

1. Why should you be concerned about hazardous waste?

Many companies and institutions do not know that they generate hazardous waste, or are not sure how to properly manage hazardous wastes. Uninformed hazardous waste generators may do things that can lead to environmental harm. Hazardous waste can enter the environment as a result of:

- Improper storage,
- Dumping on the land or into lakes and streams,
- Illegal burning,
- Unauthorized disposal into a municipal sewage system,
- Pouring into floor drains or storm drains,
- Unauthorized disposal into on-site septic systems,
- Improper disposal to sanitary landfills, or
- Spills.

Even very small quantities of hazardous waste (for example: silver at levels of 5 parts per million [ppm] or trichloroethylene at levels of 0.5 ppm; 1 ppm equals approximately 1 milligram per liter [mg/l]) can contaminate groundwater, lakes, streams, air, and soil and can cause a human health risk when people are exposed. Contamination can be difficult to clean up, and costly and harmful for everyone involved, including the original generator of the hazardous waste.

Legal liability for environmental damage and public health claims.

Your legal responsibility as a generator of any quantity of hazardous waste extends from “cradle to grave.” State and federal court decisions have consistently held that legal liability remains with the original generator in some instances, even after disposal of the waste. Under state and federal clean-up laws, persons, businesses, and institutions that generate hazardous waste are legally responsible for damages resulting from the waste. You may be liable for costs arising from environmental enforcement by a regulatory agency and costs of correcting environmental problems caused by the wastes, as well as costs of suits for damages by individuals.

Does your company or institution do any of the following?

- Use and discard solvent, cleaning fluids, degreasers, paints, thinners, inks, plating solutions, oils, acids, caustics, pesticides, or other chemicals?
- Accumulate waste in drums or other containers?
- Dispose of waste at your location, or send it off-site for disposal, storage, treatment, or recycling?


If the answer to any of these is “yes,” your business or institution may be required to comply with federal and Michigan regulations regarding hazardous waste.

This guide was developed based on the following:

Michigan Guide to Understanding Hazardous Waste Management produced in December 1995 by the Waste Management Division, Michigan Department of Environmental Quality in conjunction with the Environmental Assistance Division; Title 40, Code of Federal Regulations, Part 261; and Michigan Act 451 of 1994, as amended.

This brochure serves as an introduction to Michigan's hazardous waste regulations for lithographic printers. It is not intended to be a substitute for the Michigan or federal hazardous waste regulations. The actual regulations must be consulted for specific requirements.

Funding for this brochure was made available through Great Printers Project grants from the U.S. EPA and the Michigan Department of Environmental Quality.

Printed on 100% recycled paper with 100% post-consumer content using soy-based ink. 

AUTHORITY: PA 451 of 1994 TOTAL COPIES PRINTED: 3000
COST PER COPY: \$0.23 TOTAL COST: \$680.00

Michigan Department of Environmental Quality

2. What waste does your business or institution generate?

Tour your company or institution and use the lists below to inventory waste streams.

You can learn a great deal about your own wastes and minimize expenses for waste management and testing, if you review the materials and processes at your site and use this available information. The initial review described in this section will show whether you may be generating hazardous wastes and at what quantity level. If you find out that some of your waste may be hazardous, then it will be necessary to conduct a more specific waste evaluation which is described in section 3.

Use the lists below to help you inventory the types of all waste being generated. Estimate the quantity of each waste generated per month. Convert each quantity to pounds. Tour all parts of the facility and ask questions of the personnel. Try to notice all chemical inputs, as well as all outputs or waste streams at each point. It is important to identify all the sources of hazardous waste and to calculate the volume generated at each source. Business owners and managers may be surprised to learn about wastes from their site about which they previously had not known.

In your review, consider what likely wastes are being generated from all activities at your company or institution:

- building & machine maintenance
- grounds maintenance
- production processes
- cleaning processes
- laboratory procedures
- vehicle maintenance
- finishing processes
- office procedures

Be sure to trace what happens to likely hazardous substances that are purchased for use at your facility. Follow what is done with substances, such as those listed below, from the time they enter your premises to when they may become wastes:

- acids
- caustics
- degreasers
- lamps: fluorescent, mercury, or halide
- paints
- plating solutions
- alkalies
- cleaning fluids
- inks
- metallic compounds
- pesticides
- solvents
- batteries
- cyanides
- laboratory chemicals
- oils
- photographic wastes
- thinners

To assist you in this process, you may wish to request the *Waste Reduction Checklist* from the Michigan Department of Environmental Quality's (MDEQ) Environmental Assistance Center (EAC) at 1-800-662-9278.

