Land Disposal Restrictions

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Steve obtained his Bachelors of Chemistry degree from Oakland University in Rochester Hills, Michigan. He started his career at US Ecology(formerly EQ) as a lab technician in 2007 at the Detroit South Facility. Over the last 13 years, Steve's additional positions included Chemist, Approvals Coordinator for various US Ecology facilities, and is currently the Technical Services Manager at US Ecology Detroit South. In his current role, Steve oversees both the Approvals department and onsite lab. Steve is an asset in complex regulatory issues because of always asking the hard questions and needing to know the “why and how” behind decisions.

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Addie obtained her Bachelors of Science degree from the University of Findlay in Ohio. In her professional career she has gained experience in a variety of roles at US Ecology (formerly EQ). Her 15 years of experience in receiving, customer service, and approvals across the country has given her a dynamic range of industry knowledge. Currently, she coordinates approvals into both the USE Michigan Disposal Waste Treatment Plant and the Wayne Disposal Landfill. Additionally, she supports other branches of the company by providing training in a variety of subjects including RCRA, TSCA, and other regulatory topics. Her love of customer service and research drive her to investigate difficult regulatory situations.

Land Disposal Restrictions

RCRA Basics

What is hazardous waste?

- It is a solid waste.
  - Not excluded (261.4(b))
- It meets any of the following:
  - Exhibits characteristic of hazardous waste (261.20)
  - It is a listed waste (261.31)
- Full definition of Hazardous waste found in 40 CFR 261.3

Characteristic waste D001-D043

What is with the name?

- The features of this waste make it hazardous.
- Doesn’t matter the process

Listed waste F,K,P,U

What is with the name?

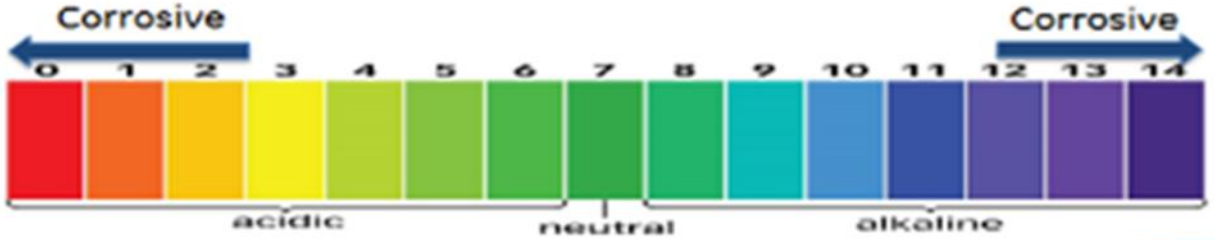
- Identified as likely to be toxic, and high probability for mismanagement
  - Specific Process
  - Specific Industry
  - Commercial Chemical

Characteristic: D001 Ignitable

- 261.21 – Ignitable High TOC (Total Organic Carbon)
  - Liquid – flash point <140 degrees F
  - Solid – capable at standard temperature and pressure of causing fire through friction, absorption of moisture or spontaneous chemical changes AND when ignited burns so vigorously it creates a hazard
- 261.21 (4) Oxidizer – chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of organic matter
  - Note 4 – DOT Regulatory definition of an oxidizer is contained in 49 CFR 173.151.
- Wastes that could cause or exacerbate fires

Characteristic: D002 Corrosive

- 261.22
  - Liquids ONLY
    - Aqueous pH < = 2 OR >= 12.5
    - Corrodes steel >6.32 mm per year.
  - Wastes could corrode containers and liberate other wastes.



Characteristic: D003 Reactive

- 261.23
  - It is normally unstable and readily undergoes violent change without detonating.
  - It reacts violently with water or it forms potentially explosive mixtures.
  - When mixed with water, it generates toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment.
  - It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment.
  - It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure, subjected to a strong initiating source or if heated under confinement.
  - It is a forbidden explosive.

Characteristic: Toxicity D004-D043

- 261.24
- A solid waste that exhibits the characteristic of toxicity from a representative sample of the waste contains any of the contaminants listed in table 1 at the concentration equal to or greater than the respective value given in that table.
  - Table 1
- Likely to leach into groundwater if mismanaged
- Levels are health based
  - Models, and dilution prior to contaminants getting into groundwater

Waste Code	Contaminant	Concentration (mg/L)
D004	Arsenic	5.0
D005	Barium	100.0
D018	Benzene	0.5
D006	Cadmium	1.0
D019	Carbon tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0
D022	Chloroform	6.0
D007	Chromium	5.0
D023	o-Cresol*	200.0
D024	m-Cresol*	200.0
D025	p-Cresol*	200.0
D026	Total Cresol*	200.0
D016	2,4-D	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dichlorotoluene	0.13
D012	Endrin	0.02
D031	Heptachlor (and its epoxide)	0.008
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloromethane	3.0
D008	Lead	5.0
D013	Lindane	0.4
D009	Mercury	0.2
D014	Methoxychlor	10.0
D035	Methylethylketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D010	Selenium	1.0
D011	Silver	5.0
D039	Tetrachloroethylene	0.7
D015	Toxaphene	0.5
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D017	2,4,5-TP (Silver)	1.0
D043	Vinyl chloride	0.2

Hazardous Waste Listing

- EPA developed after visits to sites across the country
  - Most likely to harm human health and the environment
- 261.11 – Any one of the following:
  - Exhibits a characteristic (D coded)
  - Fatal to humans at low doses, or a low LD 50 toxicity, or capable of causing or contributing to illness
    - (Acute hazardous waste)
  - Certain toxic constituents that are capable of posing a substantial hazard to human health and environment when mismanaged

