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CALIFORNIA CUPA FORUM

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Advanced Hazardous Waste Determination

Andy Smith
Regan Bottomley

March 20-23, 2023

CALIFORNIA CUPA FORUM

25th California Unified Program Annual Training Conference
March 20 – 23, 2023

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What's the Point?

Question:

Which of the following are hazardous wastes?

- radioactive waste
- infectious substances (E-bola, dengue virus, etc)
- PFAS
- chloraseptic throat spray
- leather gloves
- multivitamins

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What's the Point?

Question:

RCRA waste regulations are trying to protect human health and the environment during…

- day to day use of chemicals
- transportation (rail cars in Ohio, for example)
- disposal

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EPA sued to list PVC as HW

B. Summary of the Petitioner's Requested Changes

The EPA has been petitioned to "promulgate regulations governing the safe treatment, storage and disposal of PVC, vinyl chloride and associated dialkyl- and alkylarylesters of 1,2-benzenedicarboxylic acid, commonly known as phthalate plasticizers."

CBD requests that discarded PVC be listed as a hazardous waste, which would require a narrative listing of discarded PVC from non-specific sources be added to the "F" list under 40 CFR 261.31, the requirements for which are specified in 40 CFR 261.11.

IV. Reasons for the EPA's Tentative Denial of the Petition

A. Petition Does Not Adequately Support Regulation of Discarded PVC Under RCRA

The Petition does not provide sufficient evidence to suggest that listing discarded PVC as a hazardous waste would have a meaningful impact, if any, on reducing exposure to phthalates, including phthalates used as plasticizers in some PVC products. The rulemaking the petition is seeking under RCRA is, by definition, limited to hazards that present a substantial present or potential hazard to human health or the environment when solid waste is improperly treated, stored, transported or disposed of, or otherwise managed (40 CFR 261.11), which does not appear to correspond to the studies or data cited in the petition. As a result, the information provided about potential exposures during use of PVC is not relevant.

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Hazardous Waste Determination

RCRA Hazardous Waste

- Defined by Federal EPA
- All applicable Federal waste codes + one CA waste code
- Lists and characteristics

Non-RCRA Hazardous Waste

- Defined by DTSC
- One applicable waste code
- Lists and characteristics

Hazardous Waste Determination

1. Is it a waste?
2. Is it excluded?
3. Is it listed?
4. Is it listed in 66261 Appendix X?
   - Rebut presumption by determining characteristics
5. Is it characteristic?

Hazardous Waste Determination

HWGIR Regulations

A person who generates a solid waste, as defined at 261.2, must make an accurate determination as to whether that waste is a hazardous waste

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Hazardous Waste Determination

HWGIR Regulations

Hazardous waste determination must be made

- At the point of generation
- Before any dilution, mixing, or other alteration, and
- Any time waste has changes

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Where is (are) the Point(s) of Generation?

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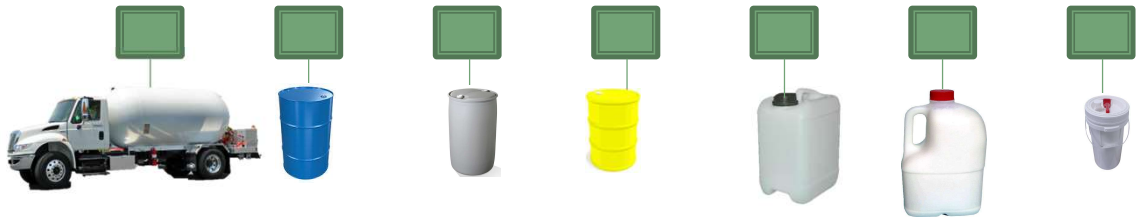

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Where is (are) the Point(s) of Generation?

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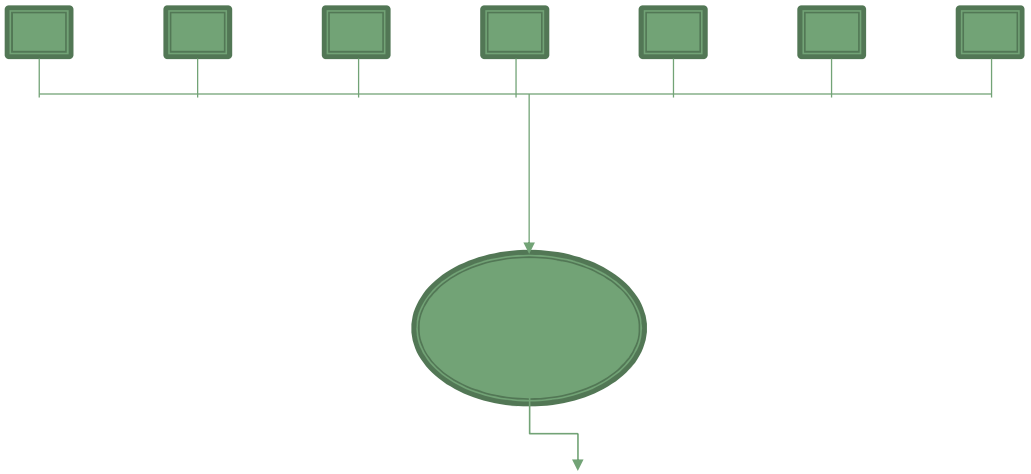

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Hazardous Waste Determination

In addition to concerns about the regulatory status of over-classified wastes, commenters also expressed concerns about generators using the best available information and still making an inaccurate determination because of the errors and omissions of others. Generators are, and always have been, ultimately responsible for making accurate hazardous waste determinations. Hiring a third party contractor, waste broker, or consultant, or reliance on information provided by suppliers does not transfer this responsibility to those third parties.

HWGIR FR 85732, November 28, 2016

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Point of Generation

Point of Generation is NOT

- When I get around to it
- When I say it out loud
- When the drum is full
- After analysis is returned
- When my TSDF gets back to me

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Hazardous Waste Determination

RCRA Memo 11424

Where a generator does meet the conditions of Section 262.34, the accumulation time begins when a waste is generated or when it is first taken from a "satellite" accumulation area operated pursuant to 40 CFR 262.34(c). Waste is generated either when it is produced or when it is first caused to be subject to regulation (40 CFR 260.10), not when a generator first analyzes the waste. If the waste in the drum was a listed or characteristic hazardous waste when it was produced, then the one-time 90-day accumulation time could begin only at the time the waste was produced or removed from the satellite accumulation area.

