

Basic Waste Characterization

You have choices!

Chapter 2

CHOICE 1

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

6 Topics being covered today

- Why characterization is important
- Steps to conduct waste determination
- Where to find the regulations
- Types of regulated wastes
- Common exemptions
- Helpful resources

Why is waste characterization important?

1. Determines what you have so you know which regulations must be followed for environmental protection and health/safety
2. Avoid violations often found during inspections
 - ☹ Failing to properly identify ALL the listed and characteristic hazardous waste generated
 - ☹ Failing to have results documented
 - ☹ Failing to keep records at least 3 years

First determination step

Create a filing system to hold your documentation and other generator records



Second Determination Step

Identify what unwanted materials and wastes are on-site...

Conduct a Waste Survey

- Review paperwork
 - Purchasing invoices
 - Inventory records
 - Waste manifests
 - Waste disposal bills



Waste Survey Continues

- **Walk through the site**
 - Where are wastes generated e.g. production, office, maintenance?
 - What is generated?
 - Where is it stored? Is it labeled?
 - Are employees mixing wastes?
 - What's in the dumpsters?



Third Determination Step

Determine if the unwanted material can be used "as is" and considered product?

Material Exchanges
www.michigan.gov/deqrecycling

The screenshot shows the MDEQ website in Microsoft Internet Explorer. The address bar displays http://www.michigan.gov/deq/0,1607,7-135-3585_4130---,00.html. The page title is "Recycling - Microsoft Internet Explorer". The website header includes the MDEQ logo and navigation links: Michigan.gov Home, DEQ Home, Online Services, Permits, Programs, Site Map, and Contact DEQ. The main content area is titled "Recycling" and includes a brief description of recycling as a waste reduction effort. Below this, there are sections for "Information" and "Related Links". The "Information" section lists various resources such as "New Recycling Opportunity", "County Recycling, Composting and HHW Contacts", "Recycling Events", "Michigan Composting Contacts", "Recycling in Michigan - Michigan Recycling Coalition 2002 Study", "Recycling in Michigan - MRC Highlights Brochure", "Bottle Bill Information", "Recycling Mission and Goal", "Recycling: Taking Care of Your Waste at Home", "Residential Information", "Reuse Resources", "Automobile Recycling", "Green Construction and Demolition", "Recycling Publications", and "Buying Recycled Products". The "Related Links" section includes "Carpet Recycling", "Chemicals", "Drums and Barrels", and "Electric Lamps". The "Online Services" section, which is circled in red, includes "Michigan Materials Exchange Service" and "Recycled Materials Market Directory (RMMD)".

Speculative accumulation

- Includes solid waste material storage for recycling or reuse at a site for a period over 1 year, or low-hazard industrial waste for 3 years, unless
 - at least 75% of materials are recycled or sent to another site for recycling from the beginning of the period when first accumulated (page 2-5)
- Includes hazardous waste being accumulated before recycling unless
 - at least 75% by weight or volume is recycled, or sent to another site for recycling, in the calendar year beginning Jan 1 (page 2-18)

Discarded materials

- Defined 40 CFR 261.2(a)(2)
- Abandoned
- Recycled
- Considered inherently waste-like
- Waste military munition

Fourth Determination Step

Become familiar with different regulations so you can...

- Determine what regulation applies to remaining waste
- Be able to identify exemption and exclusions
- Have better understanding what consultants/disposal companies are telling you

(page 2-1)

Choice 2. Options where to find regulations

The screenshot displays the Michigan Department of Environmental Quality (DEQ) website. The main navigation bar includes links for Michigan.gov Home, DEQ Home, Online Services, Permits, Programs, Site Map, and Contact DEQ. A search bar is located in the top right corner. Below the navigation bar, there are utility links for Printer Friendly, Text Version, Email Page, and Text Size. The main content area is titled "Laws and Rules" and provides an overview of Michigan Environmental Laws and Rules, explaining that they are included in both state and federal statutes and consolidated into the Natural Resources and Environmental Protection Act, 1994, PA 451. Below this overview, there are sections for "Information" and "Related Links". The "Information" section includes links to the "Environmental Laws and Rules Database", "Laws", and "Rules". The "Related Links" section includes links to the "State Office Of Administrative Hearings and Rules (for state rules)", "Federal Environmental Laws and Rules", and "International Treaties and Agreements". On the right side of the page, there is a sidebar with various links and services, including "Departments/Agencies", "Online Services", "Surveys", "RSS Feeds", "DEQ Quick Links", "DEQ Calendar", "DEQ Military Salute", "DEQ Who Does What List", "DEQ Publications", "DEQ Acronyms", "DEQ Laws and Rules", "DEQ Shortcuts", "Public Comment Opportunities", "DEQ Staff Spotlight", "DEQ Forms", "DEQ Training & Workshops", "Quick Links", and "Compliance Assistance". The "DEQ Acronyms" and "DEQ Laws and Rules" links are circled in red. At the bottom of the page, there are logos for EnviroFlash, MIAir, Beach Monitoring System, MISWIM, and Brownfields2008.