F-Listed

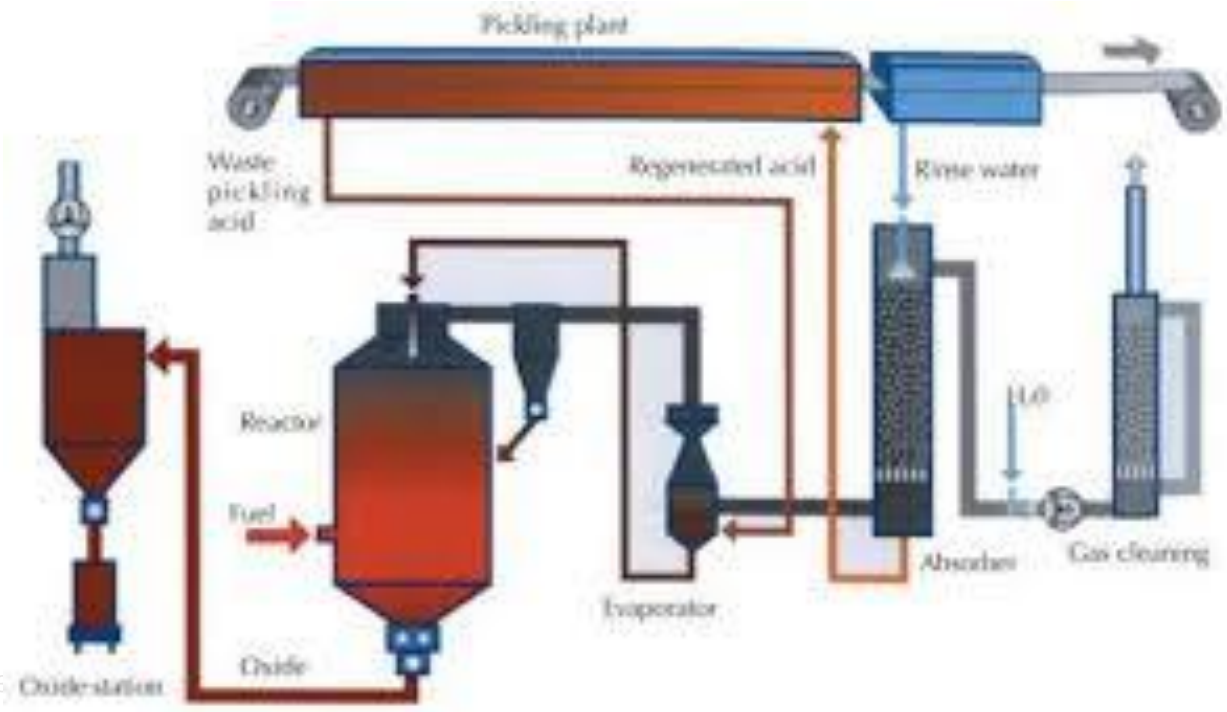
261.31

- Non specific F001 – F039 – Based on process, any industry.
- ICR (Listed for only characteristic properties)

- Spent solvent wastes (F001 – F005)
- Wastes from electroplating and other metal finishing operations (F006 – F012, and F019)
- Dioxin bearing wastes (F020 – F023 and F026 – F028)
- Wastes from production of certain chlorinated aliphatic hydrocarbons (F024 and F025)
- Wastes from wood preserving (F032, F034, and F035)
- Petroleum refinery wastewater treatment sludges (F037 and F038)
- Multisource leachate (F039)

K-Listed

- 261.32
  - Specific sources – from only certain industries



Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
K124	Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts.	(C, T)
K125	Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts.	(T)
K126	Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylenebisdithiocarbamic acid and its salts.	(T)
K131	Wastewater from the reactor and spent sulfuric acid from the acid dryer from the production of methyl bromide.	(C, T)
K132	Spent absorbent and wastewater separator solids from the production of methyl bromide.	(T)
Explosives:		
K044	Wastewater treatment sludges from the manufacturing and processing of explosives	(R)
K045	Spent carbon from the treatment of wastewater containing explosives	(R)
K046	Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds.	(T)
K047	Pink/red water from TNT operations	(R)
Petroleum refining:		
K048	Dissolved air flotation (DAF) float from the petroleum refining industry	(T)
K049	Slop oil emulsion solids from the petroleum refining industry	(T)
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry	(T)
K051	API separator sludge from the petroleum refining industry	(T)
K052	Tank bottoms (leaded) from the petroleum refining industry	(T)
K169	Crude oil storage tank sediment from petroleum refining operations	(T)
K170	Clarified slurry oil tank sediment and/or in-line filter/separation solids from petroleum refining operations.	(T)
K171	Spent Hydrotreating catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors (this listing does not include inert support media).	(I,T)
K172	Spent Hydrorefining catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors (this listing does not include inert support media).	(I,T)
Iron and steel:		
K061	Emission control dust/sludge from the primary production of steel in electric furnaces	(T)
K062	Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (SIC Codes 331 and 332).	(C,T)
Primary aluminum:		
K088	Spent potliners from primary aluminum reduction	(T)
Secondary lead:		
K069	Emission control dust/sludge from secondary lead smelting. (NOTE: This listing is stayed administratively for sludge generated from secondary acid scrubber systems. The stay will remain in effect until further administrative action is taken. If EPA takes further action effecting this stay, EPA will publish a notice of the action in the FEDERAL REGISTER).	(T)
K100	Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.	(T)
Veterinary pharmaceuticals:		
K084	Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	(T)
K101	Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	(T)
K102	Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	(T)
Ink formulation:		
K086	Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.	(T)
Coking:		
K060	Ammonia still lime sludge from coking operations	(T)
K087	Decanter tank tar sludge from coking operations	(T)
K141	Process residues from the recovery of coal tar, including, but not limited to, collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludges from coking operations).	(T)
K142	Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal.	(T)