If the waste was not subject to regulation when it was first stores, e.g., the material had not yet been listed as a regulated hazardous waste, then the 90-day period would have begun when the waste became subject to regulation--upon the effective date of the new listing. A generator's failure to properly analyze, label, and accumulate waste does not exempt the waste from regulation.

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Hazardous Waste Determination

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HWGIR Regulations

Listings

- Waste origin
- Composition
- Process
- Feedstock
- Any other reliable and relevant information

Characteristics

- Process knowledge
- Product, by-product, intermediate info
- Chemical/physical properties
- Testing
- Any other reliable and relevant information

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Record Keeping

- Records supporting determination
  - Keep 3 years
- Records must include, as applicable
  - Test results/waste analysis
  - Test/analytical methods
  - Records consulted
  - Generator knowledge

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Listed Wastes

FEDERAL - RCRA

- Lists
  - F, K, P, U list
- Characteristics
  - Ignitability
  - Corrosivity
  - Reactivity
  - Toxicity

STATE – NON-RCRA

- Lists
  - M list & Appendix X
- Characteristic
  - Toxicity
  - Corrosivity

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RCRA Lists

Used/Spent

- **F-list**
  - Non-specific source wastes
- **K-list**
  - Specific source wastes

Unused

- **P-list**
  - Acute commercial chemical products (CCP)
- **U-list**
  - Toxic and other commercial chemical products

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K-List

- Wood preservation
- Inorganic pigments
- Organic chemicals
- Inorganic chemicals
- Pesticides
- Explosives
- Petroleum refining
- Iron and steel
- Primary aluminum
- Secondary lead smelting
- Veterinary pharmaceuticals
- Ink formulation
- Coking operations

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K-List

Industry and EPA Hazardous Waste No.	Hazardous Waste	Hazard Code
Wood preservation:		
K001	bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol;	(T)
Inorganic pigments:		
K002	wastewater treatment sludge from the production of chrome yellow and orange pigments;	(T)
K003	wastewater treatment sludge from the production of molybdate orange pigments;	(T)
K004	wastewater treatment sludge from the production of zinc yellow pigments;	(T)
K005	wastewater treatment sludge from the production of chrome green pigments;	(T)
K006	wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated);	(T)
K007	wastewater treatment sludge from the production of iron blue pigments;	(T)
K008	oven residue from the production of chrome oxide green pigments;	(T)
Organic chemicals:		
K009	distillation bottoms from the production of acetaldehyde from ethylene;	(T)

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F-list Categories

Hazardous Waste Code	Waste Stream
F001-F005	Spent solvents
F006-F009	Electroplating
F010-F012, F019	Metal heat-treating waste
F020 – F0233, F026-F028	Dioxin-bearing waste
F024, F025	Chlorinated aliphatic hydrocarbon production waste
F032, F034, F035	Wood preserving waste
F037, F038	Petroleum refinery wastewater treatment sludge
F039	Multisource leachate

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Industry and EPA hazardous waste No.	Hazardous Waste	Hazard code
Generic:		
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)
F002	The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(T)
F003	The following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(I)*
F004	The following spent non-halogenated solvents: Cresols and cresylic acid, and nitrobenzene; 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, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(T)
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	(I,T)

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Hazard Codes

Waste Characteristic	Hazard Code
Ignitability	(I)
Corrosivity	(C)
Reactivity	(R)
Toxicity	(E)
Toxic	(T)
Acutely hazardous	(H)

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F001, F002, F004, F005 (Not F003)

1. Single solvent
2. Solvent mixtures/blends with combined total of ≥ 10% of solvents in F001, F002, F004, F005

- "Before Use"
- Apply all applicable waste codes

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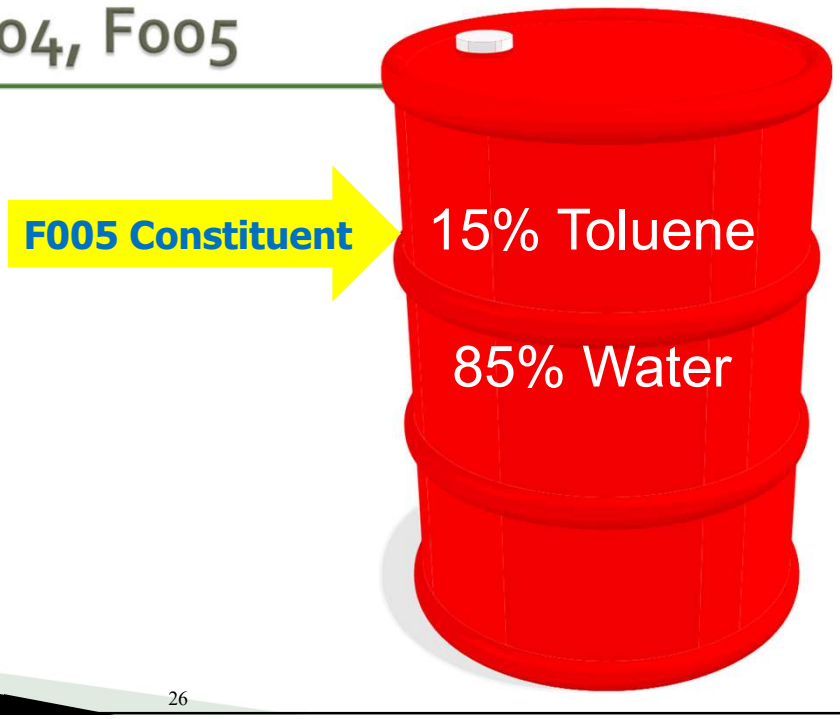
F001, F002, F004, F005