Michigan.gov Home | DEQ Home | Online Services | Permits | Programs | Site Map | Contact DEQ

Search GO

Printer Friendly | Text Version | Email Page | A- A+ Text Size

Laws and Rules

Michigan Environmental Laws And Rules Overview

Environmental requirements are included in both state and federal statutes, also called acts, and administrative rules. Most of Michigan's environmental acts were consolidated into the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended (Act 451). Act 451 is organized into sections called "Parts." Be aware that some administrative rules still refer to original environmental act numbers prior to their being included as Parts of Act 451 and that there are other state environmentally-related acts that are not incorporated into Act 451 at this time.

Information

- [Environmental Laws and Rules Database](#)
Use this search page to locate information about Michigan environmental laws and rules and which agency is responsible for enforcement of each.
- [Laws](#)
Environmental requirements are included in both state and federal statutes, also called acts, and administrative rules. Most of Michigan's environmental acts were consolidated into the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended (Act 451). Act 451 is organized into sections called "Parts."
- [Rules](#)
An administrative rule is an agency's written regulation, statement, standard, policy, ruling, or instruction that has the effect of law. Here you will find rules specific to the Department of Environmental Quality.

Related Links

- [State Office Of Administrative Hearings and Rules \(for state rules\)](#)
- [Federal Environmental Laws and Rules](#)
- [International Treaties and Agreements](#)

key topics

- Administrative Hearings
- Clean Michigan Initiative
- Community Right to Know
- Environmental Assistance
- Environmental Education
- Environmental Emergencies
- Environmental Incentives
- Forms
- Environmental Reports
- Grants and Loans
- Laboratory Services
- Laws & Rules**
 - Laws
 - Rules
- Locations of Environmental Interest
- Maps & Data
- Permits
- Policies and Procedures
- Pollutants and Toxicants
- Publications

inside DEQ

news & events

Departments/Agencies

Online Services

Surveys

RSS Feeds

DEQ Quick Links

- DEQ Calendar
- DEQ Military Salute
- DEQ Who Does What List
- DEQ Publications
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- DEQ Shortcuts
- Public Comment Opportunities
- DEQ Staff Spotlight
- DEQ Forms
- DEQ Training & Workshops

Quick Links

- Compliance Assistance

EnviroFlash
Your Environmental News Flash

MIAir

Beach Monitoring System

MISWIM
Surface Water Information Management System

Brownfields2008

To find hazwaste and liw regulations...

The screenshot shows the Michigan Department of Environmental Quality website. The left sidebar contains a navigation menu with the following items: 'WASTE' (highlighted with a red circle), 'Hazardous and Liquid Industrial Waste', 'Hazardous and Liquid Industrial Waste Management', 'Household Hazardous Waste Collection', 'Hazardous & Liquid Industrial Waste Transporters', 'Low Level Radioactive Waste', 'Medical Waste', 'Radiological Protection', 'Scrap Tires', 'Solid Waste', and 'Waste Compliance & Enforcement'. Below these are buttons for 'inside DEQ', 'key topics', 'news & events', and 'pollution prevention'. At the bottom of the sidebar are sections for 'AIR', 'LAND', 'WATER', and 'M-TAPS Michigan Timely Application and Permit Service'. The main content area is titled 'Statutes and Rules' and includes links for 'Printer Friendly', 'Text Version', 'Email Page', and 'Text Size'. The agency is identified as 'Environmental Quality'. The page is divided into two columns: 'Statutes' and 'Rules'. The 'Statutes' column contains the text 'Hazardous Waste Management ; Part 111 of 1994 P.A. 451, as amended'. The 'Rules' column contains the text 'Cover and Index for Fully Compiled Administrative Rules to Part 111 (.pdf file); Fully Compiled Administrative Rules to Part 111 (.pdf file) Effective March 17, 2008'. A detailed paragraph follows, explaining that the administrative rules promulgated pursuant to Part 111, Hazardous Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, were amended effective March 17, 2008. The rules package, SOAHR 2006-065 EQ, contains many amendments based on both federal revisions and state initiated revisions. The Michigan Department of Environmental Quality, Waste and Hazardous Materials Division, has prepared a color, strike/bold version of the newly amended rules which shows the federal revisions in red text and the state-initiated revisions in blue text.