P/U-Listed

- 261.33
  - Commercial Chemical Product
    - Virgin/Unused/Pure
    - SOLE ACTIVE
    - Residue is regulated
    - Spilling does not constitute use

P-Listed

Acute Hazardous waste
Short exposure harmful
Definition of “empty”
Requires 3x rinse

U- Listed

Solvents
Herbs/pests
Virgin mercury
Not acute (chronic)

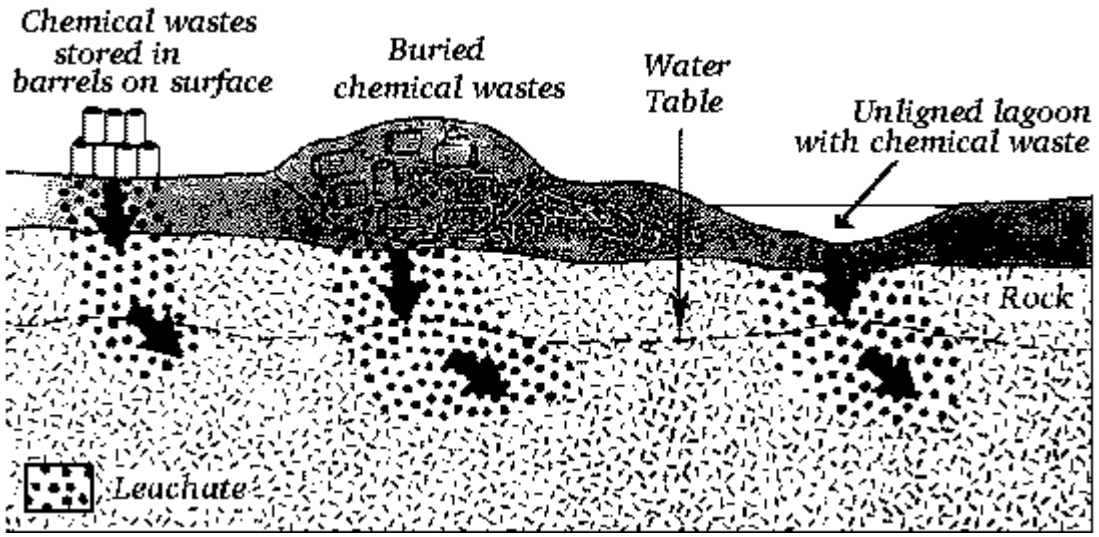
Land Disposal Restrictions (LDR)

History & Purpose

RCRA History to LDR History

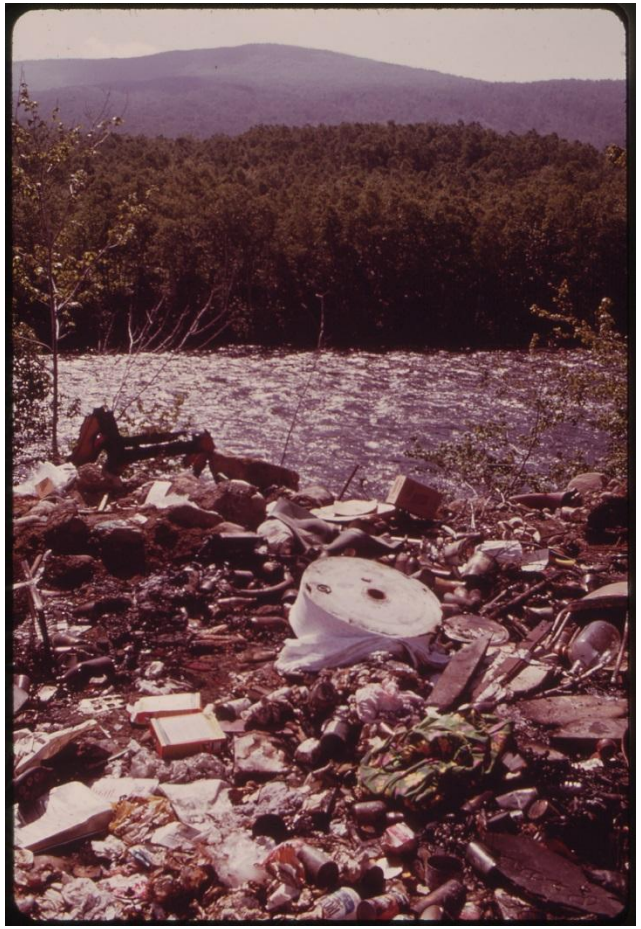
Prior to RCRA

- Solid Waste Disposal Act – 1965
- Resource Recovery Act – 1970
  - Focused on recovery of energy and material resources over disposal
  - No cradle to grave
  - Open dumping still allowed