- **F005**



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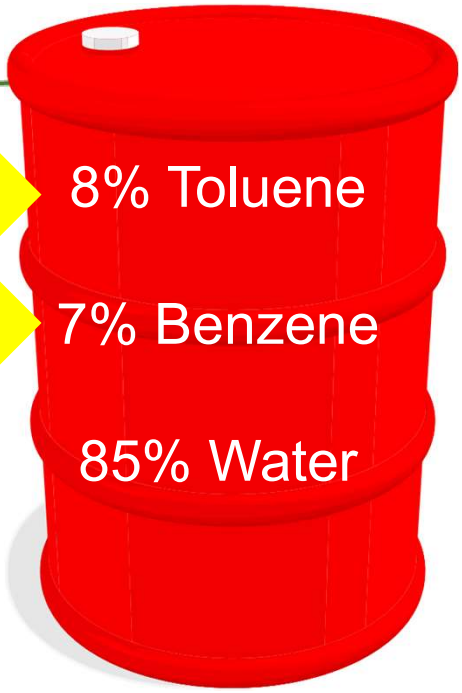
F001, F002, F004, F005

- F005

F005 Constituent: 8% Toluene

F005 Constituent: 7% Benzene

85% Water



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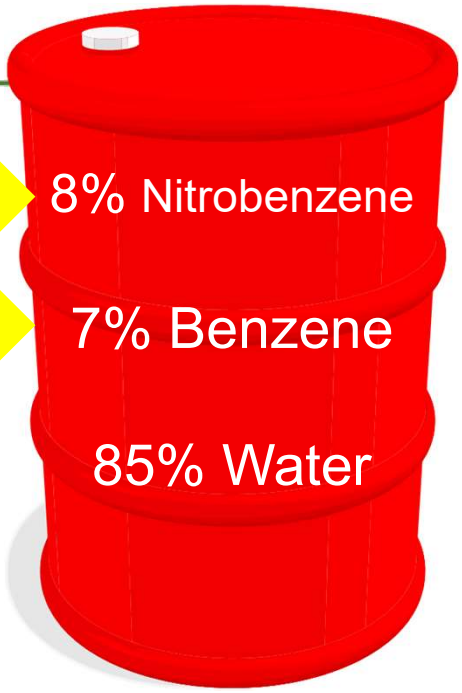
F001, F002, F004, F005

- F004
- F005

F004 Constituent: 8% Nitrobenzene

F005 Constituent: 7% Benzene

85% Water



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F003 Solvents

- Not included with F001, F002, F004, F005
  - Ignitable only
  - Still "before yes"

1. 100% F003 solvent(s)
2. Any amount F003 along with F001, F002, F004, and/or F005

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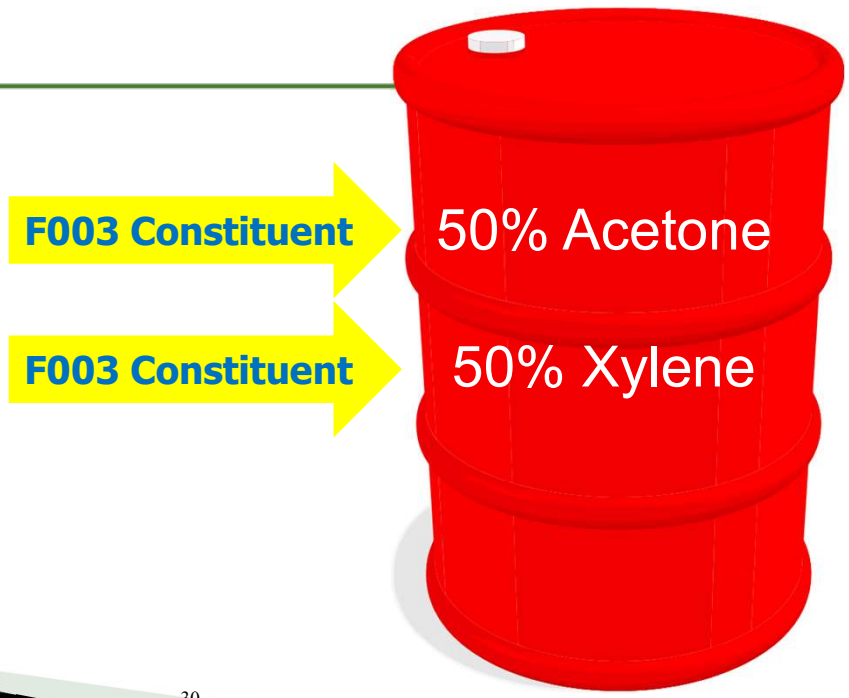
F003 Solvents

- **F003**



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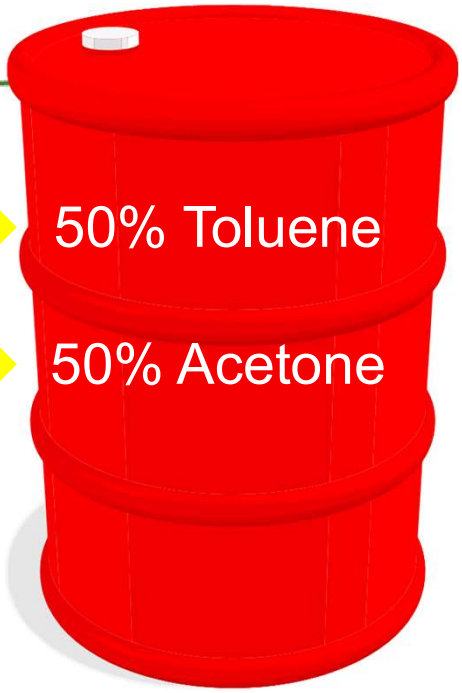
Foo3 Solvents

- Foo5
- Foo3

F005 Constituent — 50% Toluene

F003 Constituent — 50% Acetone



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Foo3 Solvents

- Foo5
- Foo3

F005 Constituent — 10% Benzene

F003 Constituent — 45% Xylene

F003 Constituent — 45% Acetone

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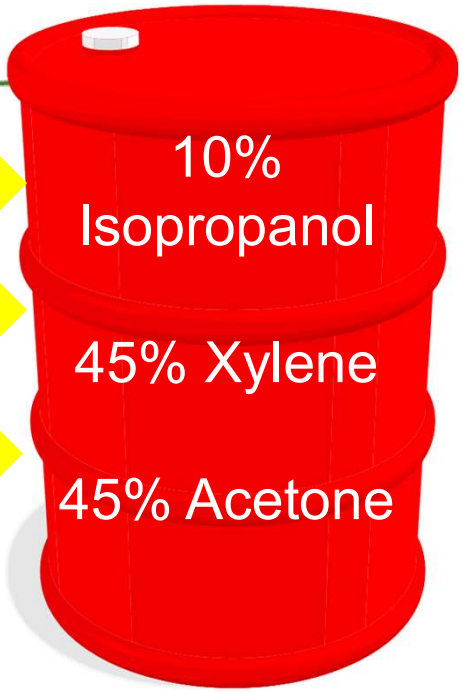
Foo3 Solvents

- **Not listed**



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F-list

- What's the difference between Foo1 and Foo2?