KNOWLEDGE

- Material Safety Data Sheets (MSDS)
- Facility Process Information
- Technical Information
- Manufacturer Information
- Other lab results



TESTING

- Representative samples
- Done at lab using EPA test methods
- On-site testing

ETHYLENE GLYCOL

1. Product Identification
Synonyms: 1,2-Ethanediol; glycol; 1,2-Dihydroxyethane; Ethylene Alcohol; Ethylene Dihydrate
CAS No.: 107-21-1
Molecular Weight: 62.07

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ethylene Glycol	107-21-1	99 - 100%	Yes

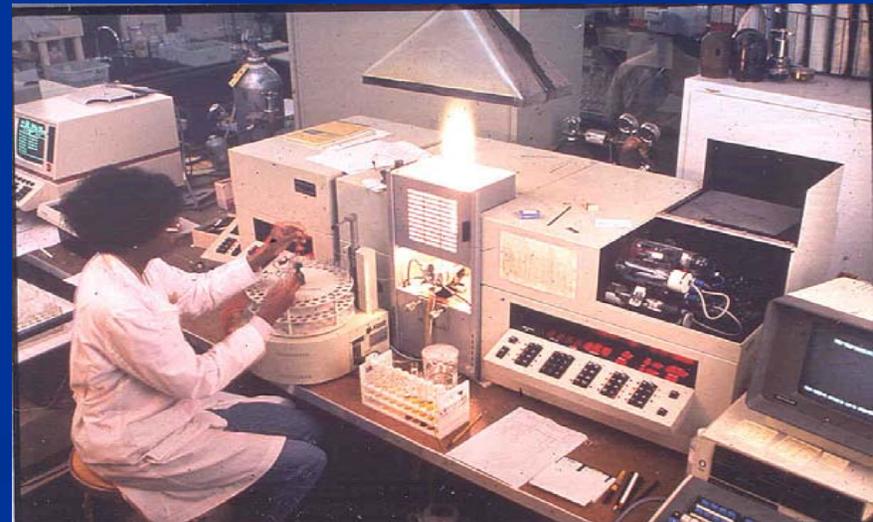
15. Regulatory Information

Federal, State & International Regulations - Part 1\-----
-SARA 302- -----SARA 313-----
Ingredient RQ TPQ List Chemical Catg.

Ethylene Glycol (107-21-1) No No Yes No

Federal, State & International Regulations - Part 2\-----
-RCRA- TSCA
Ingredient CERCLA 261.33 8(d)

Ethylene Glycol (107-21-1) 5000 No No



Common tests

- Chlor-n-oil to test oil for total halogens (often done on-site)
- Paint filter test
- TCLP (Toxicity Characteristic Leaching Procedure)
- pH
 - NEW test method 1110A referenced for testing liquids that corrode steel
- Flashpoint
 - NEW test referenced for ignitable compressed gas

Where do you find labs?

•Check if TSDF offers services or recommends labs

•See the “Directory of Michigan Environmental and Drinking Water Testing Laboratories”

The screenshot shows the DEQ website with the following elements:

- Header:** DEQ Department of Environmental Quality, Michigan.gov, The Official State of Michigan Website.
- Navigation:** Michigan.gov Home, DEQ_Home, Online_Services, Permits, Programs, Site_Map, Contact_DEQ.
- Left Sidebar:** key topics (circled in red), Administrative Hearings, Clean Michigan Initiative, Community Right to Know, Environmental Assistance, Environmental Education, Environmental Emergencies, Environmental Incentives, Forms, Environmental Reports, Grants and Loans, Laboratory Services, Laws & Rules, Locations of Environmental Interest, Maps & Data, Permits, Policies and Procedures, Pollutants and Toxicants, Publications, inside DEQ, news & events, pollution prevention.
- Main Content:** Key Topics, Assistance and Support Services, Announcements (DEQ Who Does What List PDF), Spotlight (New Water Withdrawal Law for Michigan! PDF, DEQ Grant and Loan Catalog PDF), Featured Online Services (Environmental Quality Publications Center, Pollution Emergency Alerting System Database, Pollution Emergency Alerting System Information, Toxic Chemical Release Inventory (TRI)).
- Right Sidebar:** Search, Departments/Agencies, Online Services, Surveys, RSS Feeds, DEQ Quick Links (DEQ Calendar, DEQ Military Salute, DEQ Who Does What List PDF, DEQ Publications, DEQ Acronyms PDF, DEQ Laws and Rules, DEQ Shortcuts XLS, Public Comment Opportunities, DEQ Staff Spotlight, DEQ Forms, DEQ Training & Workshops), Quick Links (Environmental & Drinking Water Testing Labs Directory - circled in red), EnviroFlash, MIair, Beach Monitoring System, MISWIM Surface Water Information Management System.