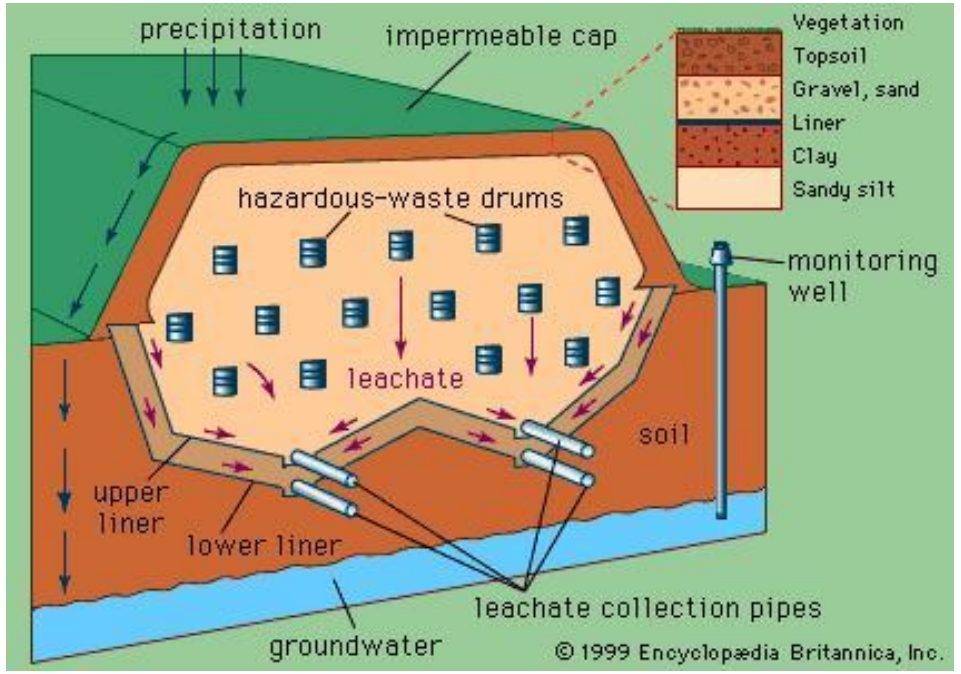
RCRA History to LDR History

- Amendments to SWDA (Resource Conservation and Recovery Act) – 1976
  - New and farther-reaching goals.
    - To protect human health and the environment, from the potential hazards of waste disposal
    - To conserve energy and natural resources
    - To reduce the amount of waste generated
    - To ensure that wastes are managed in an environmentally sound manner
  - Cradle to Grave
    - Cradle – Point of Generation
    - “to” – Transit, Storage, Treatment
    - Grave – Final Disposal



RCRA History to LDR History

- Amendments to SWDA – 1984
  - Hazardous and Solid Waste Amendments
    - Reauthorized and re-funded RCRA
    - Expanded RCRA coverage and requirements
      - LDR
        - ❑ Treatment standards
      - Corrective action
        - ❑ Enforcement
      - Permitting deadlines
      - Small Quantity Generators
      - Stricter landfill rules



RCRA History to LDR History

1986

- Established plan for determining LDR – Waste codes are divided into 3 Categories to prioritize restrictions, established schedule for evaluation of different waste types.

1988

- Injection LDR rules (including solvents and dioxins)
- Final rules for the “first-third” wastes.

1989

- Final rules “second-third” wastes.

1991

- Final rules “third-third” wastes. (List with dates in App VII to 268, Table 1)
- Technical corrections made.

1992

- Final rules for “newly listed wastes” (listed after 11/8/84).
- Alternative Treatment Standards for Debris.

RCRA History to LDR History

1993

- Emergency rule for D001 and D002 wastes.
    - This put in motion the need to create and establish Universal Treatment Standards.

1994

- Established UTS for all characteristic and listed waste (concentration based).

1996

- New listed wastes established
- New UHCs established

1997

- One-time LDR notification – to reduce paperwork burden

1998

- Revision of metals codes and Underlying Hazardous Constituents
- Alternative treatment standards for soil
- The final changes and updates to the Land Disposal Restrictions were established.
- This is the LDR program and rules as we know them.

What is Land Disposal?

Land disposal means placement in or on the land, except in a corrective action management unit or staging pile, and includes, but is not limited to, placement in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, underground mine or cave, or placement in a concrete vault, or bunker intended for disposal purposes.

Purpose

- To eliminate placement of untreated waste onto the land and promote treatment and immobilization of hazardous waste.
- Protect human health and the environment, especially ground water.
- Using best demonstrated available technology (BDAT), the EPA established limits for constituents.
    - May be concentration based or technology based
- Referred to as Treatment Standards, Land Ban, LDR, UTS, UHC

Purpose

Land Disposal Restrictions – (as we know them) established in 1998.

- 40 CFR 268
  - The Disposal Prohibition
    - Treatment Standards
  - The Dilution Prohibition
    - Cannot dilute to meet limits
  - The Storage Prohibition
    - Rules to properly store

The Disposal Prohibition 268.40

- The disposal prohibition requires waste specific treatment standards to be met before a waste can be land disposed.

- Hazardous waste that is destined for land disposal must meet all applicable treatment standards prior to land disposal.

The Disposal Prohibition 268.40

- A prohibited waste identified in the table “Treatment Standards for Hazardous Wastes” may be land disposed only if it meets the requirements found in the table. For each waste, the table identifies one of three types of treatment standard requirements.

1. TCLP
   - Extract (metals, very few organics.)
2. Totals
   - Organics, total amount in waste. Organics, Semi, Pest, Herbs
3. Technology
   - Certain methods, not quantifiable, method based.

