - 40 CFR Parts 260-279, especially Part 261
- California
  - Health and Safety Code, Division 20, Chapter 6.5 - Hazardous Waste Control Law

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HEALTH AND SAFETY CODE - HSC

DIVISION 20. MISCELLANEOUS HEALTH AND SAFETY PROVISIONS [24000 - 26275] *(Division 20 enacted by Stats. 1939, Ch. 60.)*

CHAPTER 6.5. Hazardous Waste Control [25100 - 25259] *(Chapter 6.5 added by Stats. 1972, Ch. 1236.)*

ARTICLE 4. Listings [25140 - 25145.4] *(Article 4 added by Stats. 1972, Ch. 1236.)*

25141. (a) The department shall develop and adopt by regulation criteria and guidelines for the identification of hazardous wastes and extremely hazardous wastes.

(b) The criteria and guidelines adopted by the department pursuant to subdivision (a) shall identify as hazardous waste or combinations of waste that, because of the quantity, concentration, or physical, chemical, or infectious characteristics of the waste, may do either of the following:

(1) Cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness.

(2) Pose a substantial present or potential hazard to human health or the environment, due to factors including, but not limited to, carcinogenicity, acute toxicity, chronic toxicity, bioaccumulative properties, or persistence in the environment, when improperly treated, stored, transported, or disposed of, or otherwise managed.

Hazardous Waste Laws

Where to find waste classification statutes and regulations:

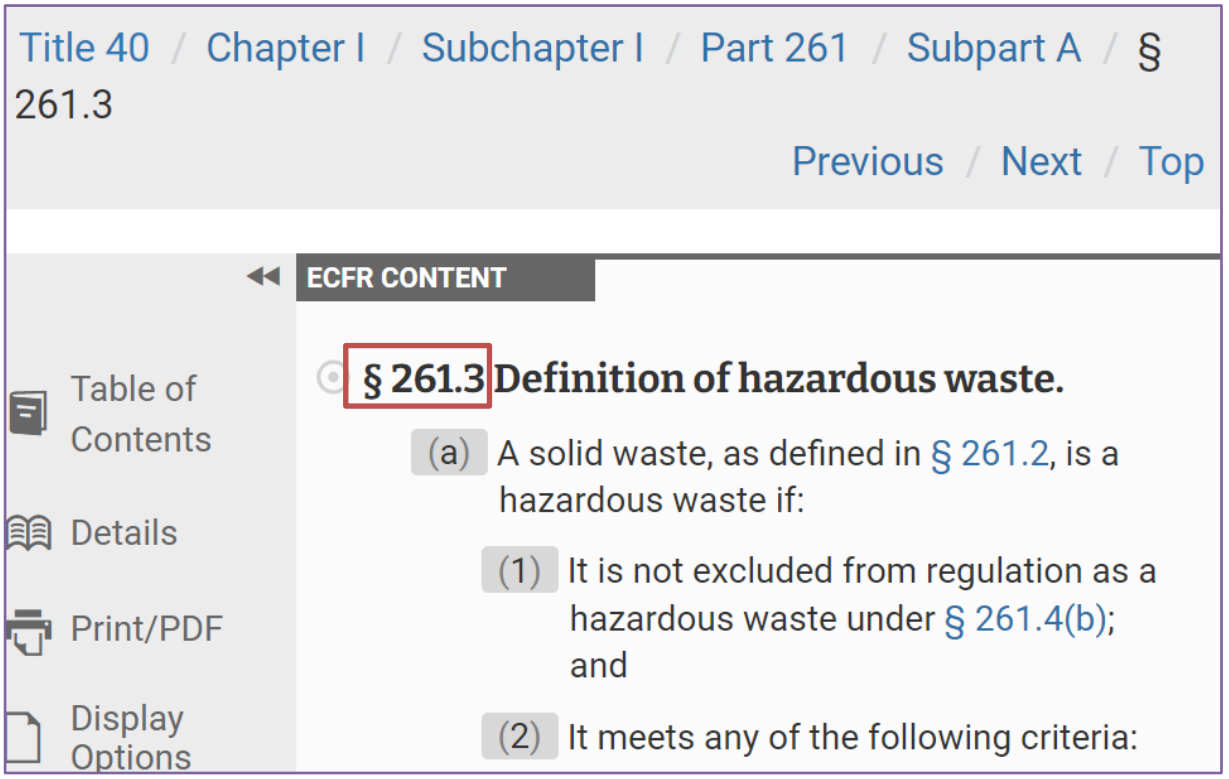
- Federal
  - Resource Conservation and Recovery Act (RCRA) – Title 42 U.S. Code, Ch. 82, Subchapter III
  - 40 CFR Parts 260-279, especially Part 261
- California
  - Health and Safety Code, Division 20, Chapter 6.5 - Hazardous Waste Control Law
  - California Code of Regulations, Title 22, Division 4.5 – especially Chapter 11

Chapter 11. Identification and Listing of Hazardous Waste

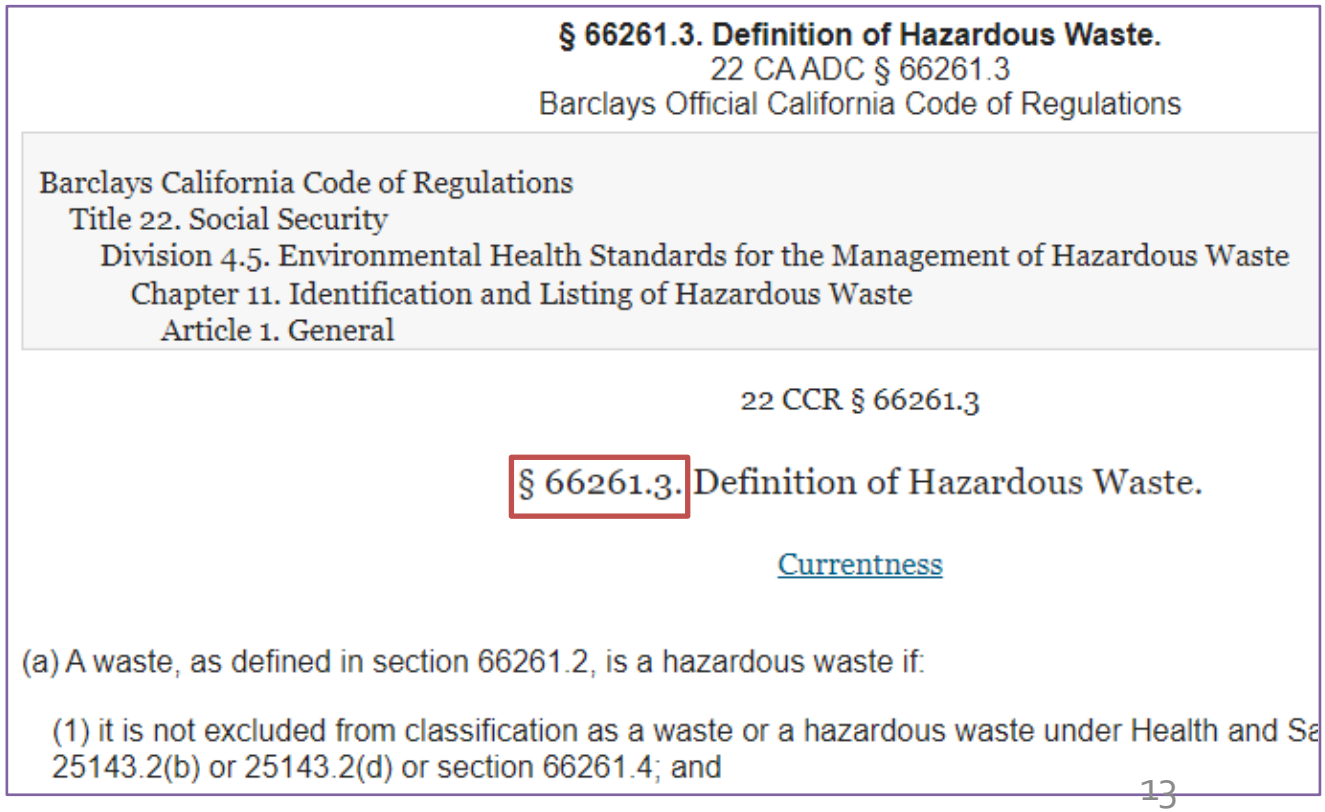
Hazardous Waste Laws

Correlation between 40 CFR and Title 22

40 CFR
(Federal Regulations)



22 CCR
(California Regulations)



Hazardous Waste Laws

California has been a leader in hazardous waste regulation

Department of Toxic Substances Control

California had hazardous waste regulations in 1972

RCRA passed in 1976, regulations adopted beginning in 1980

California's requirements are "more stringent" and "broader in scope" than the federal hazardous waste rules.

Hazardous Waste Laws

RCRA / non-RCRA Waste Classification

- "RCRA hazardous wastes"
  - Hazardous waste according to 40 CFR Part 261
  - Would be hazardous waste in any state
- "non-RCRA hazardous wastes"
  - Identified as hazardous waste in California, but not under the federal rules.
  - Informally called "California-only" hazardous wastes

Hazardous Waste Laws

- Generally, California's statutes and regulations contain all hazardous waste requirements that apply in California.
- However, we do have to use "both books" (40 CFR and 22 CCR)

California did not adopt all the federal exclusions/exemptions.

Example: U.S. EPA excludes as solid wastes hazardous secondary materials used to make zinc fertilizers, with certain conditions; California did not adopt this exclusion

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Hazardous Waste Determination Process

Step 1	Is it a waste?
Step 2	Excluded or exempted?
Step 3	Listed?
Step 4	Characteristic?

Is it a Waste? – See 22 CCR § 66261.2

§ 66261.2. Definition of Waste.

Currentness

(a) "Waste" means any discarded material of any form (for example, liquid, semi-solid, solid or gaseous) that is not excluded by section 66261.4(a) or section 66261.4(e) or that is not excluded by Health and Safety Code section 25143.2(b) or Health and Safety Code section 25143.2(d).

(b) A discarded material is any material which is any of the following:

(1) relinquished as explained in subsection (c) of this section; or

(2) recycled, as explained in subsection (d) of this section; or

(3) considered inherently waste-like, as explained in paragraph (e) of this section.

(c) A material is a waste if it is relinquished by being any of the following:

(1) disposed of;

(2) burned or incinerated;

(3) accumulated, stored or treated, but not recycled, before or in lieu of, being relinquished by being disposed of, burned or incinerated.

