Waste Characterization and Generator Status

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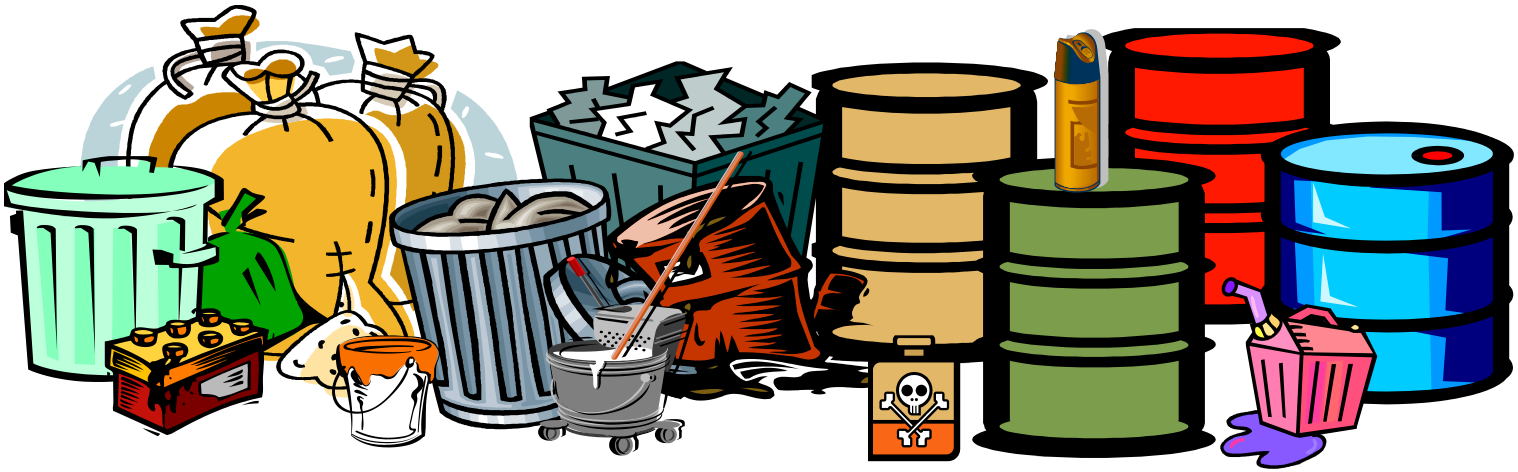
WHAT TYPE OF WASTES DO I GENERATE?



Do I Need to Know All of This?

Hazardous waste regulations...

- apply to all businesses, including municipalities, hospitals, & service industries, not just manufacturing industries
- are written broadly to address hazards posed by all waste streams

Why Cover These Topics?

Hazardous waste regulations require each business to…

- Evaluate the character & composition of their wastes
- Determine the total weight of all hazardous waste generated each month
- Determine their legal disposal options

Why Cover These Topics?

Less hazardous waste = less regulation and more disposal options under the law

There is no one best answer for how to dispose of waste for all businesses and locations!!!

Waste Characterization Regulations

- Act 451, Michigan Natural Resources & Environmental Protection Act:
  - Part 111, Hazardous
  - Part 121, Liquid Industrial By-Products
  - Part 115, Solid Waste
  - Part 169, Scrap Tires
- Act 368, Michigan Public Health Code:
  - Part 138, Medical Waste Regulatory Act
  - Part 2, Ionizing Radiation Rules
- Federal Toxic Substance Control Act (TSCA)

Waste Characterization

Where do I start?

- Perform a waste survey to identify what wastes are generated at your facility
- Tour your entire facility and inventory all waste streams
- Don’t overlook identifying & characterizing ALL waste streams

Waste Survey

Drains and Discontinued Lines

* Automatically subject to waste regulations 90 days after equipment taken out of service

Drains

Discontinued lines

Waste Survey

Catch Basins

Waste Survey

Office Activities

Electronics

Batteries

Electric lamps

Elemental mercury products

Waste Survey

Aerosol Cans

Can crushing & puncturing

Ignitable & could have TCLP issues

Michigan Department of Environmental Quality
Office of Waste Management and Radiological Protection

ON-SITE AEROSOL CAN DRUM TOP RECYLING SYSTEMS

Guidance

Aerosol cans are a common waste generated by most businesses. Aerosol cans contain a product and propellant under pressure. The product is released from the aerosol can (the container) in the form of a spray or mist when the nozzle is pressed to apply the product. As the product is used, the propellant is also used. Examples of products commonly dispensed using aerosol cans include:

- maintenance products (degreasers and cleansers)
- beauty products (hair sprays and perfumes)
- cooking products (vegetable sprays)
- surface coating products (paints and varnishes)
- personal care products (bug sprays and sunscreens)
- pharmaceutical products (inhalers) and
- pesticides (ant or wasp sprays)

If a site routinely generates large volumes of aerosol cans, it may be cost effective to recycle the aerosol cans for their scrap metal value and manage any accumulated liquids separately. Typically aerosol cans are made of steel or aluminum. Although the DEQ does not consider empty aerosol cans a reactive hazardous waste, some states do and most solid waste vendors require special waste approvals for aerosols due to the explosion hazard they present when compacted. To avoid special waste costs, recycling may be a cost effective option.

This guidance summarizes the environmental regulations that apply to on-site drum top puncturing systems used to recycle aerosol cans. Additional requirements apply to puncturing and recycling aerosol cans discarded by another site. For questions about recycling off-site generated aerosol cans, please contact the Environmental Assistance Center at 800-662-9278. For questions about the safety requirements related to recycling aerosol cans, please contact the Michigan Occupational Safety and Health Administration at 517-284-7750. Often aerosol cans contain ignitable and/or combustible products. When recycling aerosol cans that contain ignitable or combustible liquids, put precautions in place to prevent ignition and coordinate with local fire officials to ensure the local fire code is met. Measures to ensure only compatible materials are managed in an aerosol can recycling program are also key to an effective

What is an Empty Aerosol can?

Most aerosols cans do not contain products which become an acutely toxic hazardous waste when discarded. Therefore, most aerosol cans are empty when the pressure in the container approaches atmospheric pressure. To ensure an aerosol can that held a non-acute hazardous waste is considered empty under the hazardous waste and liquid industrial by-product regulations, listen for audible liquids and check to see if the can is clogged. If the container is clogged and has audible liquids, accumulate the non-empty aerosol cans to meet the regulations that apply based on the type of waste and the site's generator status.

Waste Survey

Remodeling/Demolition Debris

Demolition Debris

Gym Flooring

Abrasive Blasting

Waste Survey

Fleet Maintenance

Antifreeze &
Mercury Switches

Parts Washer

Used Oil

Waste Survey

Laboratory Waste

Art Class Waste

Waste Survey

Rags & Textiles

Waste Characterization

Who does it?

- Do the waste characterization yourself
- Hire a consultant
- Use the disposal company services
- Use a combination of the above

Waste Characterization

Knowledge

- SDS
- Facility Process Information
- Technical Information
- Manufacturer Information
- Hazardous Waste Listings

Testing

Waste Characterization

Cautionary example for use of knowledge:

Analyses of wastes from dry cleaning processes using the newer "green" solvents are testing positive for chromium

Waste Characterization

Basics

- Characteristic Hazardous Waste (D wastes)
  - A waste stream found to be ignitable, corrosive, reactive, and/or toxic by testing.
- Listed Hazardous Waste (F, K, P & U wastes)
  - A common waste stream known to be hazardous without testing.
- Hazardous Waste Mixture Rule
  - Mixture of a listed hazardous waste with other non-hazardous wastes is a listed hazardous waste.
- Hazardous Waste Derived From Rule
  - Residues derived from treating a listed hazardous waste is listed hazardous waste.

Waste Characterization

Basic Steps

1. Is waste listed? Review lists of waste types & codes in rules.
2. Is waste characteristic? Analytic test or by knowledge (MSDS, knowledge of process, etc.).
3. Does an exclusion or exemption apply?
4. Do other regulations apply? (liquid industrial, solid waste, etc.)
5. Create & maintain records of characterization for at least 3 years from the date waste was last shipped off-site.
6. Re-characterize if change process or materials.

Waste Characterization

Step 1

Listed Hazardous Waste

Waste Characterization

What are listed hazardous wastes?

- F Codes (Table 203a) – Wastes from non-specific sources (e.g. spent chlorinated solvents, metal treatment wastewaters & sludges).
- K Codes (Table 204a) – Wastes from specific industries *(2014 rule change – Michigan Haz Wastes 001K and 002K rescinded).*

Waste Characterization

What are listed hazardous wastes?