Determine if solid waste regulations apply

- Commonly use knowledge AND/OR
- Use the paint filter test to determine if “free liquids” present
- Conduct other listed tests if needed
- Identify if have inert materials listed in Rule 299.4114
- Identify if there is a solid waste recycling exclusion for unwanted material
- Discuss with district staff or Duane Roskoskey 517.335.4712 to request additional determinations per Part 1 of the Part 115 rules

(page 2-5)

Common Examples Solid Waste

- Cardboard
- Glass
- Wood
- Packaging materials
- Garbage from breakroom
- Industrial non hazardous solid wastes



Know which wastes are banned from landfills

- Used oil
- Lead acid batteries
- Whole tires
- Beverage containers
- Yard clippings
- Empty drums unless crushed
- Regulated hazardous waste
- Liquid waste
- Low level radioactive waste
- Some asbestos waste
- Some medical waste
- Some PCB waste
- Sewage

Talk to your waste hauler/
landfill what they accept

The screenshot shows the Michigan Department of Environmental Quality (DEQ) website. The main navigation bar includes 'Michigan.gov Home', 'DEQ Home', 'Online Services', 'Permits', 'Programs', 'Site Map', and 'Contact DEQ'. A search bar is located on the right. The 'Solid Waste' section is highlighted, and a red circle is drawn around the 'WASTE' menu item in the left sidebar. Another red circle is drawn around the 'Solid Waste' menu item in the same sidebar. A third red circle is drawn around the 'Landfill Prohibited Materials and Appropriate Disposal Options' link in the 'Laws & Rules' section of the main content area. The page also features a 'Michigan Solid Waste Program Overview' section and a list of links under the 'Information' heading, including 'Documents Concerning Emerging Solid Waste Policies', 'Solid Waste Fees', 'Annual Reports of Solid Waste Landfilled', 'Solid Waste Operational Memos', 'Exemptions and Guidance', 'Solid Waste Facilities', 'Solid Waste Planning', 'Solid Waste Alternatives Program', 'General Information', 'FY05 Solid Waste Management Fund Report to Legislature PDF', 'Solid Waste Policy Advisory Committee Meeting Notes', 'Solid Waste Policy Advisory Committee', 'Municipal Recycling Information', and 'Common Solid Waste Violations'. The 'Laws & Rules' section includes links for 'Solid Waste Disposal Area License Application Forms & Instructions' and 'Solid Waste Statutes and Rules'. The page footer includes 'OZONE ACTION!' and 'MI Kids! Tax Time Resources'.

Determine if scrap tire regulations apply

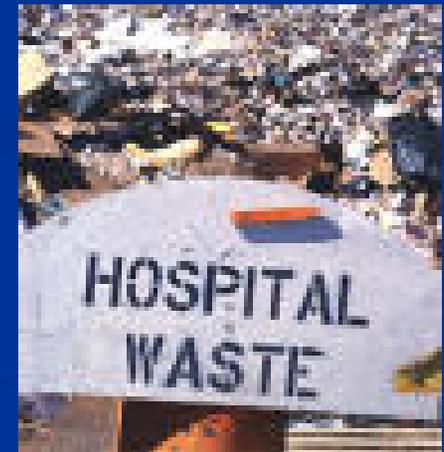
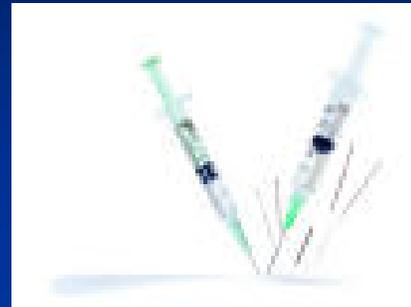


- Do you have 500 or more scrap tires, or if tire retail do you have 1500 or more scrap tires?
- Do you haul more than 7 of your own tires?
- Do you haul someone else's tires?

(page 2-7)

Determine if medical waste regulations apply

- Syringes and needles
- Blood and blood products and body fluids, but not including urine or materials stained with blood or body fluids
- Infectious waste
- Pathological waste
- Cultures
- Vaccines



See page 2-67

Determine if radioactive wastes regulations apply



Industrial smoke detectors



Lead pigs clue

(page 2-62 and
Chapter 10)

Determine if have regulated amounts of PCB wastes and articles

Toxic Substances and Controlled Substances (TSCA)

- transformers
- capacitors; heat transfer systems
- hydraulic systems
- electromagnets
- switches
- voltage regulators
- circuit breakers
- reclosers and cables



(page 2-53 and Chapter 4.5)

Determine if have liquid industrial waste

- Includes liquid wastes from other locations besides "industrial" sites
- Liquids that are not hazardous waste
- Test
 - Paint filter test

Common LIW examples:

- Most antifreeze
- Some wastewater including most mobile power washing wastewater
- Most sludges from trenches (unless there's been a release)
- Storm sewer cleanout
- Grease trap waste
- Oils being recycled

What is "used oil"?

- Regulations differ in its definition
- Part 111 and 121 define it as "any oil which has been refined from crude oil, or any synthetic oil, which has been used and as a result of use, is contaminated with physical or chemical impurities."