(d) A material is a waste if it is recycled, or accumulated, stored or treated before recycling, by being managed:

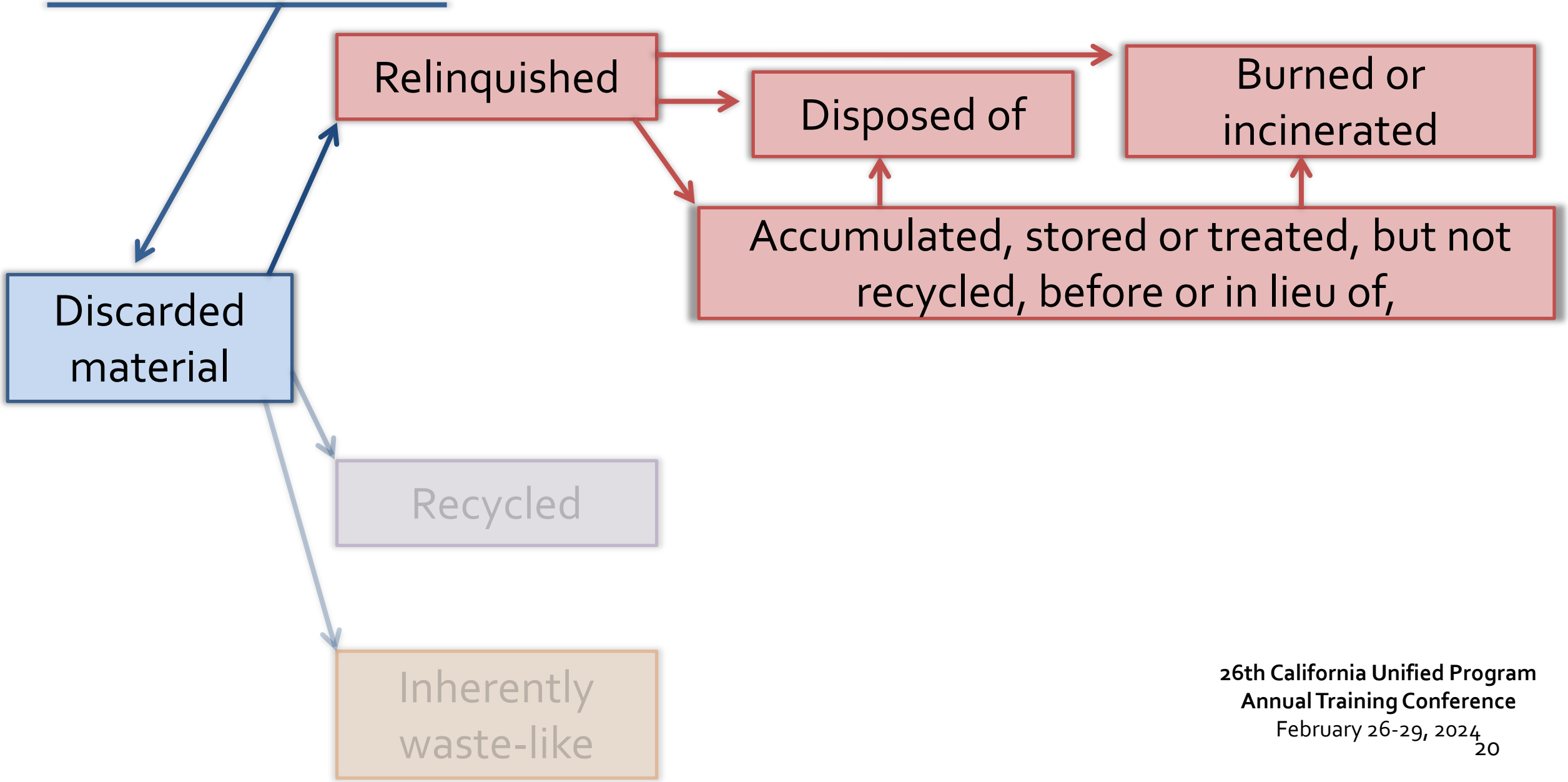
(1) through being used in a manner constituting disposal:

(A) materials noted with an "*" in column 1 of Table I are wastes when they are:

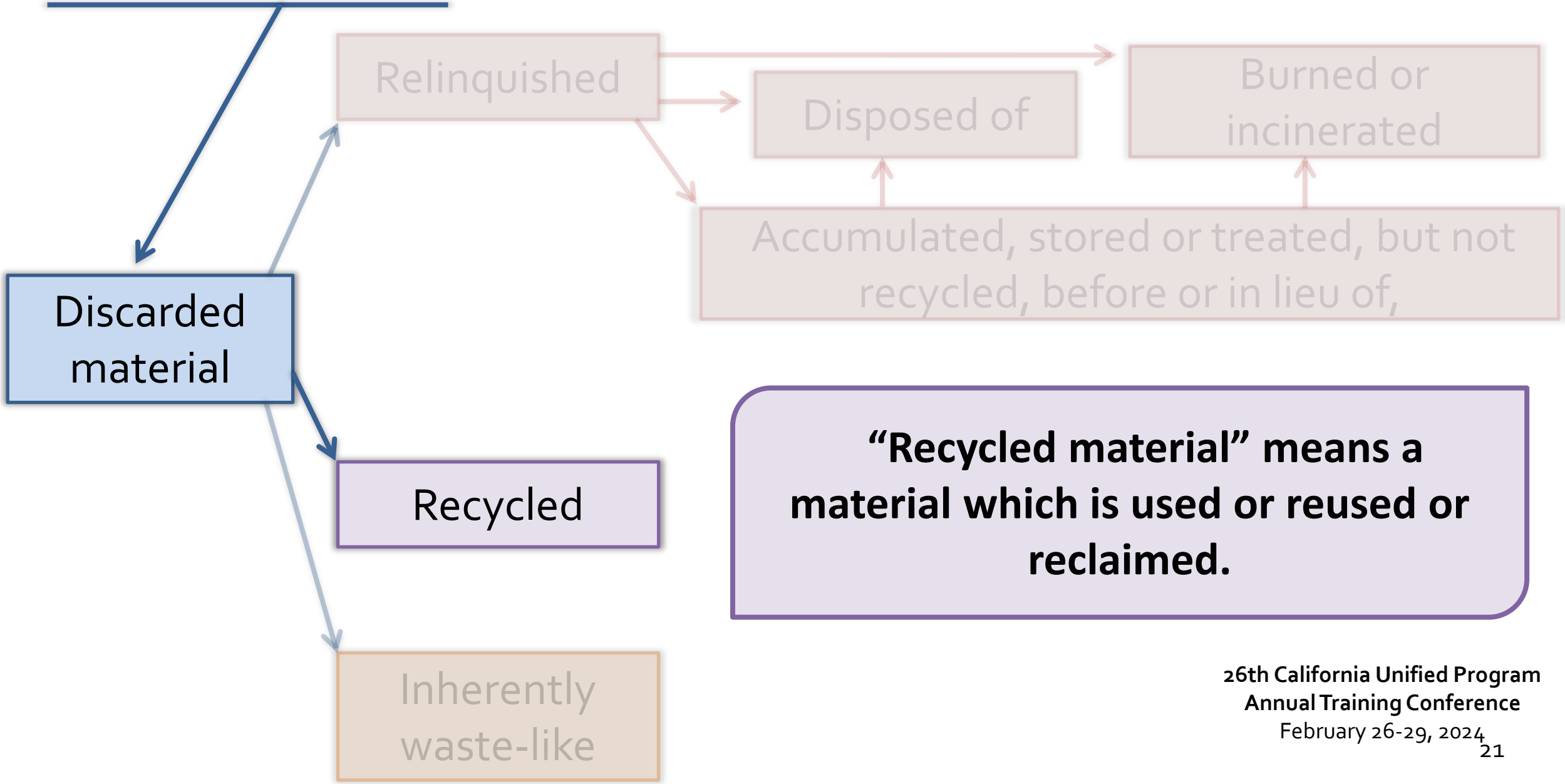
1. applied to or placed on the land in a manner that constitutes disposal; or

2. used to produce products that are applied to or placed on the land or are otherwise contained in products that are applied to or placed on the land (in which cases the product itself is a waste);

Is it a Waste? – See 22 CCR § 66261.2



Is it a Waste? – See 22 CCR § 66261.2



"Recycled material" means a material which is used or reused or reclaimed.

Is it a Waste? – See 22 CCR § 66261.2

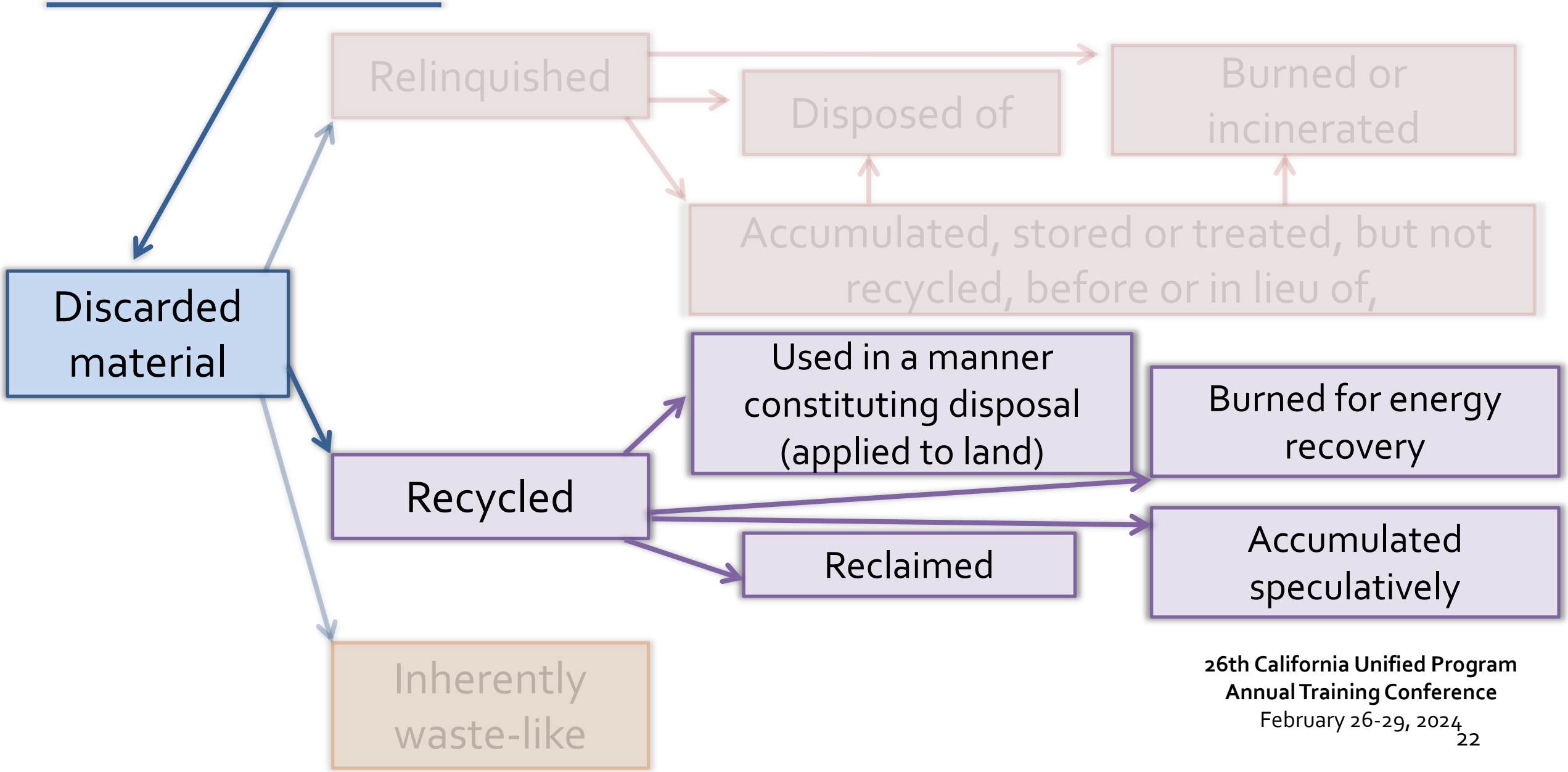
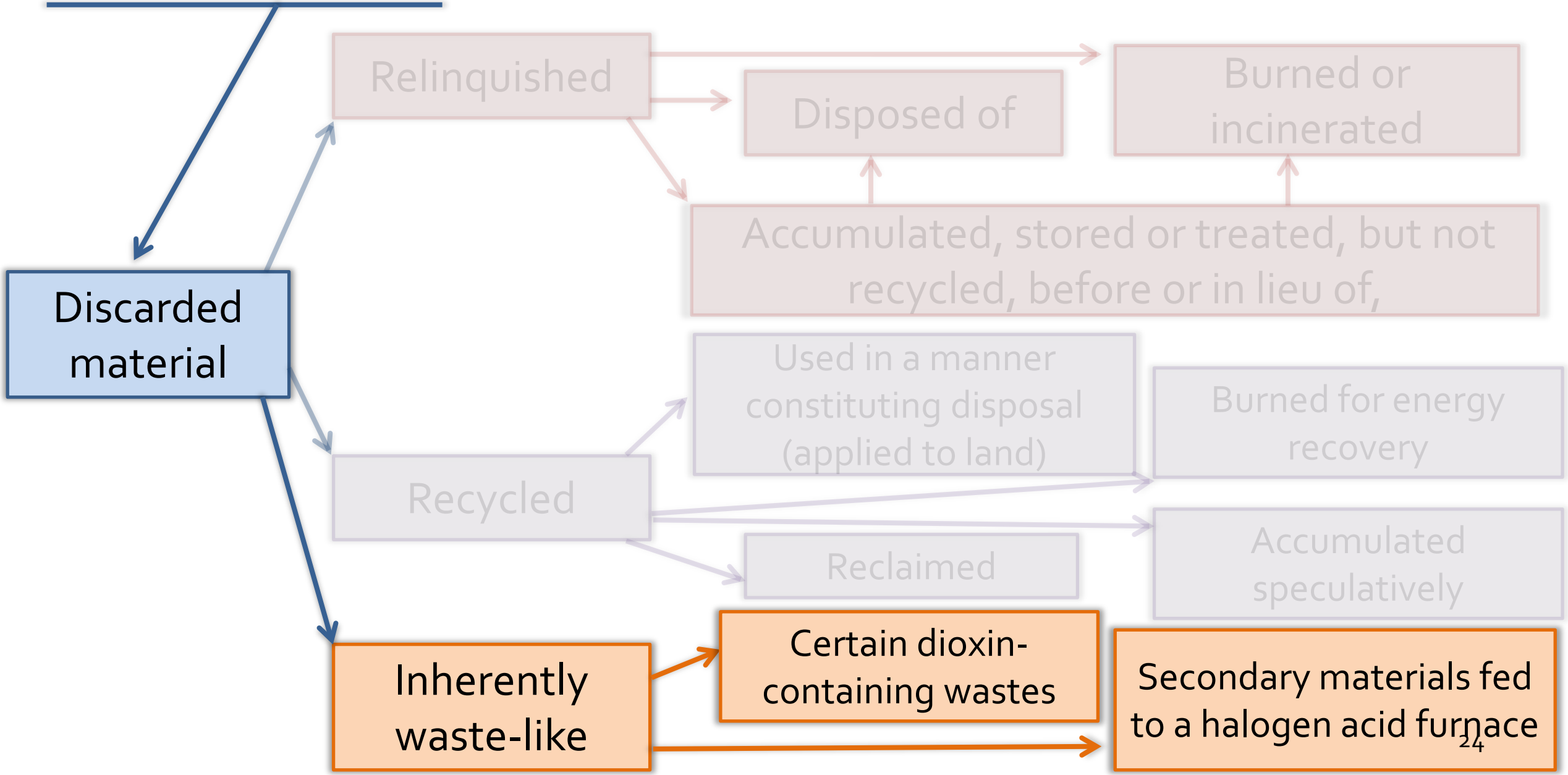