- P & U Codes (Table 205a-c) – Commercial chemical products, off-specification products, container and spill residues including some Michigan only U Codes (e.g., formaldehyde, parathion, benzene, DDT, xylene).
  - *2014 and 2017 Rule Changes Rescinded Some Michigan Only U Hazardous Wastes/Codes.*
- *P Codes are all acutely hazardous.*

Waste Characterization

Listed Hazardous Waste Codes

Table 203a

EPA Hazardous Waste Number	Hazardous Waste From Nonspecific Sources	Hazard Code
F020	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the production or manufacturing use as a reactant, chemical intermediate, or component in a formulating process, of tri- or tetrachlorophenol or of intermediates used to produce their pesticide derivatives. This listing does not include wastes from the production of hexachlorophene from highly purified 2,4,5-trichlorophenol	(H)
F021	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the production or manufacturing use as a reactant, chemical intermediate, or component in a formulating process of pentachlorophenol or of intermediates used to produce its derivatives	(H)
F022	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the manufacturing use as a reactant, chemical intermediate, or component in a formulating process of tetra-, penta-, or hexachlorobenzenes under alkaline conditions	(H)
F023	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the production of materials on equipment previously used for the production or manufacturing use as a reactant, chemical intermediate, or component in a formulating process of tri- and tetrachlorophenols. This listing does not include wastes from equipment used only for the production or use of hexachlorophene from highly purified 2,4,5-trichlorophenol	(H)

Acutely hazardous when "H" appears in Hazard Code Column.

Waste Characterization

Step 2

Characteristic Hazardous Waste

Waste Characterization

What are characteristic hazardous wastes?

Characteristic Hazardous Waste & Codes:

- Ignitable - D001
- Corrosive - D002
- Reactive - D003
- Toxic - D004 – D043 (Table 201a)
- Severely Toxic – 001S - 007S (Table 202, includes dioxins & furans)

Characteristic Hazardous Waste

Common Tests

- Flash point – Used for testing Ignitability < 140 F (D001)

  Examples: paints, solvents

- pH – **Used for testing corrosivity ≤ 2 or ≥ 12.5 (D002)**

  Examples: acids, bases

- Reactivity – Test as required for DOT classification for materials that are unstable at normal conditions, reacts violently with water, explode, and/or emit toxic gas (D003)

  Examples: lithium hydride & trichlorosilane

Characteristic Hazardous Waste

Common Tests

- TCLP (Toxicity Characteristic Leaching Procedure) - Used for testing leaching potential for Table 201a hazardous constituents (D004-D043)

  Examples: Paints or sludges containing metals or MEK, contaminated media

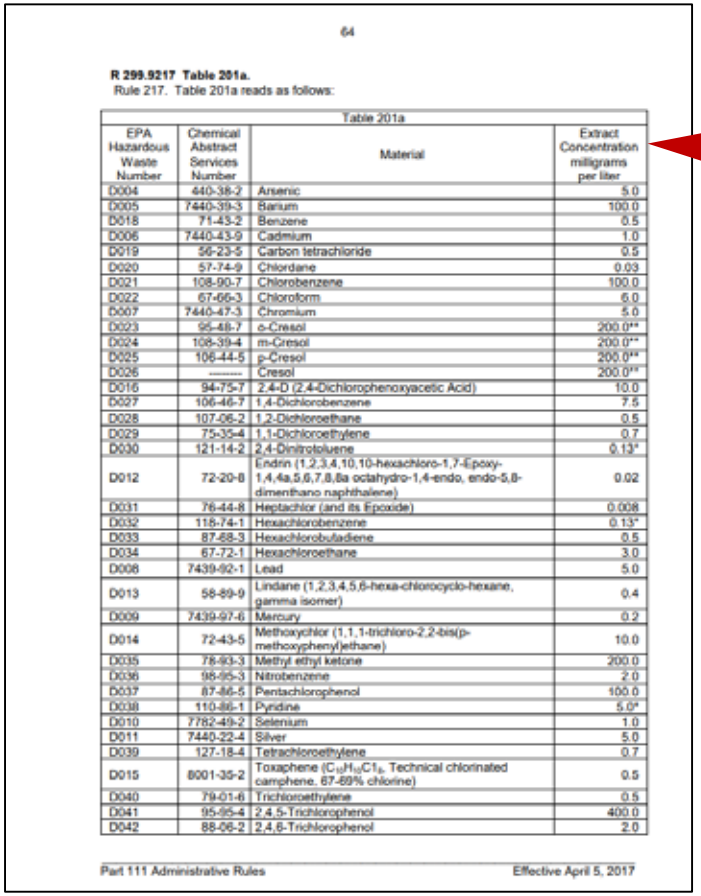
- Total Halogens – Used for testing used oils for chlorine, fluorine, bromine, etc. to determine if a "presumed" hazardous waste