Examples of used oil

- used motor oil
- used hydraulic oil
- used transmission and brake fluids
- spent synthetic cutting and machine oils
- spent mineral seal oils
- spent quench oils
- spent gear oils
- non-PCB transformer oils
- CFC-contaminated oils from air-conditioning and refrigeration units
- oil-water mixtures if sufficient oil exists for legitimate recycling and oil does not arise from "de minimis" sources.
- oil drippings from metal shavings from turning and drawing operations, etc.

Used oil mixture rule

- SQG and LQG must not mix any hazardous waste with used oil
- CESQG must not mix halogenated hazardous wastes with used oil
- Check with recycler before mixing liquid industrial waste with used oil
- If burning oil on-site, check with AQD for additional testing, permitting, and if any LIW mixing will be allowed

Used Oil Not Considered Hazwaste

- Used oil being recycled which contains less than 1,000 ppmw total halogens (a test for chlorine, bromine, fluorine, iodine, and astatine content)
Or
- There was a successful rebuttal
- Test
 - Total halogens
 - Most haulers use a chlorinated compound detection test kit before picking up oils

Other non hazardous waste oils

- Used oil that only exhibits a characteristic of hazardous waste (i.e. ignitable, corrosive, toxic, reactive) that is sent for recycling
- Mixtures of used oil and diesel fuel that is mixed on the generator's site and used in their own vehicles as fuel

Exclusion from Part 121 as a "Product"

- Meets Part 111 used oil specs
- PCB concentration cannot exceed 2 ppm
- The heating value of the oil is equal or greater than 17,000 BTU per pound (approximately 128,000 BTU per gallon)

Determine if have Hazardous Waste and how much is generated in calendar month

It is not necessarily the same as
“Hazardous MATERIAL”

PART 2. IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

R 299.9201 Purpose and scope.

Rule 201. (1) This part identifies only some of the materials which are hazardous wastes under sections 46 and 48 of part 111 of the act. A material which is not a hazardous waste identified in this part is still a hazardous waste for purposes of those sections if, in the case of section 46 of part 111 of the act, the director has reason to believe that the material may be a hazardous waste within the meaning of section 3 of part 111 of the act, and, in the case of section 48 of part 111 of the act, the statutory elements are established.

(2) The explanation of waste contained in this part applies only to wastes that also are hazardous for purposes of the rules implementing part 111 of the act. For example, it does not apply to materials such as nonhazardous scrap, paper, textiles, and rubbers that are not otherwise hazardous wastes and are recycled.

R 299.9202 "Waste" explained.

Rule 202. (1) A waste is any discarded material that is not excluded by R 299.9204 or that is not excluded by a variance granted under R 299.9202(6) and (7). A discarded material is any material that is any of the following:

REVISED HAZWASTE RULES EFFECTIVE 3/17/08

OBTAIN REVISED RULES PDF FILE 5/13/08

- air emission standards
- universal wastes
- wastewater treatment exemptions
- hazardous waste combustors
- hazardous waste identification and listing, exemptions
- manifesting
- consistency with flammable and combustible liquids regulations
- construction permit application content

**When referred to federal regulations,
make sure looking at correct edition**

- **The state's hazardous waste rules now adopt the 2006 editions of 40 CFR Parts 260-299.**
- **See R 299.11003 for specific dates of the adopted federal regulations.**

Is the waste a "listed" hazardous waste?

- MI has more hazardous waste than EPA
 - Look where letter is located in code
e.g. federal U002 (Acetone) vs
state 015U (Barban)

- Some wastes were added and removed from lists in the March 17, 2008 rules
 - Added K181 Nonwastewaters from the production of dyes or pigments
 - K069 Secondary lead Stayed administratively
 - Removed 155U Vinylidene chloride
 - Removed 146U Ziram

- Delisting option

"F" Listed Hazardous Waste

- ✓ From nonspecific sources
- ✓ Same listing as EPA
- ✓ Some "F" waste is acutely hazardous – when hazard code includes "H"
- ✓ F001-F005 solvents common

EPA Hazardous Waste Number	Hazardous Waste From Nonspecific Sources	Hazard Code
F019	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	(T)
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	(H)

"K" Listed Hazardous Waste

- From specific sources
- Additional MI listings
- In MI, most is from iron & steel production and petroleum refining industries

Table 204a

Industry	EPA Hazardous Waste Number	Hazardous Waste From Specific Sources	Hazard Code
Petroleum Refining	K048	Dissolved air floatation, 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 or 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	(C,T)
Primary	K088	Spent potliners from primary aluminum	(T)

For the next P & U listings

- Commercial chemical products (CCP) are:
 - 100% pure
 - Technical (commercial) grade
 - Sole active ingredient in the chemical formulation
- Compare the CAS # and generic names from the MSDS to the list of chemicals in the rules

"P" Listed Hazardous Waste

- ✓ From unused commercial chemical products, off-spec, container residues, and spill residues
- ✓ All "P" wastes are acutely hazardous
- ✓ Same listing as EPA

R 299.9224 Table 205a; discarded commercial chemical products; off-specification species; container residues; and spill residues thereof as acutely hazardous wastes.