Table 1 of 22 CCR section 66261.2(d)

Column	**Use Constituting Disposal** 66261.2(d)(1)	**Energy Recovery / Fuel** 66261.2(d)(2)	**Reclamation** 66261.2(d)(3)	**Speculative Accumulation** 66261.2(d)(4)
Spent Materials	*	*	*	*
Sludges (listed in section 66261.31 or 66261.32)	*	*	*	*
Sludges exhibiting a characteristic of hazardous waste	*	*	**	*
By-products (listed in section 66261.31 or 66261.32)	*	*	*	*
By-products exhibiting a characteristic of hazardous waste	*	*	**	*
Commercial chemical products (listed in section 66261.33)	*	*	**	**

Is it a Waste? – See 22 CCR § 66261.2



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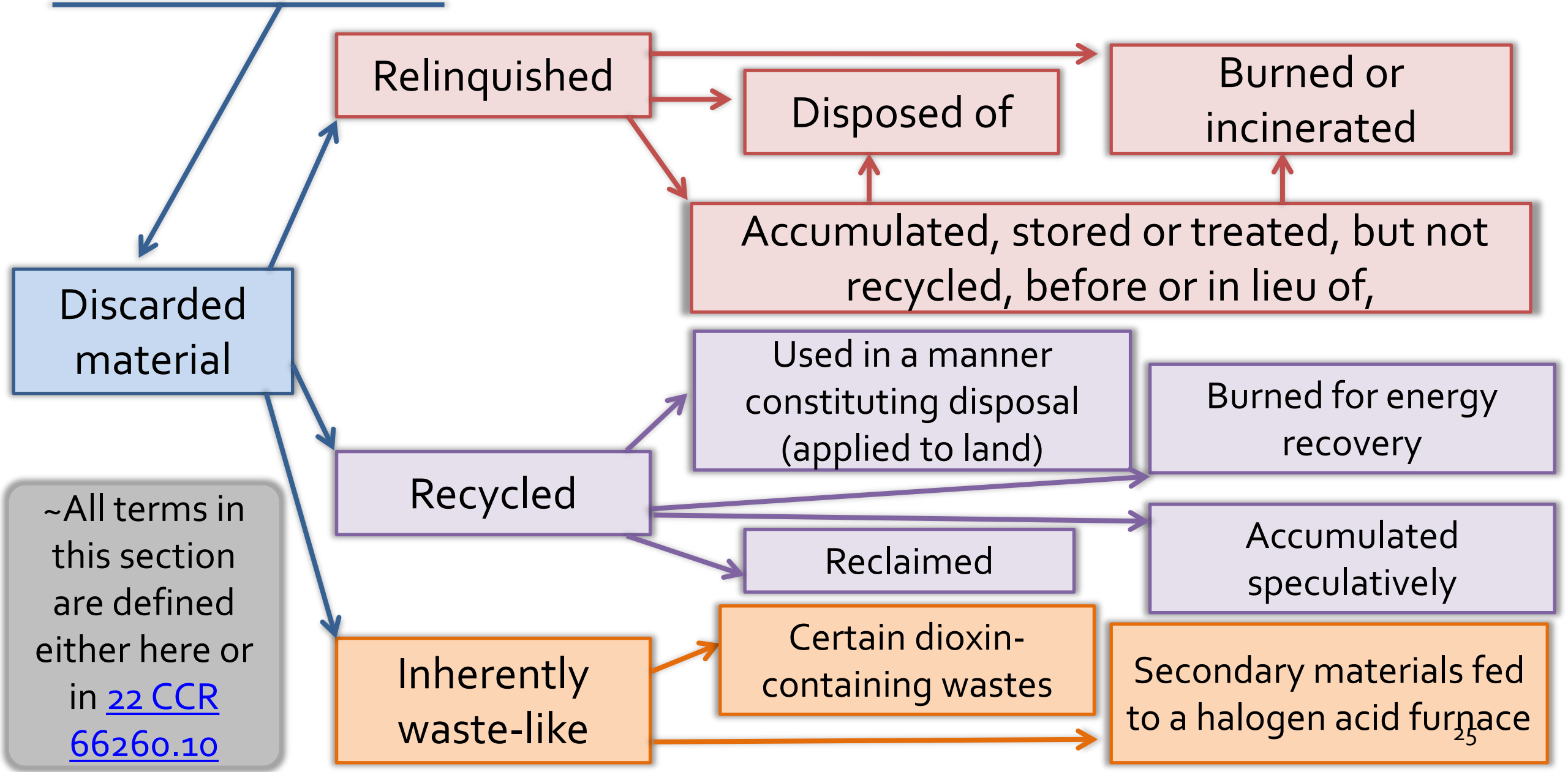

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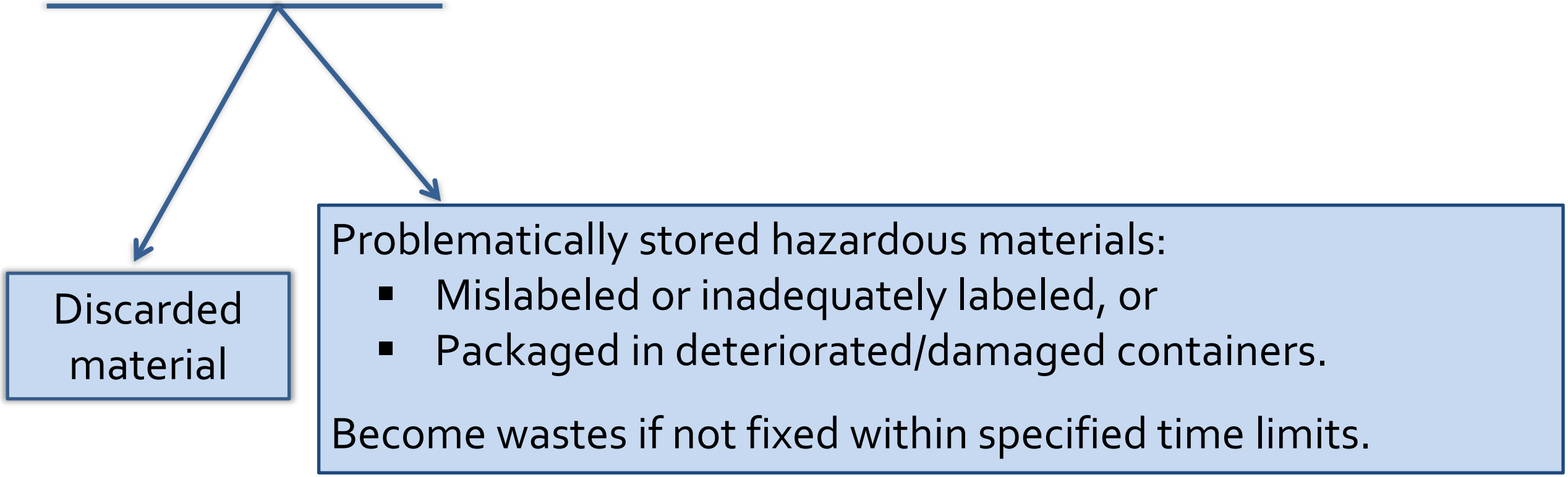


Hazardous Waste Determination Process

Step 1	Is it a waste?
Step 2	Excluded or exempted?
Step 3	Listed?
Step 4	Characteristic?

BREAK TIME!

Hazardous Waste Determination Process

Step 1	Is it a waste?
Step 2	Excluded or exempted?
Step 3	Listed?
Step 4	Characteristic?

Exclusions vs Exemptions

- Excluded from the definition of a waste or hazardous waste
  - Out up front; no longer a waste or hazardous waste
  - Specific conditions need to be met

- Exempted from certain Laws or regulations
  - It is still a hazardous waste, but you do not need to manage it as a fully regulated hazardous waste
  - Alternative management standards
  - Specific conditions need to be met

EXCLUSIONS

Is it Excluded?

- 22 CCR §66261.4(a): Materials which are not wastes
- 22 CCR §66261.4(b): Wastes which are not hazardous wastes
- 22 CCR §66261.4(h) and (i): CRT panel glass
- HSC §25143.2(b) and (d): Recycling exclusions
- Additional exclusions not covered in this training

Regulatory Exclusions
22 CCR §66261.4(a)

Materials which are not wastes

- Industrial wastewater discharge
- Source, special nuclear or by-product material
- Spent sulfuric acid used to produce virgin sulfuric acid
- Pulping liquors that reclaimed and reused
- Secondary materials that are reclaimed (closed loop recycling with reclamation)
  - No speculative accumulation
  - Not burned for energy recovery or UCD

Regulatory Exclusions
22 CCR §66261.4(b)

Wastes which are not hazardous wastes

- Infectious wastes (animal carcasses)
- Materials exempted or excluded from 40 CFR 261.4, if not listed in Article 4.1 and do not exhibit a characteristic
- Mining wastes
- Used oil re-refining still bottoms used in asphalt products
- Used CFC refrigerants

Regulatory Exclusions
22 CCR §66261.4(h) and (i)

- CRT panel glass
  - Not a hazardous waste for purposes of disposal
  - Must meet the criteria specified in §66273.81
  - Must be destined for disposal in a CRT panel glass approved landfill
  - Not subject to regulation by DTSC if managed according to § 25143.2.5

Comparison of federal and State exclusions (non-inclusive list)

Material	RCRA	Calif.
(1) Domestic sewage	Yes	No
(2) Industrial waste water (point source) discharges regulated under section 402 of the Clean Water Act	Yes	Yes
(3) Irrigation return flows	Yes	No
(4) Source, special nuclear, or by-product material as defined the Atomic Energy Act of 1954, as amended	Yes	Yes
(5) Materials subject to in-situ mining techniques which are not removed during the extraction process	Yes	No
(6) Pulping liquors that are reclaimed in pulping liquor recovery furnace and then reused in the pulping process, unless accumulated speculatively	Yes	Yes
(7) Spent sulfuric acid used to produce virgin sulfuric acid, unless it is accumulated speculatively	Yes	Yes

Continued…

Excluded Material	RCRA	Calif.
(8) Secondary materials that are reclaimed and returned to the original process or processes in which they were generated where they are reused in the production process [under certain provisions]	Yes	Yes
(9)(i) Spent wood preserving solutions that have been reclaimed and reused for their original intended purpose; and wastewaters from the wood preserving process that have been reclaimed and are reused to treat wood … etc.	Yes	No
(10) EPA Hazardous Waste Nos. K060, K087, K141, K142, K143, K144, K145, K147, and K148, and any wastes from the coke by-products process that are hazardous only because they exhibit the Toxicity Characteristic … etc.	Yes	No
etc.		