The Disposal Prohibition 268.40

Waste code	Waste description and treatment/Regulatory subcategory [1]	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS [2] number	Concentration [3] in mg/L; or Technology Code [4]	Concentration [5] in mg/kg unless noted as "mg/L TCLP"; or Technology Code [4]
D001 [9]	Ignitable Characteristic Wastes, except for the § 261.21(a)(1) High TOC Subcategory.	NA	NA	DEACT and meet § 268.48 standards [8]; or RORGS; or CMBST	DEACT and meet § 268.48 standards [8]; or RORGS; or CMBST
	High TOC Ignitable Characteristic Liquids Subcategory based on 40 CFR 261.21(a)(1) - Greater than or equal to 10% total organic carbon. (Note: This subcategory consists of nonwastewaters only.)	NA	NA	NA	RORGS; CMBST; or POLYM
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.	Cadmium Chromium (Total) Cyanides (Total) [7] Cyanides (Amenable) [7] Lead Nickel Silver	7440-43-9 7440-47-3 57-12-5 57-12-5 7439-92-1 7440-02-0 7440-22-4	0.69 2.77 1.2 0.86 0.69 3.98 NA	0.11 mg/L TCLP 0.60 mg/L TCLP 590 30 0.75 mg/L TCLP 11 mg/L TCLP 0.14 mg/L TCLP

The Disposal Prohibition 268.40

Technology Standards – Found at 40 CFR 268.42

CMBST:	High temperature organic destruction technologies, such as combustion in incinerators, boilers, or industrial furnaces operated in accordance with the applicable requirements of 40 CFR part 264, subpart O, or 40 CFR part 265, subpart O, or 40 CFR part 266, subpart H, and in other units operated in accordance with applicable technical operating requirements; and certain non-combustive technologies, such as the Catalytic Extraction Process.
DEACT:	Deactivation to remove the hazardous characteristics of a waste due to its ignitability, corrosivity, and/or reactivity.
CHOXD:	Chemical or electrolytic oxidation utilizing the following oxidation reagents (or waste reagents) or combinations of reagents: (1) Hypochlorite (e.g., bleach); (2) chlorine; (3) chlorine dioxide; (4) ozone or UV (ultraviolet light) assisted ozone; (5) peroxides; (6) persulfates; (7) perchlorates; (8) permangantes; and/or (9) other oxidizing reagents of equivalent efficiency, performed in units operated such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., Total Organic Carbon can often be used as an indicator parameter for the oxidation of many organic constituents that cannot be directly analyzed in wastewater residues). Chemical oxidation specifically includes what is commonly referred to as alkaline chlorination.
CHRED:	Chemical reduction utilizing the following reducing reagents (or waste reagents) or combinations of reagents: (1) Sulfur dioxide; (2) sodium, potassium, or alkali salts or sulfites, bisulfites, metabisulfites, and polyethylene glycols (e.g., NaPEG and KPEG); (3) sodium hydrosulfide; (4) ferrous salts; and/or (5) other reducing reagents of equivalent efficiency, performed in units operated such that a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals (e.g., Total Organic Halogens can often be used as an indicator parameter for the reduction of many halogenated organic constituents that cannot be directly analyzed in wastewater residues). Chemical reduction is commonly used for the reduction of hexavalent chromium to the trivalent state.

The Dilution Prohibition 268.3

- Do not dilute to meet land disposal limits.

- No generator, transporter, handler or owner operator of a TSDF, shall in any way dilute a restricted waste as a substitute for adequate treatment.

The Storage Prohibition 268.50

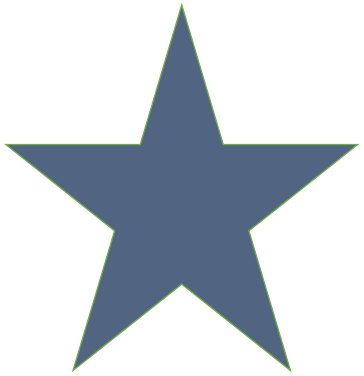
- Proper Storage – labels/markings, rows, containers, inspections
- Storage length depending on RCRA status:
  - Generator - 90 or 180 days
  - Transporter – 10 days
  - TSDF – 364 days

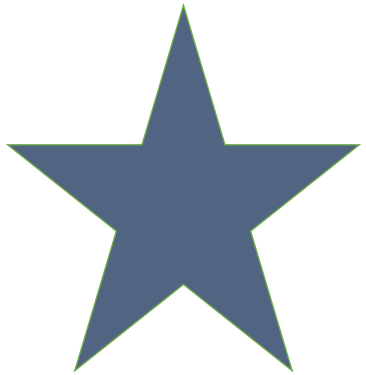
Land Disposal Restrictions

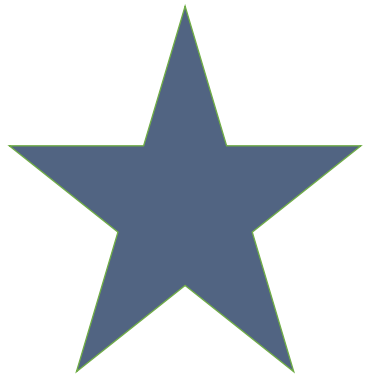
Steps to Compliance

Steps to Compliance

1. Is it hazardous waste?
2. Is it being land disposed? (Directly or eventually)
3. Assign waste codes and UHC/HCs
4. Assign Subcategory
5. Waste Water/ Non Wastewater
6. Look up TS under 268.40
7. Does it meet or exceed treatment standards?
8. Prepare LDR