Rule 224. Table 205a reads as follows:

Table 205a			
EPA Hazardous Waste Number	Chemical Abstract Services Number	Substance	Hazard Code
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	

"U" Listed Hazardous Waste

- ✓ Also from unused commercial chemical products, off-spec, container residues, and spill residues
- ✓ These wastes are considered toxic
- ✓ Additional MI listings

R 299.9226 Table 205c; discarded commercial chemical products; off-specification species; container residues; and spill residues thereof as toxic hazardous wastes.
 Rule 226. Table 205c reads as follows:

Table 205c			
Michigan Hazardous Waste Number	Chemical Abstract Services Number	Substance	Hazard Code
001U	50-76-0	Actinomycin D	
002U	107-05-1	Allyl chloride	
003U	117-79-3	2-aminoanthraquinone	
004U	60-09-3	Aminoazobenzene	
005U	97-56-3	0-aminoazotoluene	
006U	92-67-1	4-aminobiphenyl	
007U	132-32-1	3-amino-9-ethyl carbazole	
157U	57360-17-5	3-amino-9-ethyl carbazole hydrochloride	
008U	82-28-0	1-amino-2-methyl anthraquinone	
009U	101-05-3	Anilazine	
158U	142-04-1	Aniline hydrochloride	
011U	90-04-0	o-Anisidine	
012U	134-29-2	o-Anisidine hydrochloride	
013U	Class-01-0	Antimony (when in the form of particles 100 microns or less)	
014U	1397-94-0	Antimycin A	
147U	2642-71-9	Azinphos-ethyl	
148U	86-50-0	Azinphos-methyl	
159U	103-33-3	Azobenzene	
015U	101-27-9	Barban	
016U	22781-22-2	Barbitone	

Mixture or Derived From

- If listed hazardous waste is combined with other non-hazardous wastes it is all listed hazardous waste
- All residue derived from treating a listed hazardous waste is listed hazardous waste

Does the waste exhibit a characteristic of hazardous waste?

- Ignitable
- Corrosive
- Reactive
- Toxic
- Severely Toxic



Ignitable Characteristic

➤ D001

- Liquids FP <140 F,
- Non-Liquids that spontaneously ignite
- Ignitable compressed gas, or
- Oxidizing material

➤ Test

- Flash point
- For compressed gases meeting criteria in 40 C.F.R. §§260.20 and 2601.21(a)(3) NEW



Corrosive Characteristic

➤ D002

- Aqueous with a $\text{pH} \leq 2.0$ or ≥ 12.5 or
- Liquid that corrodes steel at a rate more than 6.35 mm per year at 130°F

➤ Test

- pH
- Test method 1110A for liquids corrode steel NEW



Reactive Characteristic

➤ D003

- Undergoes rapid or violent chemical reaction
 - ☑ Explodes
 - ☑ Normally unstable
 - ☑ Reacts violently with water or forms explosive mixture with water

➤ Test

- As required for DOT classification



Toxicity Characteristic

- D004-D043 (Same as EPA)
- Test
 - Toxicity Characteristic Leaching Procedure [TCLP]
 - ☑ If waste is all solid, run totals & use 20 times rule
 - ☑ If waste is all liquid, run totals first
 - ☑ If waste is a solids & liquids, run TCLP
 - ☑ Semi volatiles solvents

**TABLE 2.3 Characteristic Hazardous Wastes for Toxicity
(if waste meets or exceeds the listed concentration)**

EPA Hazardous Waste Number	Chemical Abstract Services Number	Material	Extract Concentration milligrams per liter
D004	7440-38-2	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-dimethano 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

Severely Toxic Characteristic

- 001S -007S
 - Additional MI hazardous wastes
 - Contains 1.0 ppm or more
 - Not common wastes

Another question...

- Does the waste exhibit any other characteristics for the Land Disposal Restrictions (LDR)?

☹️ **Commonly overlooked wastes**

- Sorbents (used with listed hazardous waste spills)
- Partially empty aerosol cans (TCLP contents, ignitability)
- Sump, trench or pit sludge (metals, solvents)
- Grinding swarf from stainless steel working (chromium)
- Spent activated carbon media (solvents)
- High flash solvents (TCLP metals, chlorinated solvents)
- Sand blasting media (metals)
- Spent paint filters (metals, ignitability)
- Others listed on Page 2-23

Hazardous waste does not include:

PCB's

Radioactive wastes

Used oils being recycled

HOWEVER--*Mixtures* of hazardous waste with PCB's or radioactive wastes may be considered *mixed wastes* and be dually regulated.