Recycling – Excluded Recyclable Material (ERM)

- HSC §25143.2(b): Recyclable materials (RCRA & non-RCRA)
  - Ingredients in industrial processes
  - Substitutes for commercial products
  - Returned to original process without first being reclaimed
- HSC §25143.2(d): Recyclable materials (non-RCRA)
  - 7 subsections
  - (d)(1) recycled and reused on-site
  - (d)(3) transported between locations owned by the generator and recycled at final location
  - (d)(5),(d)(6) similar to (b)(1),(b)(2) but for non-RCRA and allow reclamation

Recycling Exclusions Requirements for HSC §25143.2

- HSC 25143.2(e): “e” overrides - Automatically a HW
  - UCD, burned for energy recovery, speculative accumulation
- HSC 25143.2(f-h): Documentation, and other requirements
  - Maintain adequate records
  - ERM may still be a hazardous substance
  - Used oil exclusion

Statutory Exclusions HSC §25141.5 (b)(2)(B)

These substances are not hazardous wastes, if only hazardous by acute oral toxicity criteria.

- Acetic acid - vinegar
- Aluminum chloride - deodorant
- Ammonium bromide - textile finishing & anticorrosive agent
- Ammonium sulfate - food additive & fertilizer
- Anisole - perfumes & food flavoring
- Boric acid - eyewashes & heat resistant glass
- Calcium fluoride -fluoridate drinking water
- Calcium formate - brewing & briquette binder
- Calcium propionate - food additive
- Cesium chloride - brewing & in mineral waters
- Magnesium chloride - flocculating agent
- Potassium chloride - salt substitute & food additive
- Sodium bicarbonate – (baking soda) antacids & mouthwashes
- Sodium borate decahydrate – (borax) laundry detergents
- Sodium carbonate – (soda ash) textile processing
- Sodium chloride - (table salt)
- Sodium iodide - iodine supplement and in cloud seeding
- Sodium tetraborate - (borax) used in laundry detergents
- The following oils commonly used as food flavorings: allspice oil, ceylon cinnamon oil, clarified slurry oil, dill oils, or lauryl leaf oil

EXEMPTIONS

Is it Exempted?

- HSC §25143.12: Petroleum-contaminated debris
- HSC §25143.7: Asbestos Waste (non-RCRA)
- 22 CCR §66261.4(c): HW generated in manufacturing tanks
- 22 CCR §66261.4(d)-(f): Samples
- 22 CCR §66261.4(g): Controlled substances
- Additional exemptions not covered in this training

Statutory Exemptions HSC §25143.12

Petroleum-contaminated debris

- Must meet the following conditions :
  - Consists of wood, paper, textiles, concrete rubble, metallic objects, solid manufactured objects
  - Not Federally regulated
  - Does not contain free liquids
  - Debris is not a container or tank that is subject to regulation as hazardous waste
  - Disposed in Class I or II landfill

Statutory Exemptions HSC §25143.7

Asbestos wastes (non-RCRA)

- May be disposed of in a landfill that is not Class I (Hazardous Waste Landfill)
- Concentration must be >1%
- Friable

Regulatory Exemptions
22 CCR §66261.4(c)

- Hazardous waste generated in:
  - Product or raw material storage tanks, vehicles, vessels, or pipelines
  - A manufacturing process unit or an associated non-waste-treatment-manufacturing unit

*Exempt unless the waste exits the unit or remains in unit for more than 90 days after operation ceases

Regulatory Exemptions
22 CCR §66261.4(d)

- Samples: collected for testing to determine characteristics or composition
  - Subject to regulation as a waste after use as a sample ceases
  - Do not need to be manifested but must comply with applicable shipping requirements
  - Stored for less than 90 days before transport to a laboratory
  - Stored at a laboratory before or after testing
  - Mass of a sample imported/exported to a laboratory must not exceed 25kg

Regulatory Exemptions
22 CCR §66261.4(e)

- Treatability Study Samples:
  - Sample must be collected/prepared for transport by the generator
  - Sample mass limits per waste stream
    - 400kg HW, 1kg acute HW, 250kg soil, water, or debris
  - Accumulation time limits
    - 1 year on-site, 10 days in-transit
  - Labeling requirements
  - Do not need to be manifested but must comply with applicable shipping requirements

Regulatory Exemptions
22 CCR §66261.4(f)

- Samples Undergoing Treatability Studies at Laboratories and Testing Facilities:
  - Notification requirements to the Dept.
  - Accumulation time limits
    - 90 days since study completion or 1 year since shipment initiated
  - Study may not involve placing HW on land, incineration, or open burning
  - Sample mass limits
    - 400kg total, 1kg extremely HW, 200kg soil, water, or debris

Regulatory Exemptions
22 CCR §66261.4(g)

- Controlled substances:
  - Non-RCRA
  - Seized by a peace officer
  - Must be stored separate from chemicals seized from clan labs, under the control of LE
  - Do not have to be manifested, but must be under the control of LE and be accompanied by a shipping document
  - Incinerated at a non-hazardous waste incineration facility

Hazardous Waste Exemptions
22 CCR §66261.7

- Contaminated containers
  - Exempt when “empty”
  - Definition varies between CA and USEPA
    - CA is more stringent, Federal allows up to one inch or 3%
  - Reclaimed, reconditioned, or refilled
  - Conditions vary depending on container size
    - Bulk containers >119gal, <0.3% by weight of the total capacity

HSC 25143.9: Management Requirements for 25143.2 Exclusions

- Storage unit and labeling
  - Container, tank, *containment building, or waste pile*
  - Labeled “Excluded Recyclable Material” and/or “Used Oil”
- Emergency response
  - HMBP or *emergency plan*
- Storage requirements for each type of storage unit
  - *Broke existing requirements down into individual subsections*
  - Export requirements
- Lose exclusion!

EXCLUDED RECYCLABLE MATERIAL

STATE & FEDERAL LAW PROHIBITS IMPROPER DISPOSAL
IF FOUND, CONTACT THE NEAREST POLICE OR PUBLIC SAFETY AUTHORITY, OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY OR YOUR STATE DEPARTMENT OF TOXIC SUBSTANCES CONTROL.

GENERATOR INFORMATION:

NAME _____

ADDRESS _____ PHONE _____

CITY _____ STATE _____ ZIP _____

EPA ID NO. / MANIFEST DOCUMENT NO. _____ / NOT APPLICABLE

EPA WASTE NO. _____ CA WASTE NO. _____ ACCUMULATION START DATE _____

CONTENTS, COMPOSITION: _____

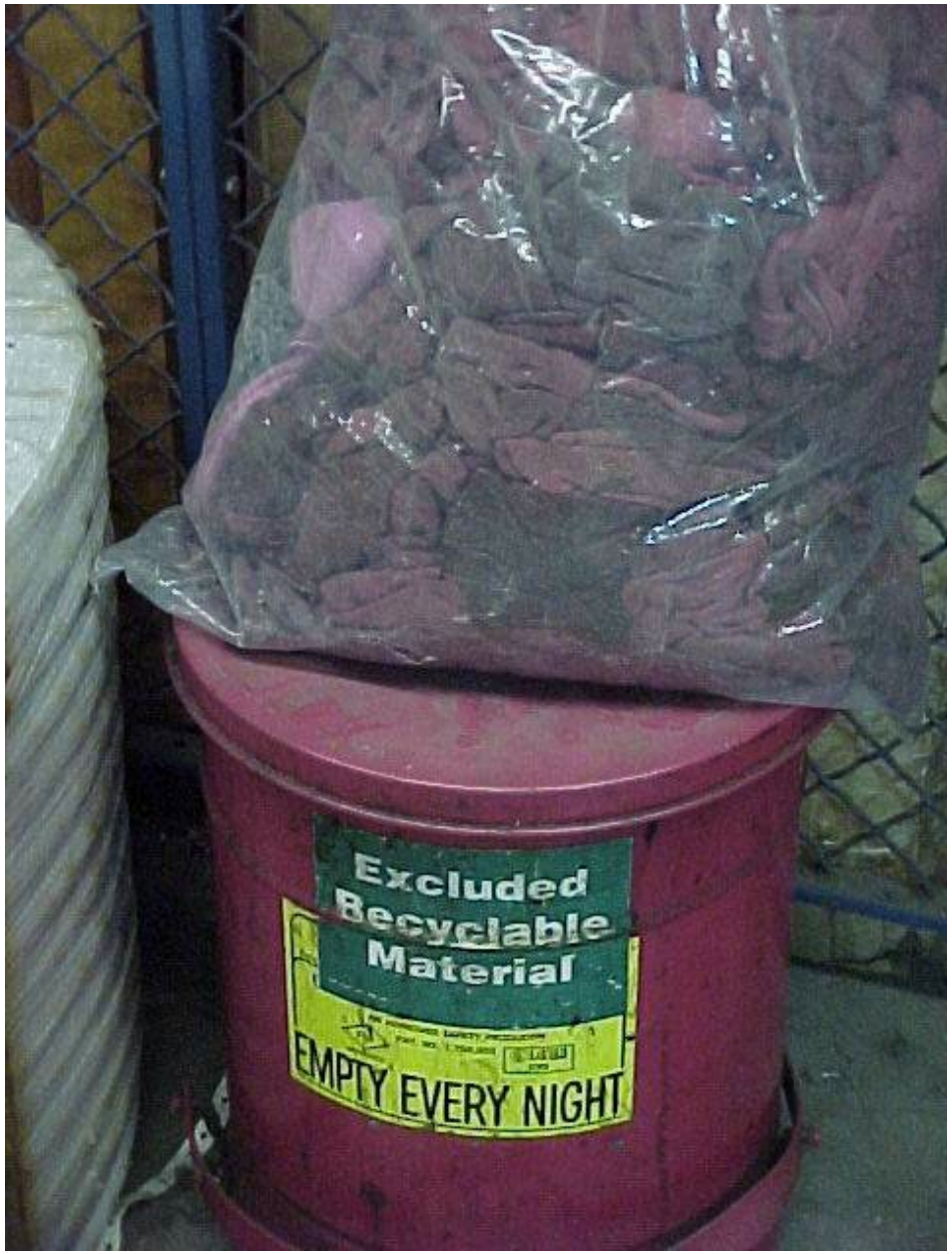
PHYSICAL STATE: ☐ SOLID ☐ LIQUID

HAZARDOUS PROPERTIES: ☐ FLAMMABLE ☐ TOXIC ☐ CORROSIVE ☐ REACTIVITY ☐ OTHER _____

D.O.T. PROPER SHIPPING NAME AND UN OR NA NO. WITH PREFIX

HANDLE WITH CARE!