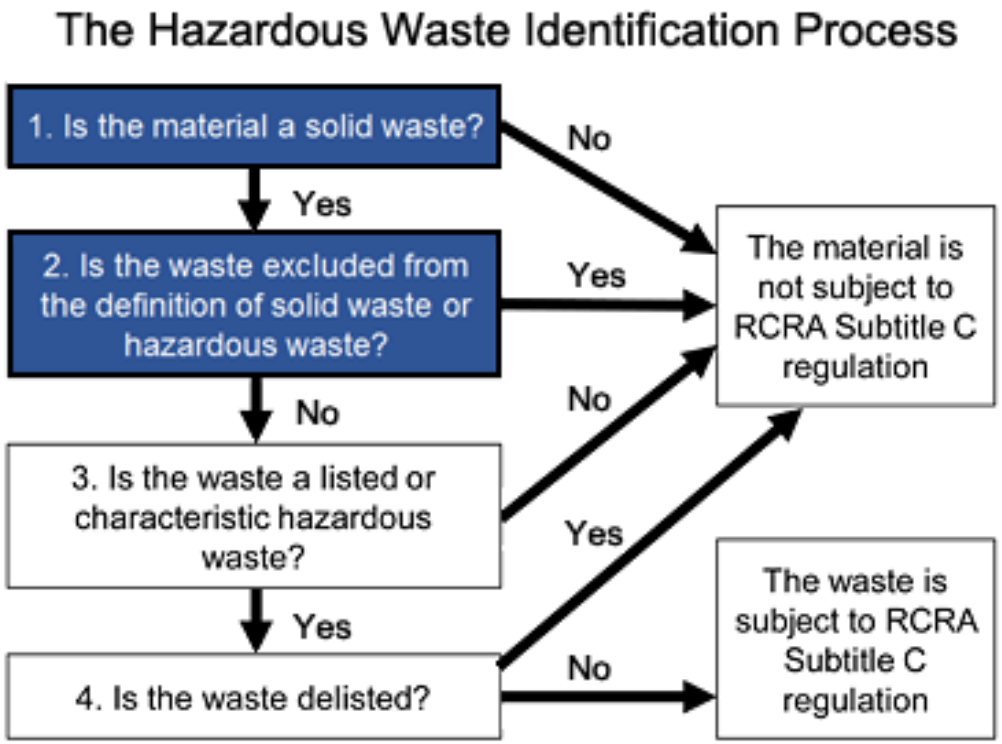






Steps to Compliance

1. Is it hazardous waste?
   - 261.10 and .11 – Criteria – This is why the EPA listed them



- Point of generation
  - The material must be a hazardous waste at the point of generation.
    - When does a waste become “hazardous waste?”
      - Meets a listing, or exhibits a characteristic
    - Where is a hazardous waste generated?
      - When it becomes discarded
      - Spill, no value, leaves manufacturing process, expired, abandoned

Steps to Compliance

2. Is it being land disposed? (directly or eventually)
    - Includes incineration and deep well. Does include wastewater treatment if any residues will be land disposed (filter cake)
    - 268.2(c) – Definition of land disposal

3. Assign waste codes.
    - Characteristic or Listed
        - 261.20 & 261.30

Steps to Compliance

4. Assign Subcategory
   - In table 268.40

D001 [9]	**Ignitable Characteristic Wastes, except for the § 261.21(a)(1) High TOC Subcategory.** High TOC Ignitable Characteristic Liquids Subcategory based on 40 CFR 261.21(a)(1)—Greater than or equal to 10% total organic carbon. (Note: This subcategory consists of nonwastewaters only.)

	Nonwastewaters that exhibit, or are expected to exhibit, the characteristic of toxicity for mercury based on the toxicity characteristic leaching procedure (TCLP) in SW846; and contain greater than or equal to 260 mg/kg total mercury that are inorganic, including incinerator residues and residues from RMERC. (High Mercury-Inorganic Subcategory)	Mercury	7439-97-6	NA	RMERC

Steps to Compliance

5. Waste Water/ Non Wastewater
    - Wastewaters are wastes that contains less than 1% by weight total organic carbon and less than 1% by weight total suspended solids, everything else is Non-wastewater (268.2(f))
    - Change in Treatability Group Principle for characteristic wastes
        - If a characteristic wastewater is treated and a non-wastewater sludge is generated from the treatment process, the prohibition for the wastewater does not automatically apply to the sludge. The resulting sludges constitute a new point of generation and thus require a new hazardous waste and LDR determination.

Steps to Compliance

6. Look up Treatment Standards under 268.40 (and UHC levels 268.48)
    - Treatment Standards
    - Universal Treatment Standards
7. Does it meet or exceed treatment standards?
    - If it exceeds, treatment is required. If it meets, direct disposal into a Subtitle C landfill may be appropriate.
8. Prepare LDR.
    - Requirements are listed for what must be on an LDR under 268.7 as well as the certification:

> " I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment."

LDR Required Data (268.7)

- EPA hazardous waste code(s)
- Identification of the waste as a wastewater or non-wastewater
- Manifest number associated with the waste shipment
- Waste analysis data (if available)
- Date waste was subject to prohibition
- For characteristic wastes, any additional hazardous constituents present
- When hazardous debris is to be treated by an alternative technology in §268.45, a statement to that effect and the contaminants subject to treatment
- For contaminated soil, a list of the constituents subject to treatment and a statement that the soil does or does not meet LDR standards
- Certification

Generator Issues

- LDR Frequency – 40 CFR 268.7(a)(2)
  - At time of initial shipment.
  - Any time the waste or management changes.