More questions to consider

- Does an exclusion or restriction listed in R 299.9202, R 299.9204, 299.9228, and Part 8 of rules apply to specific waste?

Wastewater discharges into POTW

- If approved by the sewer authority (exemption begins at the point of discharge into sewer system)
- Does NOT include unpermitted discharge into septic system (illegal discharge)
- NEW conditions for discharging solvents

Scrap Metal Examples

- Grinding swarf
- Metal pieces (page 2-62)
- Precious metals (page 2-60)
- Aerosol cans (page 2-58)
- Drained oil filters (page 2-50)



Lab Samples

- Submit smallest amount possible to lab
- Shipping records:
 - Sample collector's name, mailing address, and telephone number
 - Laboratory's name, mailing address, and telephone number
 - Date of shipment
 - Quantity of the sample
 - Description of the sample

Rags and other textiles

- Different requirements if being disposed or commercially cleaned and reused
 - Textiles do not contain free liquids (i.e., you cannot squeeze any liquid from the textiles)
 - The containers used to store the textiles do not contain free liquids
 - Hazardous waste is not mixed with the textile after its original use

"Empty containers"

- All non acute wastes practically removed,
 - Residue no more than 1 inch and not more than 3.0% weight (containers less than or equal to 110 gallons in size)
 - no more than 0.3% weight (containers more than 110 gallons in size)
- Compressed gas: approaches atmospheric pressure

Empty container (cont)

- If held acute or severely toxic:
 - Triple rinse with appropriate solvent or cleaned by proven equivalent method
 - Remove inner liner that prevented contact with container
- Rinse water/removed residue would be hazardous waste

Empty Pharmaceutical Containers

NEW rule applies IF:

- Pharmaceutical was an acute hazwaste only because of a characteristic
- Remaining formulation in the container or liner does not exhibit that characteristic
- As much as possible is removed from container under normal practices
- 1" or less remains or
- Not more than 3% by weight of the container capacity remains

Does that mean this "empty" rule applies to all P listed pharmaceutical wastes?

Not necessarily, need to first look at the table in the rules and see if has a hazard code

EPA Hazardous Waste Number	Chemical Abstract Services Number	Substance	Hazard Code
P081	55-63-0	Nitroglycerine	(R)
P084	4549-40-0	N-Nitrosomethylvinylamine	
P085	152-16-9	Octamethylpyrophosphor-amide	
P087	20040-49-0	Quinidine	

Universal Waste

- Fluorescent tubes & other lights
- Electronic equipment
- Dry cell batteries
 - Lead acid batteries (normally managed under R 299.9804, see page 2-48)
- Devices containing mercury
- Pesticides
- Pharmaceuticals
- Antifreeze (NEW in 2008)

To determine your facility's current universal waste generator classification

- Add up ALL universal waste accumulated at any time
- Once a LQH, stay at that level through the end of the calendar year

SUMMARY OF UNIVERSAL WASTE HANDLER CATEGORIES¹

	Small Quantity Handler ¹ (SQH) ²	Large Quantity Handler ¹ (LQH) ³
Amount of all universal waste accumulated at any time ²	Less than 5,000 kilograms (11,000 pounds) ²	5,000 kilograms (11,000 pounds) or more ²
Maximum amount that can be accumulated on-site ²	Less than 5,000 kilograms (11,000 pounds) ²	No limit ²
Maximum time period before waste must be shipped ²	1 year after generated or received from another facility ²	1 year after generated or received from another facility ²

To determine your facility's current hazardous waste generator classification

- Add up ALL the hazardous waste generated at the site in a calendar month
- The amounts are calculated per site
- One site is under one identification number and is contiguous property
- Calculate the amount *generated*, not necessarily the amount *shipped*.

