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Topics for Discussion

- Introduction to RCRA
- Determining if your waste is hazardous waste
- Requirements for Small Quantity Generators
- Used oil regulations
- Universal waste rule



Introduction to RCRA

- What is the Hazardous Waste Law?
 - *Resource Conservation & Recovery Act (RCRA)*
 - *Title 40 of the Code of Federal Regulations*
 - *Parts 260 – 279 for solid and hazardous waste*
 - *Effective November 1980*
 - *Cradle to grave law*
 - *Provides Authorization for the States to run their RCRA program*
 - *CT is an Authorized State (40 CFR 272 subpart H)*
- Goals of RCRA
 - *Encourage generators to reduce, reuse, recover, eliminate solid waste & hazardous waste*

Small Quantity Generator (SQG)

- Generates more than 100 kilograms but less than 1000 kilograms of hazardous waste per month provided that amount doesn't include more than –
 - *1 kilogram of acute hazardous waste*
 - *100 kilograms of spill debris from clean-up of acute hazardous waste (provided the amount of spilled acute hazardous waste doesn't exceed 1 kilogram)*
- Never accumulate more than 1000 kilograms of non-acute hazardous waste at any one time
- Never accumulate more than 1 kilogram of acute hazardous waste at any one time

SQG Requirements

- EPA Id. No. • 40 CFR 262.12
- Determining if your waste is hazardous waste • 40 CFR 262.11
- Satellite containers • 40 CFR 262.34
- Storage containers • 40 CFR 265.170-177
 - *Secondary containment & Impervious base* • 40 CFR 264.175
 - *Aisle space* • 40 CFR 264.35
- Storage tanks • 40 CFR 265.201
 - *Note – open tanks not allowed*
- Inspections & inspection logs • 40 CFR 265.15 & 201
- Emergency response planning • 40 CFR 262.34
- Employee training • 40 CFR 262.34

SQG Requirements

- Pre-transport requirements
 - Ship waste within 180 days (270 if >200 miles)
 - Hazardous waste manifest
 - Land disposal restrictions
 - Hazardous waste storage area closure
 - Universal waste requirements
 - Used oil requirements
- 40 CFR 262.30-34
 - 40 CFR 262.34
 - 40 CFR 262.20-22
 - 40 CFR 268
 - 40 CFR 265.111, 114, 201
 - 40 CFR 273
 - 40 CFR 279

Where it begins

Determining if your waste is a hazardous waste

(40 CFR 262.11)

"A hazardous waste is a solid waste that is listed as a hazardous waste and/or exhibits the characteristic of hazardous waste and has not been excluded "

1. *Determine if the waste is a solid waste*

2. *Determine if the waste is a hazardous waste*
 - *Use knowledge of the chemicals, processes, contaminants*
 - ✓ *Material Safety Data Sheets*
 - ✓ *Product labeling and manufacturer's information*
 - *Testing*
 - *Both*

3. *Determine if the waste is excluded from the definition of solid waste and hazardous waste*

Solid Waste



Solid waste is –

- *Spent material*
- *Sludge*
- *By-product*
- *Commercial chemical product*
- *Scrap metal*



When discarded by –

- *Burned (energy recovery)*
- *Recycled/reclaimed*
- *Accumulated speculatively*
- *Used in a manner constituting disposal**
disposed means placed on ground, water, or incinerated



Table 1 in 261.2

	Use constituting disposal	Energy recovery (fuel)	Reclaimed	Speculative accumulation
Spent material	*	*	*	*
Sludge (listed in 262.31 or 32)	*	*	*	*
Sludge (exhibiting a characteristic of hazardous waste)	*	*		*
By-products (listed in 262.31 or 32)	*	*	*	*
By-products (exhibiting a characteristic of hazardous waste)	*	*		*
Commercial chemical products (listed in 262.33)	*	*		*
Scrap metal	*	*	*	*

Some Exclusions

Fuel Exemption

Fuel & fuel/water mixtures

- ✓ Sent for fuel use or blending – not solid waste
- ✓ Spilled or incinerated – is solid waste

“Used as effective substitute for a commercial chemical product, provided the product is not *used in a manner constituting disposal or burned*”

Fly ash containing zinc

- *Sludge exhibiting a characteristic of hazardous waste*
 - Recycled for the zinc to make plant food
 - ✓ Is solid waste
 - Recycled to make zinc powder
 - ✓ Is not solid waste