  Examples: Used to process used oil into lubricants, specification or off-specification used oil fuels

Characteristic Hazardous Waste

Common Tests

Table 201a from Part 111 Rules



64

R 299.9217 Table 201a.
Rule 217. Table 201a reads as follows:

Table 201a

EPA Hazardous Waste Number	Chemical Abstract Services Number	Material	Extract Concentration milligrams per liter
D004	440-38-2	Arsenic	5.0
D005	7440-39-3	Barium	100.0
D018	71-43-2	Benzene	0.5
D006	7440-43-9	Cadmium	1.0
D019	56-23-5	Carbon tetrachloride	0.5
D020	57-74-9	Chlordane	0.03
D021	108-90-7	Chlorobenzene	100.0
D022	67-66-3	Chloroform	6.0
D007	7440-47-3	Chromium	5.0
D023	95-48-7	o-Cresol	200.0**
D024	108-39-4	m-Cresol	200.0**
D025	106-44-5	p-Cresol	200.0**
D026	———	Cresol	200.0**
D016	94-75-7	2,4-D (2,4-Dichlorophenoxyacetic Acid)	10.0
D027	106-46-7	1,4-Dichlorobenzene	7.5
D028	107-06-2	1,2-Dichloroethane	0.5
D029	75-35-4	1,1-Dichloroethylene	0.7
D030	121-14-2	2,4-Dinitrotoluene	0.13*
D012	72-20-8	Endrin (1,2,3,4,10,10-hexachloro-1,7-Epoxy-1,4,4a,5,6,7,8,8a octahydro-1,4-endo, endo-5,8-dimenthano naphthalene)	0.02
D031	76-44-8	Heptachlor (and its Epoxide)	0.008
D032	118-74-1	Hexachlorobenzene	0.13*
D033	87-68-3	Hexachlorobutadiene	0.5
D034	67-72-1	Hexachloroethane	3.0
D008	7439-92-1	Lead	5.0
D013	58-89-9	Lindane (1,2,3,4,5,6-hexa-chlorocyclo-hexane, gamma isomer)	0.4
D009	7439-97-6	Mercury	0.2
D014	72-43-5	Methoxychlor (1,1,1-trichloro-2,2-bis(p-methoxyphenyl)ethane)	10.0
D035	78-93-3	Methyl ethyl ketone	200.0
D036	98-95-3	Nitrobenzene	2.0
D037	87-86-5	Pentachlorophenol	100.0
D038	110-86-1	Pyridine	5.0*
D010	7782-49-2	Selenium	1.0
D011	7440-22-4	Silver	5.0
D039	127-18-4	Tetrachloroethylene	0.7
D015	8001-35-2	Toxaphene ($C_{10}H_{10}Cl_8$, Technical chlorinated camphene, 67-69% chlorine)	0.5
D040	79-01-6	Trichloroethylene	0.5
D041	95-95-4	2,4,5-Trichlorophenol	400.0
D042	88-06-2	2,4,6-Trichlorophenol	2.0

Part 111 Administrative Rules — Effective April 5, 2017

- TCLP Sample Extract Concentration Limit
- If sample extract meets or exceeds limits, waste is a characteristic toxic hazardous waste

Waste Characterization

Step 3

Exemptions and Exclusions

(Rules 202, 203, 204, 206, 207 and 228 of Part 111 -not all inclusive)

Waste Characterization

What are exemptions & exclusions?

- Wastewater discharges to POTW's that are *approved* by that sewer authority are exempted at the point of discharge to the sewer

- Batteries, pesticides, mercury devices, electric lamps, pharmaceuticals, consumer electronics & antifreeze handled as Universal Waste enjoy a *partial exemption*

Waste Characterization

What are exemptions & exclusions?

- Wastes that are used or reused in a process to make a product are excluded provided there is no reclamation - *Beware of sham recycling & get DEQ concurrence on exemption. Supporting documents required!!!*

- Laboratory samples are exempt until being discarded

Waste Characterization

What are exemptions & exclusions?