ERMI-PT



HSC 25143.10: Reporting Requirements for 25143.2 Exclusions and Exemptions

- *Generator:* Recyclable Materials Report (RMR)
  - Initial, re-notification
- *Brokers, Intermediary* and Recycler: RMR
  - Initial, re-notification
- *RMR submittal when generation, accumulation, management, or recycling of the material is permanently discontinued.*
- Submission through CERS
- RMR is being updated to clarify these requirements
- Violation

REMEMBER

- The only person who can claim an exclusion and proceed to manage the material as an excluded recyclable material, is the generator.
- Look at the entire process from beginning to end to make sure all the conditions are met along the way.

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Hazardous Waste Determination Process

Step 1	Is it a waste?
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22 CCR Chapter 11, Article 4: RCRA Lists

- Lists were created based on U.S. EPA criteria (40 CFR §261.11)
- **The source of the waste (i.e., the <u>process</u> that generated the waste) is as important as the concentrations of the waste constituents**
- Must meet all aspects of the listing for it to apply

Listed Wastes

- Four RCRA lists
  - F, K, P, U
- One California List
  - M-List, mercury-containing wastes
- The presumptive list (Appendix X)
  - are not “listed” wastes

RCRA Lists

- Non-specific sources (F-listed)
- Specific sources (K-listed)
- Discarded commercial chemical products, off-specification species, and spill residues (P- and U-listed)

Non-Specific Sources (F-listed)
22 CCR §66261.31

- Waste codes with “F” followed by a three-digit number (F001-F039)
- Not solely dependent on industry or process that generates the waste
- Not dependent on constituents or their concentrations present in the waste
- May be excluded pursuant to 40 CFR 260.20 and 260.22

F-listed Waste Groupings

- Spent solvents (F001 - F005)
- Metal plating wastes (F006 - F012, and F019)
- Dioxin-bearing wastes (F020 - F023 and F026 - F028)
- Wastes from production of certain chlorinated aliphatic hydrocarbons (F024 and F025)
- Wood preserving wastes (F032, F034, and F035)
- Petroleum refinery wastewater treatment sludges (F037 and F038)
- Multisource leachate (F039)

F007 Example

Spent cyanide plating bath solutions from electroplating operations.

Specific Sources (K-listed)
22 CCR §66261.32

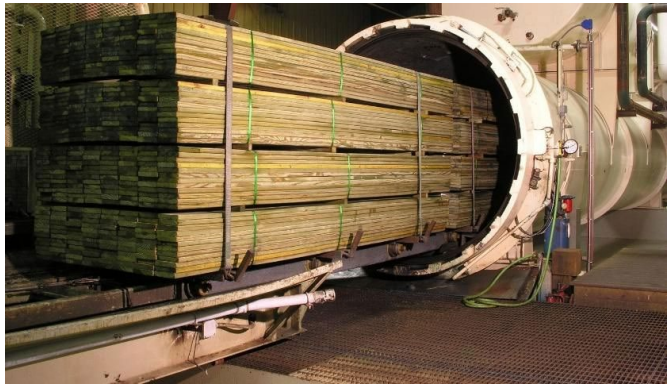
- Waste codes with “K” followed by a three-digit number (ex: K001 or K175)
- Dependent on industry or process that generates the waste
- Not dependent on constituents or their concentrations present in the waste

K-listed Waste Groupings

- wood preservation (K001)
- inorganic pigment manufacturing (K002 - K008)
- organic chemicals manufacturing (K009 - K011, K013-K030, K083, K085, K093-K096, K103-K105, K107-K118, K136, K149-K151, K156-K159, K161, K174-K175, and K181)
- inorganic chemicals manufacturing (K071, K073, K106, and K176-K178)
- pesticides manufacturing (K031-K043, K097 - K099, K123-K126, and K131-K132)
- explosives manufacturing (K044-K047)
- petroleum refining (K048-K052, & K169 - K172)
- iron and steel production (K061 & K062)
- primary aluminum production (K088)
- secondary lead processing (K069 and K100)
- veterinary pharmaceuticals manufacturing (K084 and K101-K102)
- ink formulation (K086)
- coking (K060, K141-K145, & K147- K148)

K001 Example

- "Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol."



- <u>To be Listed:</u>
  - Wood preserving facility
  - Facility must use creosote or pentachlorophenol
  - Facility must generate and treat wastewater
  - Only bottom sediment sludge from a wastewater treatment unit

P- and U-Listed Wastes
22 CCR §66261.33(e) & (f)

Discarded Commercial Chemical Products, Off-Spec. Species, Container Residues, and Spill Residues

- Waste codes with “P” or “U” with a three-digit number (P001, U001)
- “P” listings are acutely hazardous (H)
- “U” listings contain toxic constituents (T)
- The presence of a P or U listed chemical alone does not trigger the listing.

P- and U-Listed Wastes
22 CCR §66261.33(e) & (f)

To be listed:

- Discarded or intended to be discarded
- Must be **unused and not spent**
  - If it has been used for its intended purpose it is not listed
- Must be pure
  - **Sole active ingredient** in a formulation
- Must not have been mixed with other chemicals to form a product

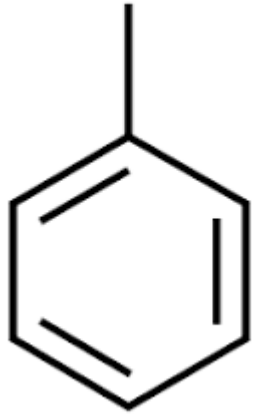
P- and U-Listed Wastes

- Examples of wastes: laboratory chemicals, expired or shelf-life materials, raw material spills
- Common P-listed examples: benzyl chloride (P028), hydrogen cyanide (P063), nicotine (P075), warfarin (P001)
- Common U-listed examples: acetone (U002), ACN (U003), benzene (U019), toluene (U220)

Scenario : Toluene (U220)

A paint formulation containing toluene is discarded. Toluene helps the paint spread evenly.

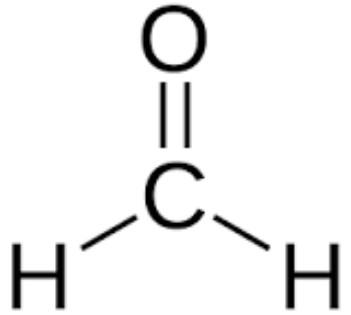
Is the paint a U-listed waste?



Scenario : Formaldehyde (U122)

Unused embalming fluid that contains formaldehyde and some colorants and perfumes is to be discarded.

Is the discarded, unused embalming fluid a U-listed waste?



Article 4.1 – California List M-listed Waste

- Mercury-containing wastes, “M” letter plus 3 digits.
  - M001: Mercury light switches in cars and cars with them prior to crushing, baling, shredding
  - M002: Other mercury switches in products, including appliances
  - M003: Mercury-containing lamps and products with mercury lamps
  - M004: Mercury-added novelties

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Hazardous Waste Determination Process

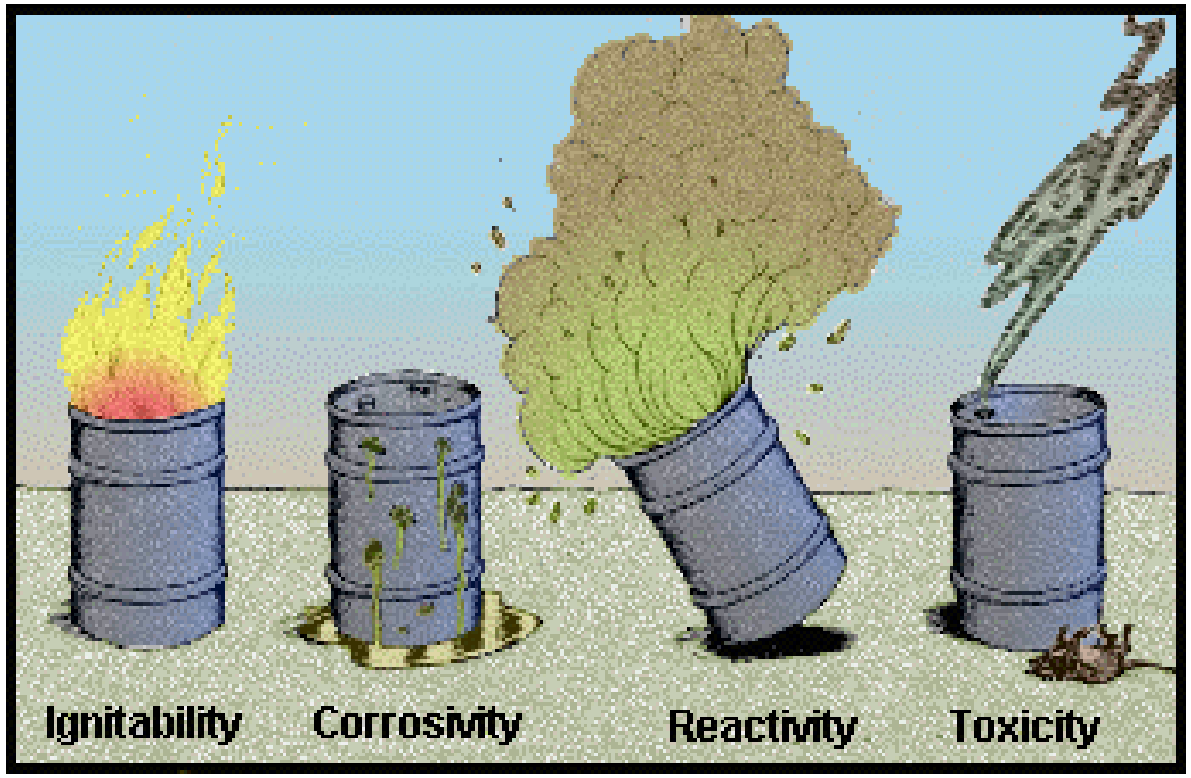
Step 1	Is it a waste?
Step 2	Excluded or exempted?
Step 3	Listed?
Step 4	Characteristic?

BREAK TIME!

Hazardous Waste Determination Process

Step 1	Is it a waste?
Step 2	Excluded or exempted?
Step 3	Listed?
Step 4	Characteristic?

Characteristics of Hazardous Waste



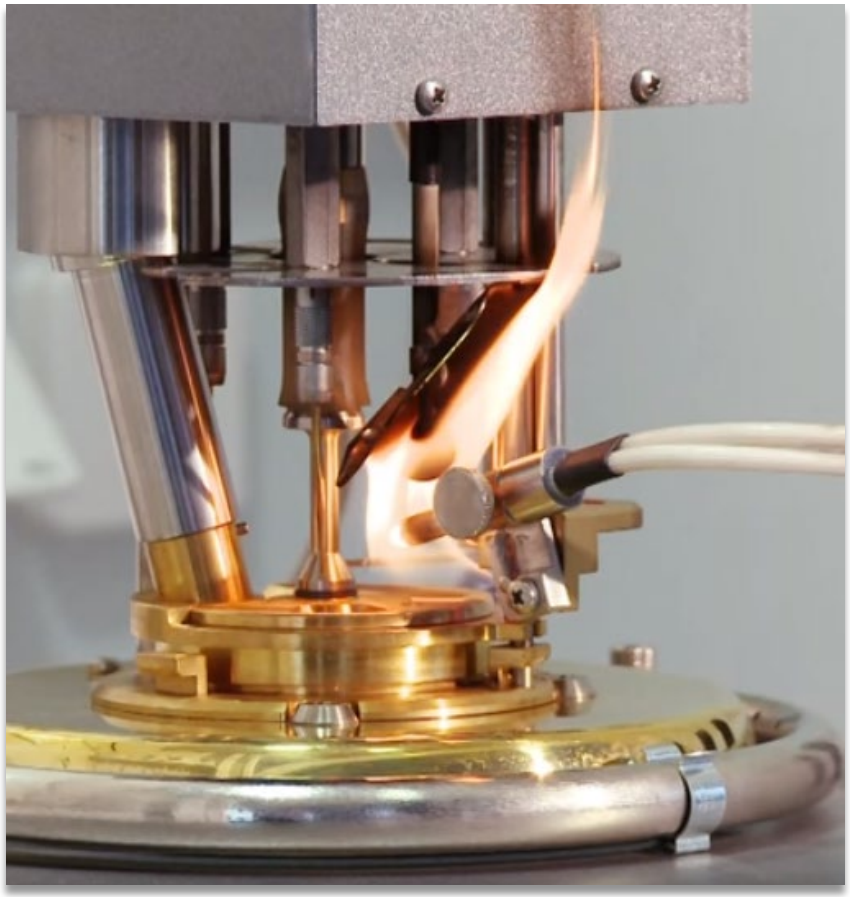
1. Characteristic of Ignitability (22 CCR § 66261.21)
2. Characteristic of Corrosivity (22 CCR § 66261.22)
3. Characteristic of Reactivity (22 CCR § 66261.23, HSC § 25141.5)
4. Characteristic of Toxicity (22 CCR § 66261.24)

Characteristics of Hazardous Waste

Ignitable Hazardous Waste (D001)

- Liquids with flash point less than 140⁰ F (other than an aqueous solution containing less than 24% alcohol by volume)

Flash point is the lowest temperature at which a liquid will form sufficient vapors to generate a combustible mixture with the air at its surface.