Industry and EPA hazardous waste No.	Hazardous Waste	Hazard code
Generic:		
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)
F002	The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(T)

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Still bottoms

- Also includes still bottoms from recovery of these solvents

Industry and EPA hazardous waste No.	Hazardous Waste	Hazard code
Generic:		
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)
F002	The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(T)

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Listed Wastes

- F019 (in CA)

wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process;

F019 (federal)

Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process. Wastewater treatment sludges from the manufacturing of motor vehicles using a zinc phosphating process will not be subject to this listing at the point of generation if the wastes are not placed outside on the land prior to shipment to a landfill for disposal and are either: disposed in a Subtitle D municipal or industrial landfill unit that is equipped with a single clay liner and is permitted, licensed or otherwise authorized by the state; or disposed in a landfill unit

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Listed Wastes

- F019 (in CA)
  - In CA, always F019
- F019 (federal)
  - Not HW if going to Subtitle D landfill in a different state…

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Listed Wastes

- Some Federal listed waste codes don't exist in CCR
  - K169, K170, K171, K172, K177, K181 (HSWA)
  - K178 (RCRA)

K181	Nonwastewaters from the production of dyes and/or pigments (including nonwastewaters commingled at the point of generation with nonwastewaters from other processes) that, at the point of generation, contain mass loadings of any of the constituents identified in paragraph (c) of this section that are equal to or greater than the corresponding paragraph (c) levels, as determined on a calendar year basis. These wastes will not be hazardous if the nonwastewaters are: (i) disposed in a Subtitle D landfill unit subject to the design criteria in §258.40, (ii)

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Original P List

P071..... Methyl parathion
METRON see P071
MOLE DEATH see P108
MOUSE-NOTS see P108
MOUSE-RID see P108
MOUSE-TOX see P108
RO-DETH see P001
RO-DEX see P108
ROSEX see P001
ROUGH & READY MOUSE MIX see P001
SANASEED see P108
SANTOBRITE see P090
SANTOPHEN see P090
SANTOPHEN 20 see P090
SCHRADAN see P085
P103..... Selenourea

[1] The Agency included those trade names of which it was aware; an omission of a trade name does not imply that the omitted material is not hazardous. The material is hazardous if it is listed under its generic name.

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P and U-List

Hazardous waste No.	Chemical abstracts No.	Substance
P023	107–20–0	Acetaldehyde, chloro-
P002	591–08–2	Acetamide, N-(aminothioxomethyl)-
P057	640–19–7	Acetamide, 2-fluoro-
P058	62–74–8	Acetic acid, fluoro-, sodium salt
P002	591–08–2	1-Acetyl-2-thiourea
P003	107–02–8	Acrolein
P070	116–06–3	Aldicarb
P203	1646–88–4	Aldicarb sulfone
P004	309–00–2	Aldrin
P005	107–18–6	Allyl alcohol
P006	20859–73–8	Aluminum phosphide (R,T)

U394	30558–43–1	A2213
U001	75–07–0	Acetaldehyde (I)
U034	75–87–6	Acetaldehyde, trichloro-
U187	62–44–2	Acetamide, N-(4-ethoxyphenyl)-
U005	53–96–3	Acetamide, N-9H-fluoren-2-yl-
U240	194–75–7	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters
U112	141–78–6	Acetic acid ethyl ester (I)
U144	301–04–2	Acetic acid, lead(2+) salt
U214	563–68–8	Acetic acid, thallium(1+) salt
see F027	93–76–5	Acetic acid, (2,4,5-trichlorophenoxy)-
U002	67–64–1	Acetone (I)

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P-List

- Everything on list is acutely hazardous
  - (H) is assumed
- May have other hazards
  - (T) toxic
  - (R) reactive
- Absence of a letter indicates solely acutely hazardous

Hazardous waste No.	Chemical abstracts No.	Substance
P023	107–20–0	Acetaldehyde, chloro-
P002	591–08–2	Acetamide, N-(aminothioxomethyl)-
P057	640–19–7	Acetamide, 2-fluoro-
P058	62–74–8	Acetic acid, fluoro-, sodium salt
P002	591–08–2	1-Acetyl-2-thiourea
P003	107–02–8	Acrolein
P070	116–06–3	Aldicarb
P203	1646–88–4	Aldicarb sulfone
P004	309–00–2	Aldrin
P005	107–18–6	Allyl alcohol
P006	20859–73–8	Aluminum phosphide (R,T)

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U-List

- Toxic, unless it's not
- Absence of a letter indicates solely toxic
- (T) toxic
- (R) reactivity
- (C) corrosivity
- (I) ignitability

HW No.	Chemical abstracts No.	Substance
U394	30558-43-1	A2213
U001	75-07-0	Acetaldehyde (I)
U034	75-87-6	Acetaldehyde, trichloro-
U187	62-44-2	Acetamide, N-(4-ethoxyphenyl)-
U005	53-96-3	Acetamide, N-9H-fluoren-2-yl-
U240[1]	94-75-7	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters
U112	141-78-6	Acetic acid ethyl ester (I)
U144	301-04-2	Acetic acid, lead(2+) salt
U214	563-68-8	Acetic acid, thallium(1+) salt
see F027	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-
U002	67-64-1	Acetone (I)
U003	75-05-8	Acetonitrile (I,T)
U004	98-86-2	Acetophenone
U005	53-96-3	2-Acetylaminofluorene
U006	75-36-5	Acetyl chloride (C,R,T)

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P and U-List

1. Off specification
2. Residues
3. Spills

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P and U-List

1. Pure grade
2. Technical grade
3. Sole active ingredient

[*Comment:* The phrase ''commercial chemical product or manufacturing chemical intermediate having the generic name listed in . . .'' refers to a chemical substance which is manufactured or formulated for commercial or manufacturing use which consists of the commercially pure grade of the chemical, any technical grades of the chemical that are produced or marketed, and all formulations in which the chemical is the sole active ingredient. It does not refer to a material, such as a manufacturing process waste, that contains any of the substances listed in paragraph (e) or (f). Where a manufacturing process waste is deemed to be a hazardous waste because it contains a substance listed in paragraph (e) or (f), such waste will be listed in either §261.31 or §261.32 or will be identified as a hazardous waste by the characteristics set forth in subpart C of this part.]