- Used oils that are recycled
- Petroleum contaminated media from leaking UST systems that fail the TCLP for D018 – D043 only & are being remediated under DEQ approval pursuant to Part 213
- Off-specification fuel (gasoline, kerosene, diesel, etc.) being recycled for use as fuel or burned as fuel

Waste Characterization

What are exemptions & exclusions?

- Materials remaining in manufacturing units that would otherwise be hazardous wastes - if taken out of service the material becomes a hazardous waste (degreasers, paint pots)
- Hazardous wastes from which precious metals are recovered enjoy a *partial exemption*

Waste Characterization

What are exemptions & exclusions?

- Dredge spoils from projects permitted by the U.S. Army Corps of Engineers or DEQ
- Laundered rags that are reused
- Certain solvent contaminated wipes – NEW!!!

Rags & Textiles

Disposable wipes under newly adopted federal rule

- Took effect April 2017
- Excludes wipes contaminated with solvents that are laundered and reused or disposed of properly
- To be excluded, must be managed in closed, labeled containers and cannot contain free liquids when sent for laundering and reuse or disposal
- Requires records and cannot accumulate wipes for longer than 180 days
- See new Solvent Contaminated Wipes Guide

Waste Characterization

What are exemptions & exclusions?

- Recycled materials (*not all* see 40 CFR, Part 261.2, Table 1 [*Some reclaimed materials not considered solid wastes under RCRA, although they may exhibit a haz waste characteristic (e.g., commercial chemical products, sludges and by-products. Also, commercial chemical products being speculatively accumulated are not solid wastes under RCRA.]*

Waste Characterization

What are exemptions & exclusions?

- Hazardous Secondary Materials – NEW!!!!
  - Certain materials when reclaimed to meet legitimacy criteria in Rule 232 are excluded from being a waste under hazardous waste regulation.
  - Learn more by joining the 11:00 session on this tomorrow

Waste Characterization

What are exemptions & exclusions?

- Household waste, including single & multiple residences, hotels & motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, & day-use recreational areas
- Empty container residues

Empty Containers
(Rule 207)

After all *non-acute hazardous waste* or liquid industrial by-product has been removed using common practices:

- No more than 1 inch or not more than 3.0% by weight of the total capacity of the container for containers less ≤ to 119 gallons
- No more than 1 inch or not more than 0.3% by weight of the total capacity of the container for containers > than 119 gallons

Empty Containers

(Rule 207)

Acute Hazardous or Severely Toxic Waste:

- Triple rinse with appropriate solvent or cleaned by proven equivalent method
- Remove inner liner that prevented contact with container
- If listed due to characteristic, empty if no longer exhibits the characteristic
- Rinse water/removed residue would be hazardous waste based on knowledge

Empty Containers
(Rule 207)

Compressed Gas:

- Container pressure is equal to atmospheric pressure
- Container is not clogged
- No audible liquids in container when shaken

Waste Characterization

Step 4

Liquid Industrial By-Product

Waste Characterization

What is Liquid Industrial By-Product?

- Part 121 of Act 451
- Determine by using the Paint Filter Test, Method 9095 in EPA SW-846
- If there are any free liquids in the by-product or if the by-product is thinner than butter at or < 100 F, it should be managed as a liquid industrial waste

Waste Characterization

What is Liquid Industrial By-Product?

- Liquid hazardous wastes from a CESQG
- Some wastewater including most mobile power washing wastewater, carpet cleaning wastewater, food processing wastewaters
- Most sludges from trench drains or blind sumps (unless there's been a release making it a hazardous waste)
- Includes liquid wastes from other locations besides "industrial" sites (e.g. municipal, health care, etc.)

Waste Characterization

What is Liquid Industrial By-Product?

- Most antifreeze
- Storm sewer cleanout waste
- Grease trap waste
- Most used oils being recycled
- Off-specification fuels being recycled
- Hazardous secondary materials

Waste Characterization

Step 5

Waste Characterization Record (Rule 307)

Waste Characterization

Waste Characterization Records

Records for *each* waste stream may include:

- Waste type/description
- Source of waste
- Test results
- Waste analysis records
- SDS
- Sample procedure
- Representative sample information

See the Waste Characterization Steps & Questions Guide and Optional Waste Characterization Record