- LDR Retention – 40 CFR 268.7 (a)(8)
  - Minimum 3 years after the waste was last shipped off site.
    - This includes supporting documentation.

- LDR and E-manifesting
  - No requirements under this section federally

Listed Codes

- In 268.40 only the D codes are required to meet 268.48.
- What does that mean?
    - Listed codes only have to meet 268.40, NOT 268.48. In other words, UHCs do NOT apply to listed codes. (as long as 10X isn't utilized for management).
    - However, the regulated hazardous constituents on the table (268.40) for each listed code must meet its treatment standard prior to land disposal.

Listed Codes

D004[9]	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for arsenic based on the toxicity characteristic leaching procedure (TCLP) in SW846.	Arsenic	7440-38-2	1.4 and meet §268.48 standards[8]	5.0 mg/L TCLP and meet §268.48 standards[8]
D005[9]	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for barium based on the toxicity characteristic leaching procedure (TCLP) in SW846.	Barium	7440-39-3	1.2 and meet §268.48 standards[8]	21 mg/L TCLP and meet §268.48 standards[8]
D006[9]	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for cadmium based on the toxicity characteristic leaching procedure (TCLP) in SW846.	Cadmium	7440-43-9	0.69 and meet §268.48 standards[8]	0.11 mg/L TCLP and meet §268.48 standards[8]

P074	Nickel cyanide	Cyanides (Total)[7]	57-12-5	1.2	590
		Cyanides (Amenable)[7]	57-12-5	0.86	30
		Nickel	7440-02-0	3.98	11 mg/L TCLP
P075	Nicotine and salts	Nicotine and salts	54-11-5	(WETOX or CHOXD) fb CARBN; or CMBST	CMBST
P076	Nitric oxide	Nitric oxide	10102-43-9	ADGAS	ADGAS
P077	p-Nitroaniline	p-Nitroaniline	100-01-6	0.028	28
P078	Nitrogen dioxide	Nitrogen dioxide	10102-44-0	ADGAS	ADGAS
P081	Nitroglycerin	Nitroglycerin	55-63-0	CHOXD; CHRED; CARBN; BIODG; or CMBST	CHOXD; CHRED; or CMBST
P082	N-Nitrosodimethylamine	N-Nitrosodimethylamine	62-75-9	0.40	2.3
P084	N-Nitrosomethylvinylamine	N-Nitrosomethylvinylamine	4549-40-0	(WETOX or CHOXD) fb CARBN; or CMBST	CMBST
P085	Octamethylpyrophosphoramide	Octamethylpyrophosphoramide	152-16-9	CARBN; or CMBST	CMBST
P087	Osmium tetroxide	Osmium tetroxide	20816-12-0	RMETL; or RTHRM	RMETL; or RTHRM

D001 Only

- No UHCs apply – Go to 268.40 (also 268.9 (a))

- "High TOC Ignitable Characteristic Liquids Subcategory based on 40 CFR 261.21(a)(1)—Greater than or equal to 10% total organic carbon. (Note: This subcategory consists of nonwastewaters only.)
    - RORGS; CMBST; or POLYM"

Land Disposal Restrictions

Alternative and Technology Based Treatment

Technology based

- The best technology deemed by the EPA to treat certain wastes quantitative standard may or may not be provided.
    - 268.42 Table 1

- It is important to reference each code, and make sure the treatment is being met.

- Multiple technologies may be required to meet a treatment standard.

Technology based EXAMPLE

P105	**Sodium azide**	Sodium azide	26628-22-8	CHOXD; CHRED; CARBN; BIODG; or CMBST	CHOXD; CHRED; or CMBST
D0089	**Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for lead based on the toxicity characteristic leaching procedure (TCLP) in SW846.**	Lead	7439-92-1	0.69 and meet § 268.48 standards [8]	0.75 mg/L TCLP and meet § 268.48 standards [8]
	Lead Acid Batteries Subcategory (Note: This standard only applies to lead acid batteries that are identified as RCRA hazardous wastes and that are not excluded elsewhere from regulation under the land disposal restrictions of 40 CFR 268 or exempted under other EPA regulations (see 40 CFR 266.80). This subcategory consists of nonwastewaters only.)	Lead	7439-92-1	NA	RLEAD

(The footnotes are also packed with helpful information.)

Alternative Treatment Standards

- Debris (268.45) Technology based treatment
  - Why?
    - It is not practical or logical to try to sample
    - TCLP
    - Residue stays in Subtitle C landfill
- Soil (268.49) 90% reduction or 10x UTS
  - Why?
    - To encourage clean up
    - Incineration of soil costly, impractical

Debris

Definition (268.2(g))

Debris means solid material exceeding a 60 mm particle size that is intended for disposal and that is: A manufactured object; or plant or animal matter; or natural geologic material. However, the following materials are not debris: any material for which a specific treatment standard is provided in Subpart D, Part 268…residues from the treatment of waste, wastewater, sludges, or air emission residues; and intact containers of hazardous waste that are not ruptured and that retain at least 75% of their original volume. A mixture of debris that has not been treated to the standards provided by §268.45 and other material is subject to regulation as debris if the mixture is comprised primarily of debris, by volume, based on visual inspection.

Debris

- Use a technology only to satisfy the treatment standard.
    - Table 1 under 268.45 includes “Immobilization Technology” including Microencapsulation and Macroencapsulation.

- So this is why the LDR is different.
    - Not required to meet the quantitative TS in 268.40.