Hazardous Wastes

Solid wastes that are listed as hazardous waste

40 CFR part 261.31 – 33

Solid wastes that exhibit a characteristic of hazardous waste

40 CFR part 261.21 – 24

Two sub-categories

- ✓ *Used oil – 40 CFR 279*
- ✓ *Universal waste – 40 CFR 273*

Waste Codes

Hazardous wastes are identified by “waste codes”

(except for used oil and universal waste)

The listed hazardous waste codes

F, K, U, P waste codes

(Example – F003 spent non-halogenated solvents)

The characteristic hazardous waste codes

D waste codes

(Example – D035 material with 200 mg/L or more MEK)

The Listed Hazardous Waste

Four types of listed waste

- "F" waste code – Non-specific source
- "K" waste code – Specific source
- "U" waste code – Commercial chemical product
- "P" waste code – Commercial chemical product

Reason for listings

- Ignitable (I)
- Corrosive (C)
- Reactive (R)
- Acutely hazardous (H)
- Toxic (T)

Mixture Rule

- *mixing a listed waste with any other solid waste makes the entire mixture a listed waste!*
- *not dependent on amount (one drop, one gallon, etc).*
- *not dependent on the source (intentional mixing, accidental mixing).*
- *Can cause an otherwise inexpensive waste to become more expensive when shipped off-site*

Non-specific Source “F” Waste

Waste from generic sources:

F001 – F039

- Spent halogenated solvents (F001 & F002)
- Spent non-halogenated solvents (F003 – F005)
- Metal finishing (F006 – F019)
- Pesticides/wood preservative (F020 - F035)
 - *“dioxin waste”*

Example “F” Wastes

- **F001 (T)** • **The following spent halogenated solvents used for degreasing - tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1 trichloroethane, carbon tetrachloride, chlorinated fluorocarbons, still bottoms from solvent recovery**
- **F006 (T)** • **Wastewater treatment sludge from electroplating operations except from sulfuric acid anodizing of aluminum, tin plating on carbon steel, chemical etching and milling of aluminum.....**

Specific Source “K” Waste

Specifically listed industry doing specifically listed processes:

K001 – K160

- Wood preservation
- Inorganic pigments
- Organic chemicals
- Inorganic chemicals
- Pesticides
- Petroleum refining
- Iron and steel
- Veterinary pharmaceutical
- Ink formulations
- Explosives
- Coking

Example “K” Waste

Industry	Hazardous waste	Waste & Hazard code
Wood Preservation	Bottom sediment sludge from treatment of wastewater from wood preserving process that uses creosote and/or pentachlorophenol	K001 (T)
Inorganic Pigments	Wastewater treatment sludge from the production of chrome yellow and orange pigments	K002 (T)
Organic Chemicals	Bottom stream from the acetonitrile column in the production of acrylonitrile	K013 (T, R)
Explosives	Wastewater treatment sludge from the manufacturing and processing of explosives	K044 (R)

Commercial Chemical Product

“U” and “P” waste codes

- Unused commercial products
 - Pure, technical grade
 - Sole active ingredient

Typically discarded because off-spec, shelf life,
spilled

Examples “P” Listed Waste

“acute hazardous wastes”

P001 - P205(H)

- *Empty containers of “P” listed materials (unless triple rinsed)*
- *Waste from rinsing empty containers*

Hazardous waste No.	Chemical abstract No.	Substance
P006	20859-73-8	Aluminum phosphide (R, T)
P075	54-11-5	Nicotine
P106	143-33-9	Sodium cyanide
P001	81-81-2	Warfarin (coumadin)
P022	75-15-0	Carbon disulfide

Examples “U” Listed Waste

U001 – U411(T)

Hazardous waste No.	Chemical abstract No.	Substance
U002	67-64-1	Acetone (I)
U080	75-09-2	Methylene chloride
U210	127-18-4	Tetrachloroethylene <i>(perchloroethylene)</i>
U220	108-88-3	Toluene
U240	94-75-7	2,4, Dichlorophenoxyacetic acid <i>(2,4D)</i>
U023	98-07-7	Benzotrichloride (C, R)
U159	1338-23-4	2-butanone (I) <i>(MEK)</i>

F006 Electroplating Sludge

Removing some of the confusion

The full description of “electroplating processes” in the F006 listing is from
The 1979

“Development Document for Existing Source Pretreatment Standards for
Electroplating Point Source Category”

The processes or categories are -

- ✓ Common & precious metal electroplating
- ✓ Etching
- ✓ Bright dipping
- ✓ Chemical milling
- ✓ Cleaning & stripping (when associated with above)

Any Questions

Solid Waste ?