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Technical Grades

A solvent formulation consisting of 99.98% xylene and 0.02% benzene and toluene meets the F003 listing when used for its solvent properties and discarded. The F003 listing covers pure solvent mixtures, as well as technical grade solvent formulations, which are used for their solvent properties. The term technical grade refers to all grades of a chemical which are marketed or recognized for general usage by the chemical industry. Solvent formulations containing de minimis percentages of manufacturing contaminants or impurities are considered technical grade products, provided that they are available for purchase and use in this form. Therefore, when determining if a given spent solvent mixture contains only the solvents specified in the F003 listing, generators should include in their evaluation each solvent constituent present in a mixture before use, provided that a particular solvent constituent is not a contaminant or present in de minimis concentrations (50 FR 53317; December 31, 1985). In other words, a technical grade solvent could contain small concentrations of contaminants or manufacturing impurities and still meet the F003 listing after being used for its solvent properties.

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Sole Active Ingredient

product. "Sole active ingredient" means the active ingredient is the only chemically active component for the function of the product. If a formulation has more than one active ingredient, the formulation, when discarded, would not be within the scope of the listing in §261.33, regardless of whether only one or both active ingredients are listed.

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Example

Rat-B-Gone	
Active ingredients: Warfarin Imidacloprid	 0.6% 0.4%
Inactive ingredients: Corn meal, glycerin	99%

Not P001

Warfarin is a listed hazardous waste, P001

Rat-B-Dead	
Active ingredients: Warfarin	 0.5%
Inactive ingredients: Cereal, green pigments	99.5%

P001

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Example

Nerve-Preserve (Laboratory preservative)	
Active ingredients: Formaldehyde	 0.5%
Inactive ingredients: Methanol, p ter	 99.5%

U122

U154

Which listed waste code(s) applies, if any?

U122

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Example

Ingredients

Active Ingredients

Ingredient - Purpose
Phenol 1.4% - Oral Anesthetic / Analgesic

Inactive Ingredients: FD&C red #40, flavors, glycerin, purified water, sodium chloride, sodium citrate, sodium saccharin, sucralose

U186	504-60-9	1,3-Pentadiene (I)
U187	62-44-2	Phenacetin
U188	108-95-2	Phenol
U048	95-57-8	Phenol, 2-chloro-
U039	59-50-7	Phenol, 4-chloro-3-methyl-

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California Lists – M-List

Mercury-Containing Products	
M001	Mercury-containing vehicle switches
M002	Non-automotive mercury switches and any product that contains switches
M003	Lamps that contain intentionally-added mercury and products with lamps that contain intentionally-added mercury
M004	Mercury-added novelties, includes items painted with mercury-containing paint

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California Lists – Appendix X

1. 791 chemicals
2. 66 items
3. 15 Electronic devices

1.		Acetaldehyde (X,I)
2.		Acetic acid (X,C,I)
3.		Acetone, Propanone (I)
4.		Acetone cyanohydrin (X)
5.		Acetonitrile (X,I)
6.	*	2-Acetylaminofluorene, 2-AAF (X)
7.		Acetyl benzoyl peroxide (X,I,R)
8.	*	Acetyl chloride (X,C,R)
9.		Acetyl peroxide (X,I,R)
10.		Acridine (X)
11.	*	Acrolein, Aqualin (X,I)
12.	*	Acrylonitrile (X,I)
13.	*	Adiponitrile (X)

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Appendix X

(a) This subdivision sets forth a list of chemicals which create a presumption that a waste is a hazardous waste. If a waste consists of or contains a chemical listed in this subdivision, the waste is presumed to be a hazardous waste unless it is determined that the waste is not a hazardous waste pursuant to the procedures set forth in section 66262.11. The hazardous characteristics which serve as a basis for listing the chemicals are indicated in the list as follows:(X) toxic, (C) corrosive, (I) ignitable and (R) reactive. A chemical denoted with an asterisk is presumed to be an extremely hazardous waste unless it does not exhibit any of the criteria set forth in section 66261.110 and section 66261.113. Trademark chemical names are indicated by all capital letters.

- Creates a presumption that a waste is hazardous waste
- Consists of or contains anything on list
- It is hazardous *unless* it's not hazardous

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Appendix X

(a) This subdivision sets forth a list of chemicals which create a presumption that a waste is a hazardous waste. If a waste consists of or contains a chemical listed in this subdivision, the waste is presumed to be a hazardous waste unless it is determined that the waste is not a hazardous waste pursuant to the procedures set forth in section 66262.11. The hazardous characteristics which serve as a basis for listing the chemicals are indicated in the list as follows:(X) toxic, (C) corrosive, (I) ignitable and (R) reactive. A chemical denoted with an asterisk is presumed to be an extremely hazardous waste unless it does not exhibit any of the criteria set forth in section 66261.110 and section 66261.113. Trademark chemical names are indicated by all capital letters.

- Hazard codes
  - (X) toxic
  - (C) corrosive
  - (I) ignitable
  - (R) reactive
  - * extremely hazardous waste

Appendix X - Example

Vinegar milk (mmm yum!)

- 1% acetic acid
- 99% milk

- Is it hazardous waste?