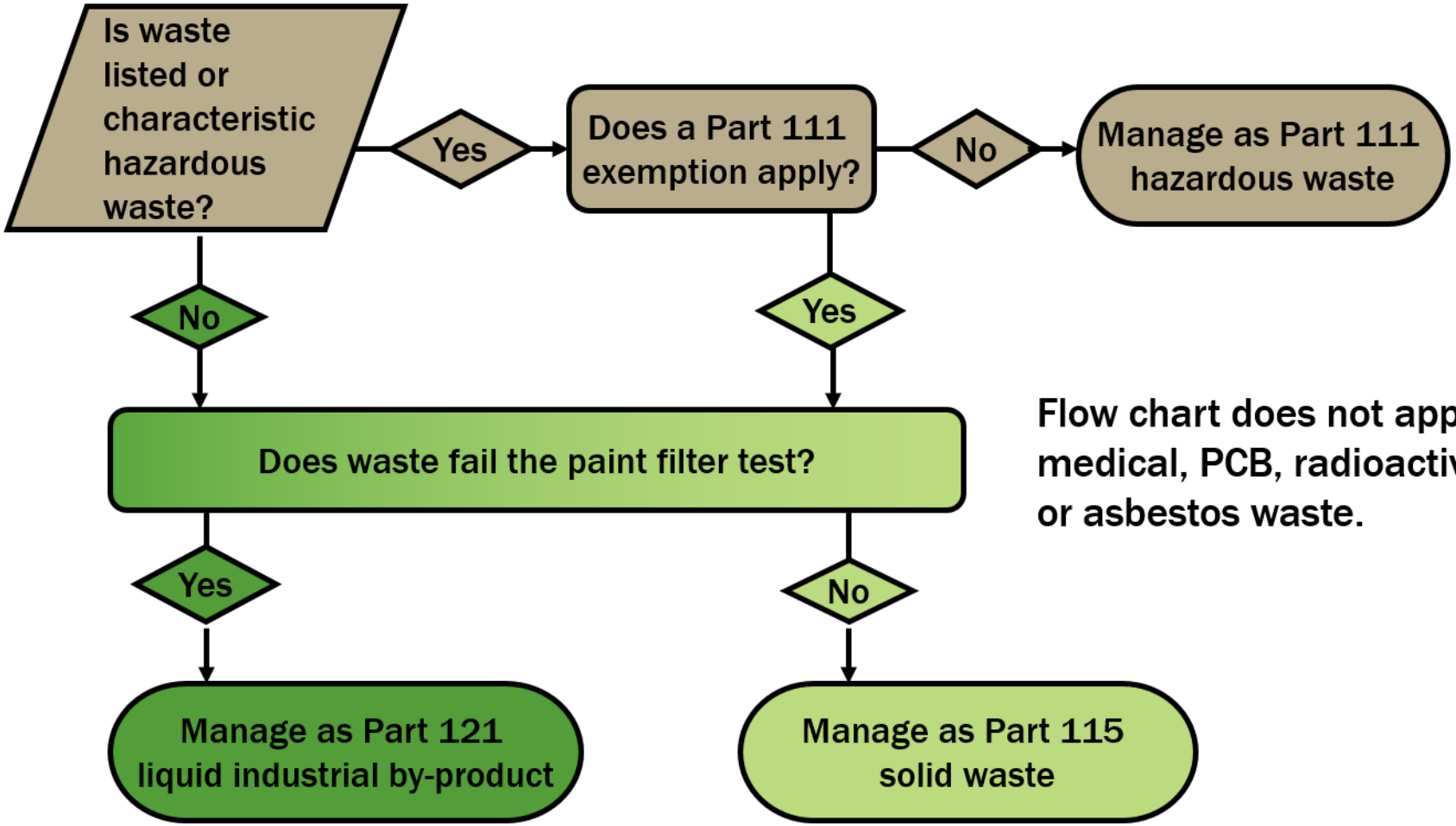
Waste Characterization

Step 6

Re-characterize if process or materials change!

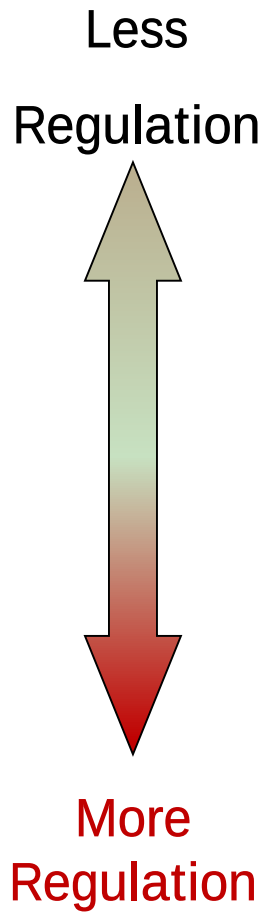
Basic Waste Characterization

Flow Chart



Flow chart does not apply to medical, PCB, radioactive, or asbestos waste.