Characteristics of Hazardous Waste

Ignitable Hazardous Waste (D001)

- Liquids with flash point less than 140⁰ F (other than an aqueous solution containing less than 24% alcohol by volume)
- Not a liquid and is capable, under STP, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard (example: magnesium metal)
- Ignitable compressed gasses
  - Flammable mixture with air at 13% or less (by volume)
  - Flammable range > 12% in air
- Oxidizers (examples: permanganate, peroxides)

Characteristics of Hazardous Waste

Corrosive Hazardous Waste

Federal (D002)	California
➢ Aqueous waste with pH ≤ 2 or with pH ≥ 12.5 ➢ Liquid that corrodes steel 	➢ Aqueous waste with pH ≤ 2 or with pH ≥ 12.5 ➢ Liquid that corrodes steel ➢ **Not aqueous and produces a solution with pH ≤ 2 or with pH ≥ 12.5** ➢ **Not liquid and produces a solution that corrodes steel**

California (not U.S. EPA) regulates corrosive solids. These are _____ hazardous waste).

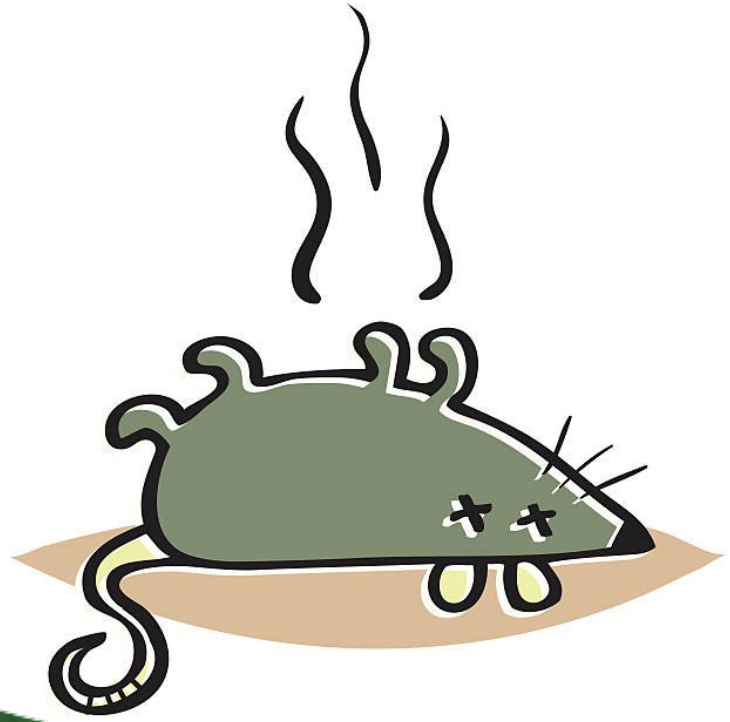
Characteristics of Hazardous Waste

Reactive Hazardous Waste (D003)

- Narrative description in 22 CCR § 66261.23 includes things that:
  - Explode / detonate;
  - React violently with water, or give off toxic or explosive gases when mixed with water;
  - Certain DOT-defined explosive categories.
- In most cases, there are no test methods.
- HSC § 25141.5(b)(1) – DTSC must use U.S. EPA's guidance.

Characteristics of Hazardous Waste

Toxic Hazardous Wastes



- Characteristic of Toxicity (22 CCR § 66261.24)
- Eight criteria for the Toxicity Characteristic:
  - Two leaching tests (TCLP and WET),
  - Total digestion test,
  - Four different direct acute toxicity (lethality to animals) tests,
  - A list of carcinogens, and
  - A "catch all" criterion.
- Toxic if satisfies any one of the elements

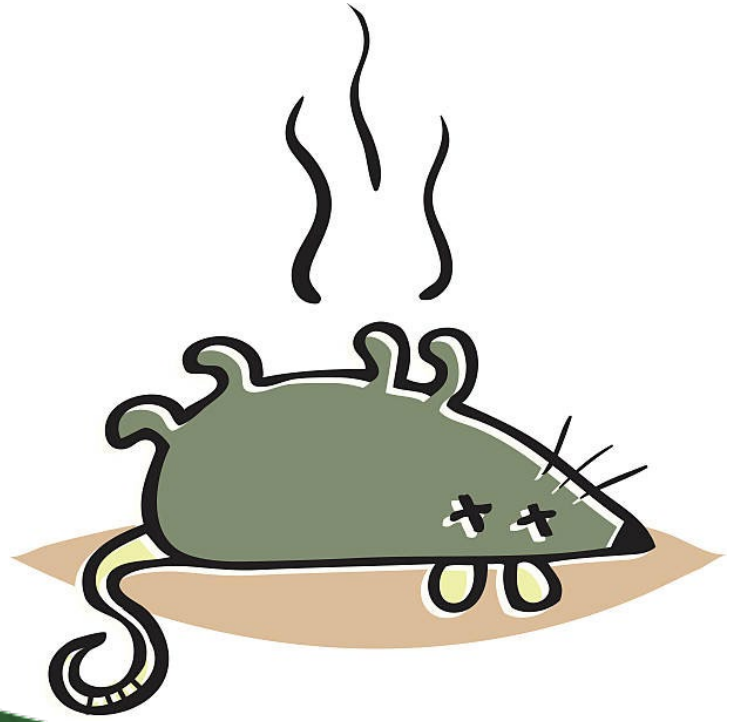
Characteristics of Hazardous Waste

Toxic Hazardous Wastes

RCRA	Non-RCRA
Toxic (D004-D043) - TCLP	Toxic (California Waste Code…) - STLC (WET) - TTLC - Oral LD_{50} < 2500 mg/kg - Dermal LD_{50} < 4300 mg/kg - Inhalation LC_{50} < 10,000 ppm - Aquatic 96hr LC_{50} < 500 mg/l - Carcinogen Concentration < 10 ppm (0.001% by weight)

Characteristics of Hazardous Waste

Toxic Hazardous Wastes



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  - A list of carcinogens, and
  - A "catch all" criterion.
- Toxic if satisfies any one of the elements

Characteristics of Hazardous Waste

Federal Toxicity Characteristic 66261.24(a)(1)

- TCLP (Toxicity Characteristic Leaching Procedure)
  - Designed to simulate the leaching of toxic constituents from waste that would occur in a municipal solid waste landfill.
- If the measured concentration in the TCLP Extract exceeds its respective regulatory threshold, the waste is toxic (and RCRA hazardous waste)
  - Eight metals
  - Four pesticides
  - Two herbicides
  - Twenty-six other organic compounds

U.S. EPA Number	Contaminant	Regulatory Level mg/L
D004	Arsenic	5
D005	Barium	100
D018	Benzene	0.5
D006	Cadmium	1
D019	Carbon tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100
D022	Chloroform	6
D007	Chromium	5
D023	o-Cresol	200.0 [1]
D024	m-Cresol	200.0 [1]
D025	p-Cresol	200.0 [1]
D026	Cresol	200.0 [1]
D016	2,4-D	10
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D012	Endrin	0.02
D031	Heptachlor (and its epoxide)	0.008

U.S. EPA Number	Contaminant	Regulatory Level mg/L
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3
D008	Lead	5
D013	Lindane	0.4
D009	Mercury	0.2
D014	Methoxychlor	10
D035	Methyl ethyl ketone	200
D036	Nitrobenzene	2
D037	Pentachlorophenol	100
D038	Pyridine	5.0 [2]
D010	Selenium	1
D011	Silver	5
D039	Tetrachloroethylene	0.7
D015	Toxaphene	0.5
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400
D042	2,4,6-Trichlorophenol	2
D017	2,4,5-TP (Silvex)	1
D043	Vinyl chloride	0.2

Characteristics of Hazardous Waste

Federal Toxicity Characteristic 66261.24(a)(1)

- TCLP (Toxicity Characteristic Leaching Procedure)
  - Designed to simulate the leaching of toxic constituents from waste that would occur in a municipal solid waste landfill.
- If the measured concentration in the TCLP Extract exceeds its respective regulatory threshold, the waste is toxic (and RCRA hazardous waste)
  - Eight metals
  - Four pesticides
  - Two herbicides
  - Twenty-six other organic compounds
- In California, the TCLP is not applied to RCRA-excluded or exempted wastes (ex. petroleum contaminated soil from UST cleanup is not subject to TCLP for benzene).

Characteristics of Hazardous Waste

California's Toxicity Characteristic 66261.24(a)(2) – (8)

Persistent and Bioaccumulative Toxic Substances 22 CCR § 66261.24(a)(2)(A) & (B)

- 19 inorganic chemicals (mostly metals)
- 18 organic chemicals

66261.24(a)(2)(A)

WET inorganics (metals)

Substance [a,b] (= California-only analyte)
Antimony and/or antimony compounds
Arsenic and/or arsenic compounds
Asbestos
Barium and/or barium compounds (excluding barite)
Beryllium and/or beryllium compounds
Cadmium and/or cadmium compounds
Chromium (VI) compounds
Chromium and/or chromium (III) compounds
Cobalt and/or cobalt compounds
Copper and/or copper compounds
Fluoride salts
Lead and/or lead compounds
Mercury and/or mercury compounds
Molybdenum and/or molybdenum compounds
Nickel and/or nickel compounds
Selenium and/or selenium compounds
Silver and/or silver compounds
Thallium and/or thallium compounds
Vanadium and/or vanadium compounds
Zinc and/or zinc compounds

66261.24(a)(2)(B)

WET organics

Substance [a,b] (= California-only analyte)
Aldrin
Chlordane
DDT, DDE, DDD
2,4-Dichlorophenoxyacetic acid
Dieldrin
Dioxin (2,3,7,8-TCDD)
Endrin
Heptachlor
Kepone
Lead compounds, organic
Lindane
Methoxychlor
Mirex
Pentachlorophenol
Polychlorinated biphenyls (PCBs)
Toxaphene
Trichloroethylene
2,4,5-Trichlorophenoxy-propionic acid

Characteristics of Hazardous Waste

California's Toxicity Characteristic 66261.24(a)(2) – (8)

Persistent and Bioaccumulative Toxic Substances 22 CCR § 66261.24(a)(2)(A) & (B)

- 19 inorganic chemicals (mostly metals)
- 18 organic chemicals

- Two kinds of tests:
  - An extraction – the Waste Extraction Test (WET), similar to the TCLP
  - A digestion of the waste, analyzed to reveal the total concentration of each toxicant in the waste
- A waste is toxic and hazardous if:
  - For any toxicant on either table, its WET extract content ≥ Soluble Threshold Limit Concentration (STLC) (in mg/L), or
  - The digest content ≥ Total Threshold Limit Concentration (TTLC) by analysis for total concentration in waste (in mg/kg).