Soil

Soil definition found 263.3 (k): *Soil* means unconsolidated earth material composing the superficial geologic strata (material overlying bedrock), consisting of clay, silt, sand, or gravel size particles as classified by the U.S. Natural Resources Conservation Service, or a mixture of such materials with liquids, sludges or solids which is **inseparable by simple mechanical removal processes** and is made up **primarily** of soil by volume based on visual inspection. Any deliberate mixing of prohibited hazardous waste with soil that changes its treatment classification (i.e., from waste to contaminated soil) is not allowed under the dilution prohibition in § 268.3.

Soil

- Alternative LDR treatment standards for contaminated soil
  - 268.9

- The regulations allow for a 90% reduction of total constituent concentrations. (268.40(c)(1)(a)) or 10x the UTS.
  - 10x examples
    - UTS for lead = .75 mg/L so 10x allows land disposal at 7.5 mg/L. (Sub C.)
    - UTS for PCBs =10 mg/kg so 10x allows land disposal at 100 mg/kg. (TSCA permitted Subtitle C)
    - UTS Naphthalene =5.6 mg/kg so 10x allows land disposal at 56 mg/kg

Soil

Point of Generation for soil? When the soil becomes contaminated?

No. The waste is “generated” when it is removed from the area of contamination.

Soil

- Area of Contamination (AOC): Discrete area of dispersed contamination. Not uniform. Consolidation, in situ management can happen here.

- Once it is moved from one AOC to another, or is being actively managed, LDRs attach.

Soil

- Metals **only** soils containing TSCA PCBs
  - (268.49(d): …PCBs are not constituent subject to treatment in…soil which exhibits the toxicity characteristic solely because of the presence of metals
  - They are however, UHCs. PCBs(total of HOCs in the stream) must not exceed 1000mg/kg (268.32)

- Metals and Organic soils containing TSCA PCBs
  - PCBs must not exceed 10x (100 mg/kg)

Land Disposal Restrictions

Form

LAND DISPOSAL RESTRICTION FORM

Profile #:

(From Question G3)

Generator Information												
1. Generator:										**2. EPA ID Number:**		
3. Manifest Number:		**4. Line Number:**		**5. Waste is a:**	○ Wastewater (<1% TSS & TOC)		○ Non-wastewater		○ Debris			
6. Notification Frequency:	○ One Time	○ Required with Each Shipment										
7. Shipment EPA Waste Codes:												
8. UHC's: *(Underlying Hazardous Constituents 40 CFR 268.48)?* ○ Yes ○ No *(If yes, list constituents):*												
9. Does a subcategory apply per 40 CFR 268.40? ○ Yes ○ No *(If yes, select subcategory):*												
10. Constituents requiring treatment in F001-5, F039, debris, and alternate soils? ○ Yes ○ No *(If yes, list):*												
Requires Treatment												

Requires Treatment

☐ **Waste Subject To Treatment (40 CFR 268.7(a) (2))**

The restricted waste identified above must be treated to the applicable treatment standards in 40 CFR 268.40, or treated to comply with applicable Prohibitions set forth in Part 268.32 or RCRA Section 3004(d) and 268.49 (c).

If applicable, under 268.49, this contaminated soil ○ does or ○ does not contain listed hazardous waste and ○ does or ○ does not exhibit a characteristic of hazardous waste and is subject to the soil treatment standards as provided by 268.49 (c) or the universal treatment standards.

☐ **Hazardous Debris Subject To Treatment (40 CFR 268.45)**

This hazardous debris identified above must be treated to the alternative treatment standards in 40 CFR 268.45.

☐ **Waste De-characterized But Requires Treatment For UHC (40 CFR 268.7 (b) (4) (iv))**

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 or 268.49 to remove the hazardous characteristic. This de-characterized waste contains Underlying Hazardous Constituents that require further treatment to meet treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Waste Meets Treatment Standards

☐ **Waste Meets Treatment Standards (40 CFR 268.7(a) (3))**

The restricted waste identified above meets the treatment standards in 40 CFR 268.40 or Alternative LDR treatment standards for contaminated soil 40 CFR268.49 and can be landfill disposed without further treatment.

If applicable, under 268.49, this contaminated soil ○ does or ○ does not contain listed hazardous waste and ○ does or ○ does not exhibit a characteristic of hazardous waste and complies with the soil treatment standards as provided by 268.49 (c) or the universal treatment standards.

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D. I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

☐ **Waste Treated To Treatment Standards (40 CFR 268.7(b) (I) & 268.7 (b) (2))**

The treatment residue, or extract of such residue, or the restricted waste identified above has been tested to assure that the treatment residues or Extract meet all applicable treatment standards in 40 CFR 268.40 and/or performance standards in 40 CFR 268.45

I certify under penalty of law that I personally have examined and am familiar with the treatment technology and operation of the treatment process used to support this certification. Based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the treatment standards specified in 40 CFR 268.40 without impermissible dilution of the prohibited waste. I am aware there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

☐ **Waste Soil treated to alternative standards (40 CFR 268.7 (b) (4))**

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and believe that it has been maintained and operated properly so as to comply with treatment standards specified in 40 CFR 268.49 without impermissible dilution of the prohibited wastes. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

I certify and warrant that the information that appears on this form, and appended documents, is true and correct. I have correctly indicated how my waste is to be Managed in accordance with 40 CFR 268. My certification is based on personal examination of the information submitted, or is based on my inquiries of those individuals responsible for obtaining the information.							
Print Name:		**Signature:**		**Title:**		**Date:**	

Thank you!

Questions?

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