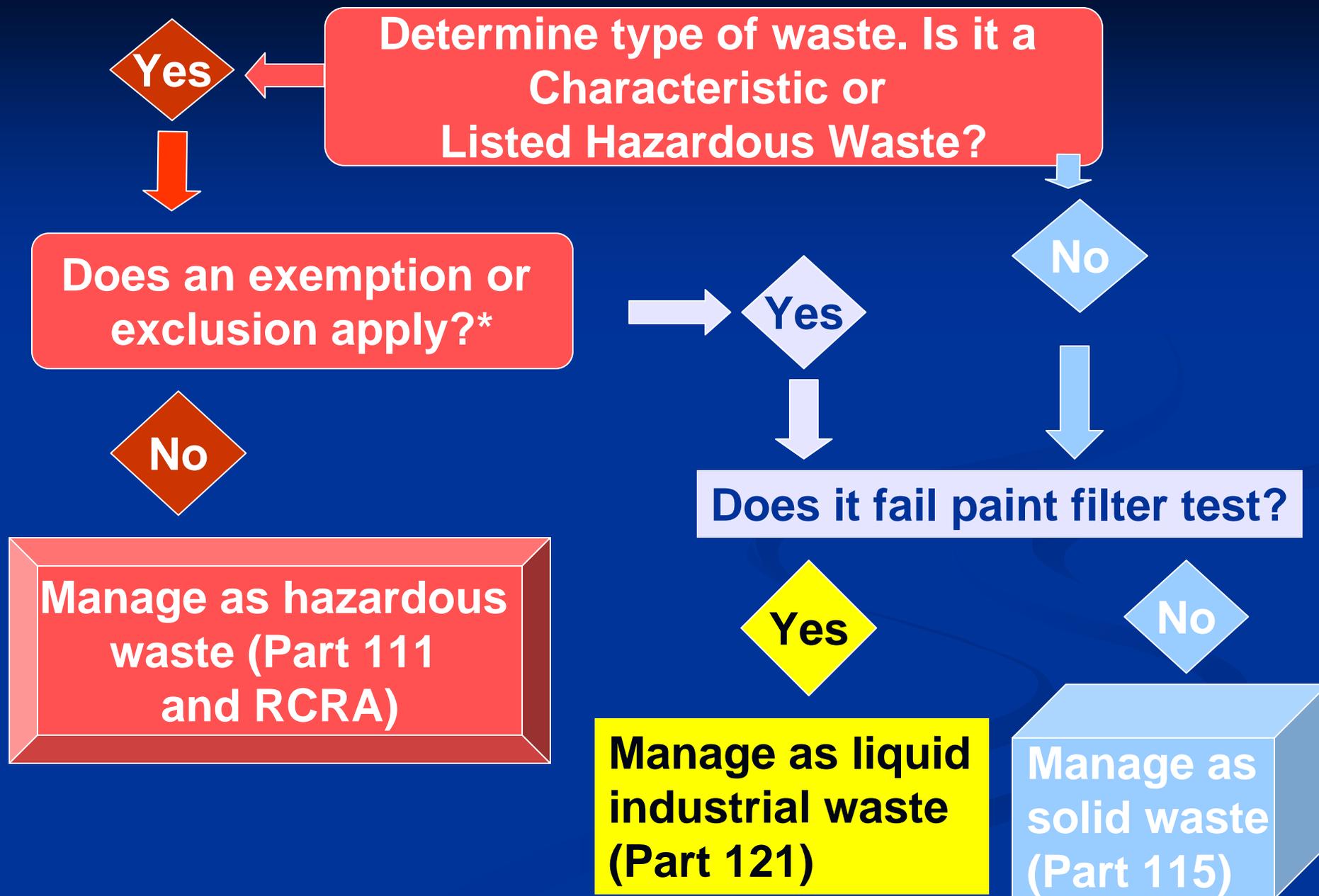
To obtain weight information

- Weigh contents in containers
- Guestimate
- See page 2-57 for solvent recycling still
- Calculate if unused products

Specific gravity of product from MSDS
X 8.34 lb/gal = weight of product

	Conditionally Exempt Small Quantity Generator (CESQG)¹	Small Quantity Generator (SQG)¹	Large Quantity Generator (LQG)
Amount of acute or severely toxic hazardous waste generated or accumulated at any time²	1 kilogram (2.2 pounds) or less	1 kilogram (2.2 pounds) or less	More than 1 kilogram (2.2 pounds)
Amount of acute spill residue or contaminated soil generated or accumulated at any time²	100 kilograms (220 pounds) or less	100 kilograms (220 pounds) or less	More than 100 kilograms (220 pounds)
Amount of non acute hazardous waste generated in 1 calendar month	Less than 100 kilograms (220 pounds)	At least 100 kilograms (220 pounds) but less than 1,000 kilograms (2,200 pounds)	1,000 kilograms (2,200 pounds) or more
Approximate volume of non acute hazardous waste³	Less than half of a 55gallon drum, or 25 gallons	One-half to five drums, or 25 to 250 gallons	Five full drums, or 200-250 gallons
Maximum amount of non acute hazardous waste that can be accumulated on-site	1,000 kilograms (2,200 pounds)	6,000 kilograms (13,200 pounds)	No maximum amount
Maximum time period before waste must be shipped	No time limit unless amount exceeds 2,200 pounds	180 days, unless shipping over 200 miles, then 270 days	90 days

Review of Waste Determination Basic Steps



Need help?

- Chapter 2 and referenced documents
- Environmental Assistance Center
800-662-9278
- WHMD District Office (Appendix C)
- TSDf and waste transporters
- Waste Consultants