Hazardous Waste Generator Status



Conditionally Exempt Small Quantity Generator (CESQG)

Small Quantity Generator (SQG)

Large Quantity Generator (LQG)

Hazardous Waste Generator Status

Conditionally Exempt Small Quantity Generator (CESQG)

- Monthly hazardous waste generation ≤ 220 lbs. or ~ 1/2 drum
- Total haz waste accumulation must always be less than 2200 pounds (~ 5 drums)
- Wastes are properly disposed under other regs
- Records of waste characterization, generator status, and lawful disposal are maintained for 3 years

Hazardous Waste Generator Status

Small Quantity Generator (SQG)

- Monthly hazardous waste generation > 220 lbs. to < 2,200 lbs. or ~ ½ to 5 drums

- Total hazardous waste accumulation must always be less than 13,200 lbs. or ~ 30 drums

Hazardous Waste Generator Status

Large Quantity Generator (LQG)

- Generates ≥ 2200 lbs. of non-acute hazardous waste per month

- Generates and accumulates > 2.2 pounds of *acute* or severely toxic hazardous waste

Hazardous Waste Generator Status

Calculating Amount of Hazardous Waste Generated

- Calculate the amount *generated*, not the amount *shipped*
- Calculate the amount in *pounds or kilograms*
- Include hazardous waste *treated and/or disposed on-site* unless it is hard piped to POTW

Hazardous Waste Generator Status

Calculating Amount of Hazardous Waste Generated

- Do not include hazardous waste ***managed*** as a *universal waste*

Electronics

Batteries

Pesticides

Thermostats

Lamps

Pharmaceuticals

Antifreeze

Hazardous Waste Generator Status

Calculating Amount of Hazardous Waste Generated

- Do not include *liquid industrial by-product and/or used oil*
- Do not include waste specifically excluded from Part 111 like:
  - ✓ *Scrap metal being recycled*
  - ✓ *Contaminated fuel being recycled into fuel*
  - ✓ *POTW approved direct discharges*
  - ✓ *Excluded solvent wipes*
  - ✓ *Hazardous secondary materials*

Hazardous Waste Generator Status

Calculating Amount of Hazardous Waste Generated

- Review total/maximum amount of hazardous waste generated and accumulated at any 1 time during the month.
- Compare amount of hazardous waste generated and total accumulated during the month to the CESQG, SQG, and LQG definitions/limits.
- Generator limits are found in Rule 306 of the Part 111 rules.

Hazardous Waste Generator Status

Calculating Amount of Hazardous Waste Generated

	CESQG	SQG	LQG
Amount of acute or severely toxic haz waste generated or accumulated at any time.	1 kg. (2.2 lbs.) or less	1 kg. (2.2 lbs.) or less	>1 kg. (2.2 lbs.)
Amount of acute spill residue or cont. soil generated or accumulated at any time	100 kgs.(220 lbs.) or less	100 kgs. (220 lbs.) or less	>100 kgs. (220 lbs.)
Amount of non-acute haz waste generated in 1 calendar month.	100 kg. (220 lbs.) or less	>100 kg. (220 lbs.) but <1000 kg (2200 lbs.)	>1000 kg. (2200 lbs.)

Hazardous Waste Generator Status

Calculating Amount of Hazardous Waste Generated

	CESQG	SQG	LQG
Approx. volume of non-acute haz waste.	25 gallons (assuming the liquid wt equals that of water)	25 to 250 gallons	250 gallons and greater
Max amount of non-acute haz waste that can be accumulated on site.	1000 kg (2200 lbs.)	6000 kg (13,200 lbs.)	No maximum amount
Max time period before waste must be shipped.	No time limit if never exceeding 2200 lbs.	180 days unless shipped over 220 miles; then 270 days	90 days

Hazardous Waste Generator

Requirements

- See Chapter 2, Table 2.6 in DEQ Guidebook at www.Michigan.gov/ehsguide
- See Summary of Generator Accumulations Requirements
- Join our other sessions in our waste track

Questions?