Listed Waste ?

Characteristic Hazardous Waste

Four types

"D" waste codes

- *Ignitable (D001)*
- *Corrosive (D002)*
- *Reactive (D003)*
- *Toxicity Characteristic (D004-D043)*

Some Facts

All discarded solid waste must be evaluated for the characteristics

- *Paper*
- *Tires*
- *Chemicals*
- *Lamps*
- *Electronic equipment*
- *Paint*
- *Scrap metal*
- *Construction debris*



Some Facts

Some characteristics are based on physical properties

- *flash point*
- *pH*
- *Compressed gases*
- *Oxidizers*

Some Facts

Some characteristics are based on concentration limits

- *milligrams per liter (mg/L)*
- *test method “Toxicity Characteristic Leaching Procedure” (TCLP)*
- *limits range between 0.008 to 400 mg/L*

note: one percent (1%) equals 10,000 ppm

Ignitable Characteristic D001

- *Liquid with a flashpoint less than 140 degrees F*
 - *Mineral spirits, petroleum distillate, stoddard solvent, paint*
- *Oxidizers (49 CFR 173.151)*
 - *Nitric acid, peroxides, permanganate*
- *Ignitable compressed gas (49 CFR 173.300)*
 - *Propane, aerosol products*
- *Not a liquid – fire through friction, moisture, spontaneous chemical change, & burns vigorously and persistently*
 - *Aluminum, zirconium & magnesium fines and chips*

Corrosive Characteristic D002

- Aqueous liquid with a pH of 2 or less
- Aqueous liquid with a pH of 12.5 or greater
- A liquid that corrodes steel at greater than 6.35 mm (0.025 inches) per year at 55 degrees C (130 degrees F.) using test method in National Association of Corrosion Engineers, Standard TM-01-69
 - *nitric acid, sulfuric acid, phosphoric acid, hydrochloric acid, chromic acid*
 - *sodium hydroxide, potassium hydroxide, ammonium hydroxide*

Reactive Characteristic D003

- Normally unstable
- Reacts violently with water or forms toxic fumes or vapors (cyanides & sulfides)
- Capable of detonation or explosion when heated under confinement or subjected to a strong initiating force

Example D003

- *Fire works and explosives*
- *Flameless ration heaters (ready-to-eat meals)*
- *Air bags (un-deployed)*
- *Old picric acid and ether*
- *Cyanides*
- *Sulfides*
- *Lithium batteries (with electrical charge)*
- *Sodium*
- *Nickel catalyst*
- *Compressed cylinders*

Toxicity Characteristic D004 – D043

- 39 elements and compounds
- cause damage to tissue, impair CNS, cause severe illness or death when ingested, inhaled, or absorbed.
- based on concentration limits (mg/L).
- testing using Toxicity Characteristic Leaching Procedure.

Toxicity Characteristic D004 – D043

Waste Code & CAS		Contaminant	Concentration limit
D004	7440-38-2	Arsenic	5 mg/L
D005	7440-39-3	Barium	100 mg/L
D006	7440-43-9	Cadmium	1 mg/L
D007	7440-47-3	Chromium	5 mg/L
D008	7439-92-1	Lead	5 mg/L
D009	7439-97-6	Mercury	0.2 mg/L
D010	7782-49-2	Selenium	1 mg/L
D011	7440-22-4	Silver	5 mg/L
D012	72-20-8	Endrin	0.02 mg/L
D013	58-89-9	Lindan	0.4 mg/L
D014	72-43-5	Methoxychlor	10 mg/L
D015	8001-35-2	Toxaphene	0.5 mg/L
D016	94-75-7	2,4D	10 mg/L

Toxicity Characteristic D004 – D043

Waste Code & CAS		Contaminant	Concentration limit
D017	93-72-1	2,4,5 TP	1 mg/L
D018	71-43-2	Benzene	0.5 mg/L
D019	56-23-5	Carbon tetrachloride	0.5 mg/L
D020	57-74-9	Chlordane	0.03 mg/L
D021	108-90-7	Chlorobenzene	100 mg/L
D022	67-66-3	Chloroform	6 mg/L
D023	95-48-7	O-cresol	200 mg/L
D024	108-39-4	M-cresol	200 mg/L
D025	106-44-5	P-cresol	200 mg/L
D026	None	Cresol	200 mg/L
D027	106-46-7	1,4 dichlorobenzene	7.5 mg/L
D028	107-06-2	1,2 dichloroethane	0.5 mg/L
D029	75-35-4	1,1 dichloroethylene	0.7 mg/L