1.		Acetaldehyde (X,I)
2.		Acetic acid (X,C,I)
3.		Acetone, Propanone (I)
4.		Acetone cyanohydrin (X)
5.		Acetonitrile (X,I)
6.	*	2-Acetylaminofluorene, 2-AAF (X)
7.		Acetyl benzoyl peroxide (X,I,R)
8.	*	Acetyl chloride (X,C,R)
9.		Acetyl peroxide (X,I,R)
10.		Acridine (X)
11.	*	Acrolein, Aqualin (X,I)
12.	*	Acrylonitrile (X,I)
13.	*	Adiponitrile (X)

Appendix X

1. 791 chemicals
2. 66 items
3. 15 Electronic devices

- Acetylene sludge (C)
- Acid and water (C)
- Acid sludge (C)
- AFU Floc (X)
- Alkaline caustic liquids (C)
- Alkaline cleaner (C)
- Alkaline corrosive battery fluid (C)
- Alkaline corrosive liquids (C)
- Asbestos waste (X)
- Ashes (X,C)
- Bag house wastes (X)
- Battery acid (C)
- Beryllium waste (X)
- Cleaning solvents (I)
- Corrosion inhibitor (X,C)
- Data processing fluid (I)
- Drilling fluids (X,C)
- Drilling mud (X)
- Dyes (X)
- Etching acid liquid or solvent (C,I)
- Fly ash (X,C)
- Fuel waste (X,I)
- Insecticides (X)
- Laboratory waste (X,C,R,I)

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Appendix X

1. 791 chemicals
2. 66 items
3. 15 Electronic devices

- (1) Cathode ray tube (CRT)-containing devices (CRT devices);
- (2) CRTs;
- (3) CRT-containing computer monitors;
- (4) Liquid crystal display (LCD)-containing laptop computers;
- (5) LCD-containing desktop monitors;
- (6) CRT-containing televisions;
- (7) LCD-containing televisions (excluding LCD projection televisions);
- (8) Plasma televisions (excluding plasma projection televisions);
- (9) Portable DVD players with LCDs.
- (10) Organic light-emitting diode (OLED)-containing televisions;
- (11) OLED-containing laptop computers;
- (12) OLED-containing tablets;

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Characteristic Hazardous Waste

Ignitability

Corrosivity

Reactivity

Toxicity

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D-Codes Pre-1990

261.21 (Ignitability)

(b) A solid waste that exhibits the characteristic of ignitability, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number of D001.

261.22 (Corrosivity)

(b) A solid waste that exhibits the characteristic of corrosivity, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number of D002.

261.23 (Reactivity)

(b) A solid waste that exhibits the characteristic of reactivity, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number of D003.

261.24 (Toxicity)

(b) A solid waste that exhibits the characteristic of EP toxicity, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number specified in Table I which corresponds to the toxic contaminant causing it to be hazardous.

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D-Codes Post-1990

261.21 (Ignitability)

(b) A solid waste that exhibits the characteristic of ignitability has the EPA Hazardous Waste Number of D001.

261.22 (Corrosivity)

(b) A solid waste that exhibits the characteristic of corrosivity has the EPA Hazardous Waste Number of D002.

[45 FR 33119, May 19, 1980, as amended at 46 FR 35247, July 7, 1981; 55 FR 22684, June 1, 1990; 58 FR 46049, Aug. 31, 1993; 70 FR 34561, June 14, 2005]

261.23 (Reactivity)

(b) A solid waste that exhibits the characteristic of reactivity has the EPA Hazardous Waste Number of D003.

[45 FR 33119, May 19, 1980, as amended at 55 FR 22684, June 1, 1990; 75 FR 13002, Mar. 18, 2010]

261.24 (Toxicity)

(b) A solid waste that exhibits the characteristic of toxicity has the EPA Hazardous Waste Number specified in Table 1 which corresponds to the toxic contaminant causing it to be hazardous.

TABLE 1—MAXIMUM CONCENTRATION OF CONTAMINANTS FOR THE TOXICITY CHARACTERISTIC

Ignitability (D001)

1. Liquid with flash point < 140°F
   1. Except aqueous alcohol solution, < 24% ABV
2. Non liquid, causes fire at STP
   - Friction
   - Absorption of moisture
   - Spontaneous chemical change
   - Burns vigorously, persistently

Ignitability (D001)

- Why < 140°F?
  - Landfill temperatures

commenters. A number of EPA studies reveal that ambient temperatures of 140° F are regularly encountered during landfill disposal. In such environments, liquid wastes with flashpoints lower than 140° F will readily volatilize and can be easily ignited by the numerous ignition sources to which wastes are exposed during management. The need

Ignitability (D001)

- Aqueous alcohol solution, < 24% ABV?

unfortunately has no data on hand which identifies the correlation between the concentration of alcohol in such wastes and the established flashpoint of 140° F. Accordingly, it has for the time being opted to follow the Department of Transportation's lead and exclude from its ignitable liquids category aqueous solutions containing less than 24 percent of alcohol by volume. This exclusion will remove from the ignitability characteristic liquid wastes which the Agency knows may flash but not sustain combustion. In the meantime, EPA hopes to undertake further study to determine whether another exclusion limit is more appropriate and to evaluate tests which might be capable of identifying wastes which exhibit this phenomenon.

Ignitability (D001)

- Proposed meaning of aqueous alcohol solution

§ 261.21 Characteristic of ignitability.

(a) * * *

(1) It is a liquid, other than a solution containing less than 24 percent of any alcohol or combination of alcohols (except if the alcohol has been used for its solvent properties and is one of the alcohols specified in EPA Hazardous Waste No. F003 or F005 in 40 CFR 261.31) by volume and at least 50 percent water by weight, that has a flash point less than 60 °C (140 °F), as

Ignitability (D001)

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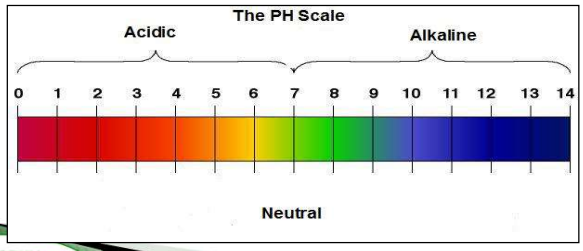
3. DOT ignitable compressed gas
4. DOT oxidizer
   - Organic peroxide

Corrosivity (D002)

1. Aqueous materials with pH ≤ 2 or ≥ 12.5
2. Liquid that corrodes steel > 0.25"/year at 55°C (130°F)



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Corrosivity (D002)

- D002 is liquids only

A few comments were received on the need for including corrosive solids in the corrosivity characteristic. All advocated including solids in the corrosivity characteristic but none described situations where the improper disposal of such wastes would be likely to cause damage.

EPA has concluded that, inasmuch as the great majority of wastes are presumed to be in liquid or semi-liquid form, there is no demonstrated need to address corrosive solids at this time.