66261.24(a)(2)(A) WET inorganics (metals)	STLC	TTLC	TTLC for Extremely HW
Substance [a,b] (= California-only analyte)	mg/l	Wet-Weight mg/kg	66261.113
Antimony and/or antimony compounds	15	500	
Arsenic and/or arsenic compounds	5.0	500	50,000
Asbestos		1.0 (as percent)	
Barium and/or barium compounds (excluding barite)	100	10,000 [c]	
Beryllium and/or beryllium compounds	0.75	75	7,500
Cadmium and/or cadmium compounds	1.0	100	10,000
Chromium (VI) compounds	5	500	
Chromium and/or chromium (III) compounds	5 [d]	2,500	
Cobalt and/or cobalt compounds	80	8,000	
Copper and/or copper compounds	25	2,500	
Fluoride salts	180	18,000	
Lead and/or lead compounds	5.0	1,000	
Mercury and/or mercury compounds	0.2	20	2,000
Molybdenum and/or molybdenum compounds	350	3,500 [e]	
Nickel and/or nickel compounds	20	2,000	
Selenium and/or selenium compounds	1.0	100	10,000
Silver and/or silver compounds	5	500	
Thallium and/or thallium compounds	7.0	700	70,000
Vanadium and/or vanadium compounds	24	2,400	
Zinc and/or zinc compounds	250	5,000	

66261.24(a)(2)(B) WET organics	STLC	TTLC	TTLC for Extremely HW
Substance [a,b] (= California-only analyte)	mg/l	Wet-Weight mg/kg	66261.113
Aldrin	0.14	1.4	140
Chlordane	0.25	2.5	250
DDT, DDE, DDD	0.1	1.0	
2,4-Dichlorophenoxyacetic acid	10	100	10,000
Dieldrin	0.8	8.0	800
Dioxin (2,3,7,8-TCDD)	0.001	0.01	1
Endrin	0.02	0.2	20
Heptachlor	0.47	4.7	470
Kepone	2.1	21	2100
Lead compounds, organic	--	13	1,300
Lindane	0.4	4.0	400
Methoxychlor	10	100	
Mirex	2.1	21	2100
Pentachlorophenol	1.7	17	
Polychlorinated biphenyls (PCBs)	5.0	50	5,000
Toxaphene	0.5	5	500
Trichloroethylene	204	2,040	
2,4,5-Trichlorophenoxy-propionic acid	1.0	10	1000

Characteristics of Hazardous Waste

TCLP, WET, and Total Digestion Tips

- For solid material wastes: The total digestion is often done first.
  - Once you know the total concentration of a toxicant in such a waste, you can divide that concentration by the dilution factors for the WET and TCLP to determine whether it is necessary to run either of those other analytical tests.
  - Dilution factors: TCLP – 20 L/kg WET – 10 L/kg

Scenario: The total concentration of lead in a solid sludge destined for disposal is 96 mg/kg. The sludge is not listed, meets no other characteristic criteria.

66261.24(a)(2)(A) WET inorganics (metals)	STLC	TTLC
Substance [a,b] (§ = California-only analyte)	mg/l	Wet-Weight mg/kg
Lead and/or lead compounds	5.0	1,000

Does the lead concentration exceed the TTLC?

If 100% of the lead is extractable in the WET, what would the be the Pb concentration of the WET extract?

Is it necessary to run the WET?

Characteristics of Hazardous Waste

TCLP, WET, and Total Digestion Tips

- For solid material wastes: The total digestion is often done first.
  - Once you know the total concentration of a toxicant in such a waste, you can divide that concentration by the dilution factors for the WET and TCLP to determine whether it is necessary to run either of those other analytical tests.
  - Dilution factors: TCLP – 20 L/kg WET – 10 L/kg
  - Scenario: The total concentration of lead in a solid sludge destined for disposal is 96 mg/kg. The sludge is not listed, meets no other characteristic criteria.

U.S. EPA Number	Contaminant	Regulatory Level mg/L
D008	Lead	5

If 100% of the lead is extractable in the TCLP, what would the be the Pb concentration of the TCLP extract?

Is it necessary to run the TCLP?

Characteristics of Hazardous Waste

TCLP, WET, and Total Digestion Tips

- For solid material wastes: The total digestion is often done first.
  - Once you know the total concentration of a toxicant in such a waste, you can divide that concentration by the dilution factors for the WET and TCLP to determine whether it is necessary to run either of those other analytical tests.
  - Dilution factors: TCLP – 20 L/kg WET – 10 L/kg

Scenario: The total concentration of lead in a solid sludge destined for disposal is 1729 mg/kg. The sludge is not listed, meets no other characteristic criteria.

U.S. EPA Number	Contaminant	Regulatory Level mg/L
D008	Lead	5

Does the lead concentration exceed the TTLC?

Is it necessary to run the STLC?

Is it necessary to run the TCLP?

Characteristics of Hazardous Waste

TCLP, WET, and Total Digestion Tips

- Also for solid material wastes, when the contaminant of concern is an organic molecule, it is usually unnecessary to run the WET.
  - Remember that the WET has a 10-fold dilution factor.
  - For organic toxicants, the TTLC is 10X the STLC numerical value.

66261.24(a)(2)(B) WET organics	STLC	TTLC
Substance [a],[b] (= California-only analyte)	mg/l	Wet-Weight mg/kg
Aldrin	0.14	1.4
Chlordane	0.25	2.5
DDT, DDE, DDD	0.1	1.0
2,4-Dichlorophenoxyacetic acid	10	100
Dieldrin	0.8	8.0
Dioxin (2,3,7,8-TCDD)	0.001	0.01

For that reason, if a solid (millable) waste's total concentration of an organic toxicant does not exceed the TTLC, it is not possible for the WET extract of that waste to exceed the STLC.

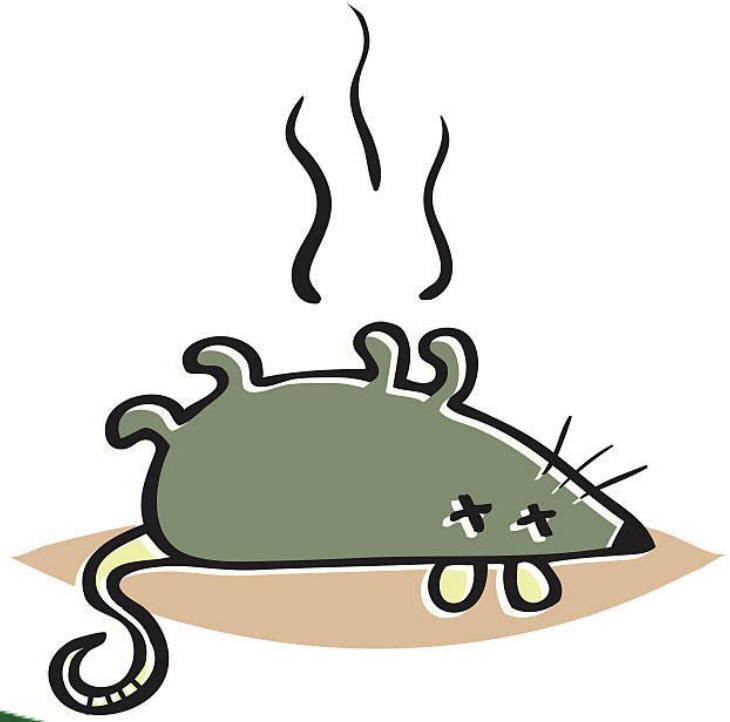
Characteristics of Hazardous Waste

TCLP, WET, and Total Digestion Tips

- For liquid wastes (with less than 0.5% solids):
  - An extraction is not performed on these kinds of wastes, for either the TCLP or the WET. The waste itself is the extract that is analyzed, and you compare the toxicant concentrations to TCLP thresholds and STLCs, respectively.
  - TTLCs are not relevant to these kinds of wastes.
- For multiphasic wastes or others that are not clearly solid or liquid, there is no shortcut: all three tests are necessary.

Characteristics of Hazardous Waste

Toxic Hazardous Wastes



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  - Four different direct acute toxicity (lethality to animals) tests,
  - A list of carcinogens, and
  - A "catch all" criterion.
- Toxic if satisfies any one of the elements

Characteristics of Hazardous Waste

California's Toxicity Characteristic 66261.24(a)(2) – (8)

Acute Toxicity

- Acute Oral Toxicity

- Acute Dermal Toxicity

- Acute Inhalation Toxicity

- Acute Aquatic Toxicity

Characteristics of Hazardous Waste

California's Toxicity Characteristic 66261.24(a)(2) – (8)

Acute Toxicity

- Acute Oral Toxicity
  - Waste is hazardous if its acute oral $LD_{50} < 2500$ mg/kg

Acute oral LD_{50} is defined in 22 CCR § 66260.10

Characteristics of Hazardous Waste

California's Toxicity Characteristic 66261.24(a)(2) – (8)

Acute Toxicity

- Acute Oral Toxicity
  - Waste is hazardous if its acute oral $LD_{50} < 2500$ mg/kg

Section 11: Toxicological Information

11.1 Acute toxicity

Oral – LD_{50} oral (rat): 1750 mg/kg
Inhalation: no data available
Dermal – LD_{50} dermal (rabbit): 4750 mg/kg

11.2 Chronic toxicity

Does the material whose partial safety data sheet is shown to the left, if a waste, meet the characteristic of toxicity due to acute oral toxicity?

Characteristics of Hazardous Waste

California's Toxicity Characteristic 66261.24(a)(2) – (8)

Acute Toxicity

- Acute Dermal Toxicity 22 CCR § 66261.24(a)(4)
  - Waste is hazardous if its acute dermal LD_{50} < 4300 mg/kg

Acute dermal LD_{50} is defined in 22 CCR § 66260.10.

Characteristics of Hazardous Waste

California's Toxicity Characteristic 66261.24(a)(2) – (8)

Acute Toxicity

- Acute Dermal Toxicity [22 CCR § 66261.24(a)(4)]
  - Waste is hazardous if its acute dermal LD_{50} < 4300 mg/kg

Section 11: Toxicological Information

11.1 Acute toxicity

Oral – LD_{50} oral (rat): 1750 mg/kg
Inhalation: no data available
Dermal – LD_{50} dermal (rabbit): 4750 mg/kg

11.2 Chronic toxicity

Does the material whose partial safety data sheet is shown to the left, if a waste, meet the characteristic of toxicity due to acute dermal toxicity?

Characteristics of Hazardous Waste

California's Toxicity Characteristic 66261.24(a)(2) – (8)

Acute Toxicity

- 22 CCR § 66261.24(c) – calculation for classifying waste mixtures by acute oral and acute dermal toxicities.

$$\text{Calculated oral or dermal } LD_{50} = \frac{100\%}{\sum_{x=1}^{n} \frac{\%\ A_x}{TA_x}}$$

11.1 Acute toxicity

Oral – LD_{50} oral (rat): 1750 mg/kg

- % A_x is the weight percent of any component in the waste mixture.
- TA_x is the acute oral or dermal LD_{50} of the corresponding component.
- Σ means to sum all the ratios of % A_x to TA_x.