Toxicity Characteristic D004 – D043

Waste Code & CAS		Contaminant	Concentration limit
D030	121-14-2	2,4, dinitrotoluene	0.13 mg/L
D031	76-44-8	Heptachlor	0.008 mg/L
D032	118-74-1	Hexachlorobenzene	0.13 mg/L
D033	87-68-3	Hexachlorobutadiene	0.5 mg/L
D034	67-72-1	Hexachloroethane	3 mg/L
D035	78-93-3	Methyl ethyl ketone	200 mg/L
D036	98-95-3	Nitrobenzene	2 mg/L
D037	87-86-5	Pentachlorophenol	100 mg/L
D038	110-86-1	Pyridine	5 mg/L
D039	127-18-4	Tetrachloroethylene	0.7 mg/L
D040	79-01-6	Trichloroethylene	0.5 mg/L
D041	95-95-4	2,4,5 trichlorophenol	400 mg/L
D042	88-06-2	2,4,6 trichlorophenol	2 mg/L
D043	75-01-4	Vinyl chloride	0.2 mg/L

Used Oil Regulations

- Based on the presumption that the used oil will be recycled
- Its expected that the used oil can exhibit one or more of the hazardous waste characteristics
 - *Such as heavy metals in machining coolants*
 - *Such as benzene in crank case oil from internal combustion engines*

Used Oil Reclaimed/Recycled

- Used oil testing

- ✓ *Total halogens*

- *Less than 1000 ppm assumed not mixed HW (halogenated solvents)*
 - *Greater than 1000 ppm must prove not mixed with HW (halogenated solvents)*

- Mixtures used oil and ignitable (only) HW

- *Test mixture for flash point*
 - *Below 140 F, HW and must test for other characteristics*

- Mixtures used oil and other characteristic HW

- *Test mixture for all RCRA characteristics*
 - *If any characteristic exhibited, oil is HW even if the characteristic is only from the used oil (such as chromium from machining stainless steel)*

- Mixtures used oil and listed HW

- ✓ *Oil is listed HW*

Used Oil Disposal

- Placed on ground, water, or incinerated
 - ✓ *Determine if listed and/or characteristic HW , if yes-*
 - ✓ *Fully regulated as hazardous waste*
 - ✓ *Comply with the applicable generator or TSD requirements*

Universal Waste

- Sent to another UW handler
 - *No waste determination required*
 - ✓ Universal waste are hazardous waste
 - Corrosive and heavy metals (batteries, lamps, equipment w/mercury)
 - ✓ *Two exceptions*
 - FIFRA recalled pesticides
 - Solid waste added by states
- Disposed or sent to destination facility
 - *Determine if listed and/or characteristic HW , if yes-*
 - ✓ Fully regulated as hazardous waste
 - ✓ Comply with the applicable generator or TSDF requirements

CT Regulated Waste

- Waste codes only apply if transported/sent to facility in CT
- Testing –
 - CR01, CR02, CR03 – total halogens (if used oil)
 - CR02 – no testing if waste oil is a waste fuel reused for fuel
 - CR04 & CR05 – RCRA Toxicity Characteristics if sent to Solid Waste Facility under a Special Waste Authorization

Waste Code	Description	Examples
CR01	Waste oil with PCBs (at or above 50 ppm)	Transformer, heat transfer, hydraulic
CR02	Waste oil (& materials containing oil)	Tank bottoms, lubrication, hydraulic, machining, grinding, bilge water
CR03	Water soluble waste oil (& materials containing oil)	Machining and grinding
CR04	Waste chemical liquid	Latex, glycol, power washing
CR05	Waste chemical solid	Foundry sand, sand blasting, polluted soil, corrosive solids

Documenting Waste Determinations

- *Documentation for both HW and non-HW*
 - *Also, for any waste when claiming its excluded*
 - *Reuse as effective substitute as ingredient*
 - *Reuse as commercial product*

- *No prescribed way to document waste determination*
 - *Use waste profile sheets from receiving facility*
 - *Memo to your file with supporting documentation*
 - ✓ *Description of process/chemicals that generates the waste*
 - ✓ *Material Safety Data Sheets or other product information*
 - ✓ *Analytical testing*
 - ✓ *Waste profiles from other businesses doing similar processes*
 - ✓ *Documentation from off-site business claiming reuse for excluded materials*

- *Used oil – federal rule requires transporter do the testing*
 - *State regulations requires generator to have test results*

Any Questions?