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California Corrosivity

- Not liquid, when mixed with same amount water forms
  - Aqueous material with pH ≤ 2 or ≥ 12.5, or
  - Corrodes steel > 0.25"/yr at 55°C (130°F)

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Reactivity (D003)

- Normally unstable, reacts violently without detonating
- Reacts violently with water
- Forms explosive mixture with water

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Reactivity (D003)

- Generates toxic gases, vapors, or fumes when mixed with water
- Generates toxic cyanide and sulfide gases, vapors, or fumes at pH > 2 and < 12.5

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Reactivity (D003)

- Capable of detonation if heated under confinement or subjected to strong initiating source

Reactivity (D003)

- Capable of detonation at standard temperature and pressure
- DOT explosive (1.1, 1.2, 1.3)

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D003 Examples

- Acetyl chloride
- Chromic acid
- Cyanides
- Hypochlorites
- Sulfides
- Perchlorates
- Permanganates
- Organic peroxides

The unavailability of suitable test methods for measuring reactivity should not cause problems. Most generators of reactive wastes are aware that their wastes possess this property and require special handling. This in because such wastes are dangerous to the generators' own operations and are rarely generated from unreactive feed stocks. Consequently, the prose definition should provide generators with sufficient guidance to enable them to determine whether their wastes are reactive.

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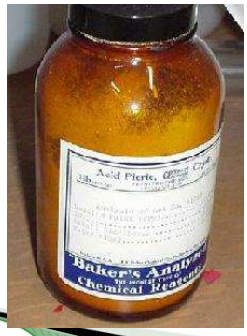
D003

Which of these is not reactive?



Toxicity (D004–D043)

- Toxicity Characteristic Leaching Procedure (TCLP)
  - Simulates landfill leaching

EPA HW Number	Contaminant	Regulatory Level (mg/l)	EPA HW Number	Contaminant	Regulatory Level (mg/l)
D004	Arsenic	5.0	D032	Hexachlorobenzene	0.13
D005	Barium	100.0	D033	Hexachlorobutadiene	0.5
D018	Benzene	0.5	D034	Hexachloroethane	3.0
D006	Cadmium	1.0	D008	Lead	5.0
D019	Carbon Tetrachloride	0.5	D013	Lindane	0.4
D020	Chlordane	0.03	D009	Mercury	0.2
D021	Chlorobenzene	100.0	D014	Methoxychlor	10.0
D022	Chloroform	6.0	D035	Methyl Ethyl Ketone	200.0
D007	Chromium	5.0	D036	Nitrobenzene	2.0
D023	o-Cresol	200.0	D037	Pentachlorophenol	100.0
D024	m-Cresol	200.0	D038	Pyridine	5.0
D025	p-Cresol	200.0	D010	Selenium	1.0
D026	Cresol	200.0	D011	Silver	5.0
D016	2,4-D	10.0	D039	Tetrachlorethylene	0.7
D027	1,4-Dichlorobenzene	7.5	D015	Toxaphene	0.5
D028	1,2-Dichloroethane	0.5	D040	Trichloroethylene	0.5
D029	1,1-Dichloroethylene	0.7	D041	2,4,5-Trichlorophenol	400.0
D030	2,4-Dinitrotolene	0.13	D042	2,4,6-Trichlorophenol	2.0
D012	Endrin	0.02	D017	2,4,5-TP (Silvex)	1.0
D031	Heptachlor (& its hydroxide)	0.008	D043	Vinyl Chloride	0.2

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California Toxicity

- Extract from Waste Extraction Test (WET) contains substances at or above STLC or TTLC limits

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Inorganic Constituents

- Antimony
- Arsenic
- Asbestos (friable)
- Barium
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Copper
- Fluoride salts
- Lead
- Mercury
- Molybdenum
- Nickel
- Selenium
- Silver
- Thallium
- Vanadium
- Zinc

Chromium Fed vs. CA

- Federal TCLP Chromium limit is all chromium
- CA Waste Extraction Test has different hex- and tri- limits

Substance [a,b]	STLC mg/l	TTLC Wet weight mg/kg
Barium and/or barium compounds (excluding barite)	100	10,000[c]
Beryllium and/or beryllium compounds	0.75	75
Cadmium and/or cadmium compounds	1.0	100
Chromium (VI) compounds	5	500
Chromium and/or chromium (III) compounds	5[d]	2,500

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Organic Constituents

- Aldrin
- Chlordane
- DDT, DDE, DDD
- 2,4-Dichlorophen oxyacetic acid
- Dieldren
- Dioxin (2,3,7,8-TCDD)
- Endrin
- Heptachlor
- Kepone
- Organic lead compounds
- Lindane
- Methoxychlor
- Mirex
- Pentachloro phenol
- PCBs
- Toxaphene
- Trichloro-ethylene
- 2,4,5-Tri-chloro phenoxy-propionic acid (Silvex)

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California Toxicity

- Oral LD_{50} < 2,500 mg/kg
  - DOT: ≤ 300 mg/kg
- Dermal LD_{50} < 4,300 mg/kg
  - DOT: ≤ 1,000 mg/kg
- Inhalation LC_{50} < 2,500 mg/kg

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California Toxicity

- Aquatic LC_{50} < 500 mg/L
- Contains listed toxics (A–P) at combined concentration > 0.001%
- Shown to pose a hazard

(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);
(0) beta-Propiolactone (BPL);
(P) Vinyl chloride (VCM);

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CA-Extremely Hazardous

- Oral LD_{50} ≤ 50 mg/kg
- Dermal LD_{50} ≤ 43 mg/kg
- Inhalation LC_{50} ≤ 100 ppm
- Contains listed chemicals at single or combined concentration of 0.1%

(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);
(0) beta-Propiolactone (BPL);
(P) Vinyl chloride (VCM);

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CA-Extremely Hazardous

- Exposure likely leads to death, disabling injury, serious illness, cancer (Prop 65?)
- Water reactive
- Chemicals listed at 66261.113 ≥ TTLC