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Characteristics of Hazardous Waste

California's Toxicity Characteristic 66261.24(a)(2) – (8)

Acute Toxicity

- 22 CCR § 66261.24(c) – calculation for classifying waste mixtures by acute oral and acute dermal toxicities.

$$\text{Calculated oral or dermal } LD_{50} = \frac{100\%}{\sum_{x=1}^{n} \frac{\%\, A_x}{TA_x}}$$

What is the calculated oral LD50 of a waste that is 65% a material with an acute oral LD_{50} of 1750 mg/kg, and 35% water?

$$\text{Calculated acute oral } LD_{50} = \frac{100\%}{\quad} = \frac{100\%}{\quad} \cong$$

Characteristics of Hazardous Waste

California's Toxicity Characteristic 66261.24(a)(2) – (8)

Acute Toxicity

- 22 CCR § 66261.24(c) – calculation for classifying waste mixtures by acute oral and acute dermal toxicities.

$$\text{Calculated oral or dermal } LD_{50} = \frac{100\%}{\sum_{x=1}^{n} \frac{\%\, A_x}{TA_x}}$$

What is the calculated oral LD50 of a waste that is 65% a material with an acute oral LD_{50} of 1750 mg/kg, and 35% a material with an acute oral LD_{50} of 4225 mg/kg?

$$\text{Calculated acute oral } LD_{50} = \frac{100\%}{\quad + \quad} = \frac{100\%}{\quad +} \cong$$

Characteristics of Hazardous Waste

California's Toxicity Characteristic 66261.24(a)(2) – (8)

Acute Toxicity

- Acute Inhalation Toxicity 22 CCR § 66261.24(a)(5)
  - Waste is hazardous if its acute inhalation LC_{50} < 10,000 ppm

Acute inhalation LC_{50} is defined in 22 CCR § 66260.10

22 CCR § 66261.24(b) further describes:

- A method for sampling the headspace gas of a waste.
- A calculation to correct reported acute inhalation LC50 data from tests conducted using a different exposure timeframe (not an 8-hour exposure).

Characteristics of Hazardous Waste

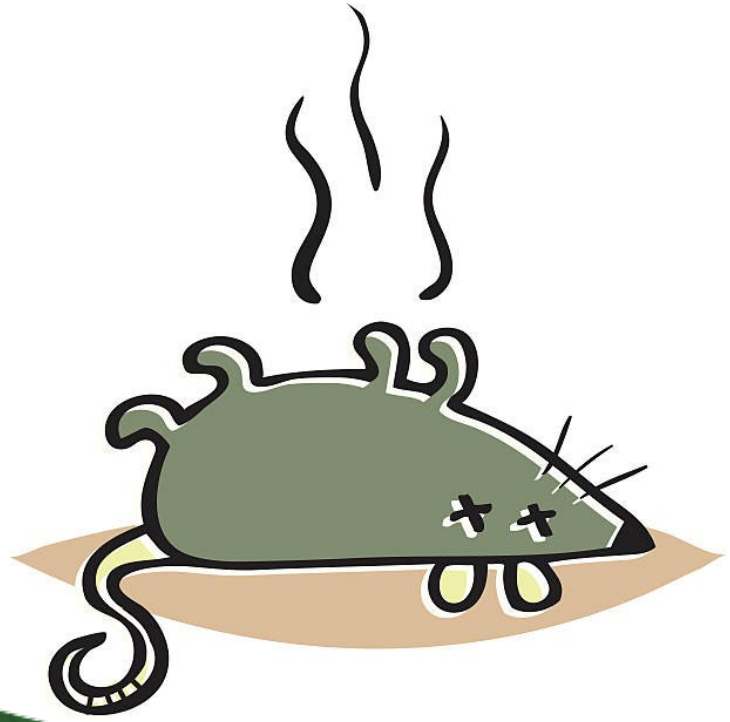
California's Toxicity Characteristic 66261.24(a)(2) – (8)

Acute Toxicity

- Acute Aquatic Toxicity [22 CCR § 66261.24(a)(6)]
  - Waste is hazardous if acute aquatic 96-hour LC_{50} < 500 mg/liter
    - AKA the fish bioassay
    - LC_{50} measured using:
      - fathead minnows
      - rainbow trout
      - golden shiners

Characteristics of Hazardous Waste

Toxic Hazardous Wastes



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Characteristics of Hazardous Waste

California's Toxicity Characteristic 66261.24(a)(2) – (8)

Carcinogenicity 22 CCR § 66261.24(a)(7)

66261.24(a)(7) – at a single or combined concentration ≥ 0.001% by weight
(A) 2-Acetylaminofluorene (2-AAF)
(B) Acrylonitrile
(C) 4-Aminodiphenyl
(D) Benzidine and its salts
(E) bis (Chloromethyl) ether (BCME)
(F) Methyl chloromethyl ether
(G) 1,2-Dibromo-3-chloropropane (DBCP)
(H) 3,3'-Dichlorobenzidine and its salts (DCB)
(I) 4-Dimethylaminoazobenzene (DAB)
(J) Ethyleneimine (EL)
(K) alpha-Naphthylamine (1-NA)
(L) beta-Naphthylamine (2-NA)
(M) 4-Nitrobiphenyl (4-NBP)
(N) N-Nitrosodimethylamine (DMN)
(O) beta-Propiolactone (BPL)
(P) Vinyl chloride (VCM)

List of 16 carcinogenic substances (examples: acrylonitrile, benzidine, vinyl chloride)

Hazardous if present in a waste in single or combined concentration exceeding 0.001 percent (10 ppm)

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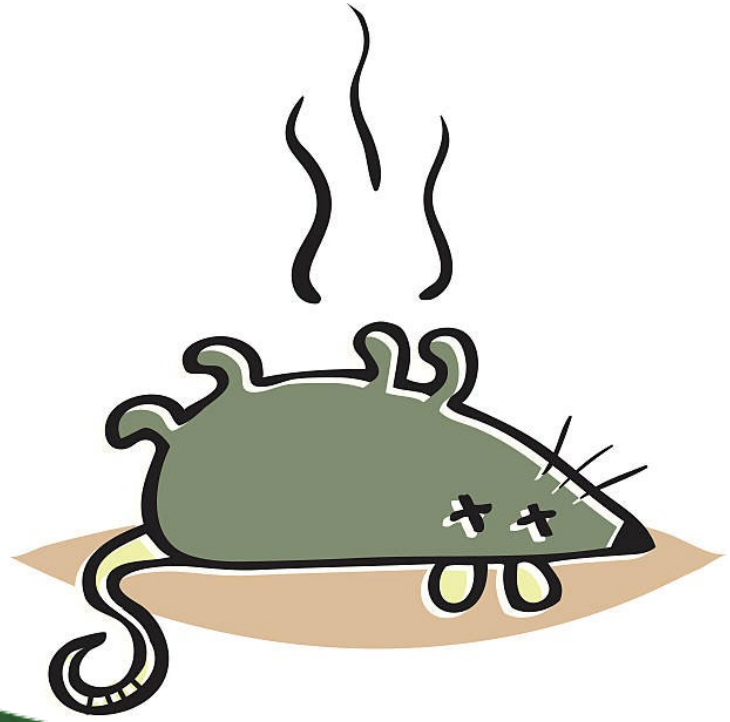
Characteristics of Hazardous Waste

Toxic Hazardous Wastes



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- Toxic if satisfies any one of the elements

Characteristics of Hazardous Waste

California's Toxicity Characteristic 66261.24(a)(2) – (8)

Experience or Testing 22 CCR § 66261.24(a)(8)

- Wastes shown through experience or testing to pose a hazard due to carcinogenicity, acute toxicity, chronic toxicity, bioaccumulative properties, or persistence in the environment.
- HSC § 25141.5 states that for DTSC to classify any waste as hazardous under (a)(8), when the regulation of such waste would have broad application, we must adopt a regulation for it.

- Example: Ethylene glycol (antifreeze). At one time we regulated it as HW under (a)(8)…**BUT**… we never incorporated it into a regulation and therefore we can no longer identify it as hazardous per (a)(8).

  Ethylene glycol kills cats (and humans) but not rats - does not meet oral LD_{50}.

Hazardous Waste Determination Process

Step 1	Is it a waste?
Step 2	Excluded or exempted?
Step 3	Listed?
Step 4	Characteristic?

Training Topics

1. Hazardous waste laws
2. Is it a waste?
3. Is it excluded or exempted?
4. Is it a listed hazardous waste?
5. Does it display a characteristic of hazardous waste?
6. The mixture and derived-from rules, and contained-in policy
7. The meaning of Appendix X
8. Self-classification options

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Different Rules for Characteristic and Listed Hazardous Waste

- Mixture Rule
- Derived-from Rule
- Contained-in Policy

Characteristic Wastes

- Mixture Rule - Characteristic Wastes 22 CCR §66261.3(b)(4)
- Derived-From Rule - Characteristic Wastes 22 CCR §66261.3(c)

Mixture Rule - Characteristic Wastes 22 CCR §66261.3(b)(4)

- Wastes mixed with either a RCRA or a non-RCRA characteristic hazardous waste are hazardous waste only if the resulting mixture still exhibits a hazardous characteristic

- Intentional mixture to avoid regulation is treatment, and requires authorization

Derived-From Rule - Characteristic Wastes 22 CCR §66261.3(c)

- Wastes derived from the treatment, storage or disposal of either a RCRA or a non-RCRA characteristic hazardous waste are hazardous waste only if the resulting waste still exhibits a hazardous characteristic

Listed Wastes

- Mixture Rule - Listed Wastes22 CCR §66261.3(a)(2)(E) and (F)
- Derived-From Rule - Listed Wastes 22 CCR §66261.3(c)

Mixture rule – RCRA Listed Wastes

- 22 CCR §66261.3(a)(2)(E) and (F)
- Mixtures of wastes and RCRA listed hazardous wastes are listed hazardous wastes
  - Concentrations are irrelevant

Mixture rule – RCRA Listed Wastes

- Exceptions:
  - Waste has been delisted by US EPA
  - Wastes listed solely due to characteristics other than (T) or (H), and mixture does not exhibit a characteristic
  - Wastewaters containing de minimis concentrations of listed hazardous wastes discharged under the Clean Water Act provisions
  - Wastes containing minimal losses of P or U listed waste due to normal handling or minor leaks

Derived-From Rule RCRA Listed Wastes

- 22 CCR §66261.3(c)
- Wastes generated from the treatment, storage, or disposal of listed hazardous waste are hazardous waste

Derived-From Rule- RCRA Listed Wastes

- Exceptions:
  - Wastes delisted by US EPA
  - Pickle liquor sludge
  - Biological treatment sludge (K156 and K157)
  - Slag from high temperature metal recovery

Derived-From Rule - Characteristic

- 22 CCR §66261.3(c)

- Wastes derived from the treatment, storage or disposal of characteristic hazardous waste are hazardous waste only if the resulting mixture still exhibits a characteristic

Example

- K001 sludge is shipped to a treatment, storage, disposal facility (TSDF) to be incinerated.
- What is the regulatory status of the ash generated from the incineration of the sludge?

California's Mixture Rule for M-listed Waste

- 22 CCR §66261.3(b)(4)
- Not like the RCRA listed waste mixture rule
- Is a hazardous waste only if it meets a characteristic of a hazardous waste (toxic, corrosive, ignitable, reactive)

RCRA Contained-In Policy

- Applies to contaminated media and debris
- Environmental media (water or soil) that contain listed hazardous wastes are hazardous wastes
  - Unless DTSC determines the listed waste is present at insignificant concentration (risk-based evaluation)

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What is Appendix X?

- List of 791 chemicals
- List of 66 common names or types of hazardous wastes
- Characteristic of concern noted (X,C,I,R)
- A tool for generators
- List creates a “presumption” – Wastes listed in Appendix X or containing a listed chemical are presumed hazardous by characteristic
- Can be classified as nonhazardous by using testing or knowledge, as with other wastes

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Self-Classification Options

Classification Of A Waste as Hazardous or Nonhazardous
22 CCR §66260.200

- DTSC concurrence: 22 CCR §66260.200(d),(e),(m)
  - Departmental timelines
- DTSC reclassification: 22 CCR §66260.200(f)
  - Non-RCRA waste w/mitigating chemical or physical characteristics
  - Departmental timelines
- DTSC special waste: 22 CCR §66261.124

* ***<u>All DTSC determinations are subject to fee for service!</u>*** *

HSC § 25205.7

TRAINING RESOURCES

- DTSC's California Hazardous Waste Classification Training
- DTSC Online Reference Library (DORY)
- RCRA Online
- RCRA Orientation Manual
- U.S. EPA's Defining Hazardous Waste page
- U.S. EPA's User-friendly Reference Guide for 261.4(b) exclusions
- U.S. EPA Regulatory Exclusions and Alternative Standards for the Recycling of Materials, Solid Wastes and Hazardous Wastes
- U.S. EPA Basis for the Listing

Any Questions?

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