TTLC Substance	Wet Weight in mg/kg
Aldrin	140
Arsenic and/or arsenic compounds	50,000 (as As)
Beryllium and/or beryllium compounds	7,500 (as Be)
Cadmium and/or cadmium compounds	10,000 (as Cd)
Chlordane	250
2,4-Dichlorophenoxyacetic acid	10,000
Dieldrin	800
Dioxin (2,3,7,8-TCDD)	1
Endrin	20
Heptachlor	470
Kepone	2,100
Lead compounds, organic	1,300 (dry weight basis; as Pb)
Lindane	400
Mercury and/or mercury compounds	2,000 (as Hg)
Mirex	2,100
Polychlorinated biphenyls (PCBs)	5,000
Selenium and/or selenium compounds*	10,000 (as Se)
Thallium and/or thallium compounds*	70,000 (as Tl)
Toxaphene	500
2,4,5-Trichlorophenoxypropionic acid	1,000

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Proposition 65

Chemical	Type of Toxicity	CAS No.	Date Listed
A-alpha-C (2-Amino-9H-pyrido [2,3-b]indole)	Cancer	26148-68-5	January 1, 1990
Abiraterone acetate	developmental, female, male	154229-18-2	April 8, 2016
Acetaldehyde	cancer	75-07-0	April 1, 1988
Acetamide	cancer	60-35-5	January 1, 1990
Acetazolamide	developmental	59-66-5	August 20, 1999
Acetochlor	cancer	34256-82-1	January 1, 1989
Acetohydroxamic acid	developmental	546-88-3	April 1, 1990
2-Acetylaminofluorene	cancer	53-96-3	July 1, 1987
Acifluorfen sodium	cancer	62476-59-9	January 1, 1990
Acrylamide	cancer	79-06-1	January 1, 1990
Acrylamide	developmental, male	79-06-1	February 25, 2011
Acrylonitrile	cancer	107-13-1	July 1, 1987
Actinomycin D	cancer	50-76-0	October 1, 1989
Actinomycin D	developmental	50-76-0	October 1, 1992
AF-2;[2-(2-furyl)-3-(5-nitro-2-furyl)] acrylamide	cancer	3688-53-7	July 1, 1987
Aflatoxins	cancer	---	January 1, 1988
Alachlor	cancer	15972-60-8	January 1, 1989
Alcoholic beverages	cancer	---	April 29, 2011
Alcoholic beverages, when associated with alcohol abuse	cancer	---	July 1, 1988

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Does Coffee Cause Cancer?

27 CCR § 25704

§ 25704. Exposures to Listed Chemicals in Coffee Posing No Significant Risk.

Exposures to chemicals in coffee, listed on or before March 15, 2019 as known to the state to cause cancer, that are created by and inherent in the processes of roasting coffee beans or brewing coffee do not pose a significant risk of cancer.

Note: Authority cited: Section 25249.12, Health and Safety Code. Reference: Sections 25249.6 and 25249.10, Health and Safety Code.

HISTORY

1. New section filed 6-3-2019; operative 10-1-2019 (Register 2019, No. 23).

Acrylamide	cancer	79-06-1	January 1, 1990
Acrylamide	developmental, male	79-06-1	February 25, 2011

CA Hazardous Wastes of Concern (DOT Classes)

- 1.1, 1.2, or 1.3 explosives
- 6.1 poison, PG I or II
- 2.3 poisonous gas
- Different discrepancy report criteria

66261.111

Excluded from Hazardous Waste Definition

- Animal carcasses
- Federal exclusions that are not characteristic
- Waste in manufacturing process units
- Samples
- Treatability studies
- Wastewater de minimis exclusions (66261.3)

66261.4(b)

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Listed Hazardous Waste Mixture Rule

Listed hazardous waste + "Waste"
= Listed hazardous waste

Unless…

Lots of exceptions, even in CA!

66261.3(a)(2)

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Pop Quiz

- 5 gallons of F003 listed spent acetone with a flashpoint of 100°F
- Mix with higher flashpoint waste
- Resulting mixture has flashpoint > 140°F
  - **Is it still an F003?**

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Mixture Rule Exceptions

- If the resulting mixture is no longer ignitable, it is no longer an F003

(E) it is a mixture of a hazardous waste that is listed in article 4 of this chapter other than a hazardous waste listed with hazard code (T) or (H), and another waste, unless the resultant mixture no longer exhibits any characteristic of hazardous waste identified in article 3 of this chapter. Howeve

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Mixture Rule Exceptions

- If no longer an F003, is it trash, or must it still be treated prior to disposal?

> (E) it is a mixture of a hazardous waste that is listed in article 4 of this chapter other than a hazardous waste listed with hazard code (T) or (H), and another waste, unless the resultant mixture no longer exhibits any characteristic of hazardous waste identified in article 3 of this chapter. However, nonwastewater mixtures are still subject to the requirements of chapter 18 of this division, even if they no longer exhibit a characteristic at the point of land disposal;

66261.3(a)(2)(E)

Mixture Rule Exceptions

- De-minimis losses to CWA regulated wastewater discharge
  - CA only includes unused products (P and U lists)

> 4. a discarded commercial chemical product, or chemical intermediate listed in section 66261.33 arising from "de minimus" losses of these materials from manufacturing operations in which these materials are used as raw materials or are produced in the manufacturing process. For purposes of this subsection, "de minimus" losses include those from normal material handling operations (e.g., spills from the unloading or transfer of materials

66261.3(a)(2)(F)(4)

Mixture Rule Exceptions

- De-minimis losses to CWA regulated wastewater discharge
  - Federal includes ALL listed wastes (F, K, P, U)

> (D) A discarded hazardous waste, commercial chemical product, or chemical intermediate listed in §§261.31 through 261.33, arising from de minimis losses of these materials. For purposes of this paragraph (a)(2)(iv)(D), de minimis losses are inadvertent releases to a wastewater treatment system,

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When Is a Listed Waste No Longer Listed?

- Listed wastes remain listed until they meet (d)
- Delisted (d)(2)

> (c)
>
> (1) A hazardous waste will remain a hazardous waste unless and until it meets the criteria of subsection (d) of this section.
>
> (2) in the case of a waste which is a waste listed in article 4 of this chapter, contains a waste listed under article 4 of this chapter or is derived from a waste listed in article 4 of this chapter (but not including precipitation run off), the waste also has been excluded by the USEPA Administrator from the lists of hazardous wastes in 40 CFR Part 261 Subpart D pursuant to 40 CFR sections 260.20 and 260.22, and

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When Is a Listed Waste No Longer Listed?

- Once a Listed Waste, always a Listed Waste
  - Even after treatment, must be disposed of in HW landfill

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