3. Does your business or institution generate hazardous waste?

What the law says:

All waste generators (except households) are required by law to evaluate whether their waste is hazardous and keep a record of the evaluation for three years after the waste was last generated.

A Note of Caution:

Waste evaluations are not easy to perform, but it is possible to reduce evaluation costs if you are able to do part or all of it by yourself. This section gives an overview of waste evaluation by:

- Providing usable steps for a generator who wishes to conduct all or part of a waste evaluation, and
- Enabling a generator to understand the process and ask the right questions if someone else is hired to conduct the evaluation.

The laws allow you as a waste generator to identify a hazardous waste yourself without testing, by applying your own knowledge of the waste. If you choose to identify a hazardous waste yourself, you will need the information provided in this section and the hazardous waste lists from state and federal regulations.

If the wastes are complex, however, you should get outside help. You may obtain advice at no expense on waste evaluation from the Waste Management Division (WMD), Michigan Department of Environmental Quality, district staff. You can contact the MDEQ EAC at 1-800-662-9278 if you need help locating or finding phone numbers for your WMD District Office. To enable the WMD district staff to better assist you, first go through section 2 titled “What waste does your business or institution generate?” along with this section, as well as you can. Waste evaluation services may also be obtained from a testing laboratory, the intended treatment or disposal facility, environmental consulting firms, or be provided by the transporter.

Determine the category of the hazardous waste.

Read through the charts on the next page, keeping in mind the information you collected about the waste. Ask yourself the accompanying questions to help determine whether the waste falls into one or more of the categories.

The complete lists for Michigan are given in the rules pertaining to hazardous waste management, which are established under Part 111 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451; formerly the Hazardous Waste Management Act, 1979 PA 64, as amended). Contact the MDEQ Waste Management Division at (517) 373-9875 for current information on how to purchase a copy of the state administrative rules. The federal lists are found in Title 40, Code of Federal Regulations, Part 261. You may purchase the lists from the U.S. Government Printing Office, or check with your local public library. However, the federal lists do not contain all the hazardous wastes listed in the Michigan regulations.

Categories of Hazardous Waste Under State and Federal Law

- A. **Listed Waste:** Waste material listed by name on either the federal or Michigan lists of hazardous waste:
1. **Waste from listed non-specific sources.**
Waste and number located in the “F” list. Potential “F” list wastes pertaining to lithographic printing are on page 6. These wastes, because of their high flammability, persistence, or toxicity, are automatically hazardous regardless of concentration or amount.
 2. **Waste from listed specific sources.**
Waste and number located in the “K” list. A potential “K” source pertaining to lithographic printing is listed on page 6.
 3. **Discarded (unused) commercial chemical products.**
Waste and number located in the “P” and “U” lists. Wastes in the “P” list are acutely hazardous and are regulated at quantities of 1 kilogram (1 kg. equals approximately 2.2 pounds) or more. “P” list wastes are not expected to be found in the lithographic printing industry and are not included. Potential “U” list wastes pertaining to lithographic printing are on page 6.
- B. **Characteristic Waste:** A waste which has any of the five hazardous waste characteristics identified in the state and federal regulations:
1. **Ignitable:** Starts burning easily; liquid with flash point below 140 degrees F, solid that spontaneously ignites, or oxidizing material.
 - E.g. solvents, paint thinners, lacquer paint filters, chlorates, nitrates, peroxides, and rags soaked with these wastes.
 - Hazardous waste number D001.
 2. **Corrosive:** Dissolves metals or burns skin; pH less than or equal to 2.0 or greater than or equal to 12.5.
 - E.g. acids, caustics.
 - Hazardous waste number D002.
 3. **Reactive:** Undergoes rapid or violent chemical reaction.
 - E.g. cyanides, sulfides, explosives, sodium metal.
 - Hazardous waste number D003.
 4. **Toxic:** Poisonous to humans and other living organisms.
 - E.g. metal-bearing solutions containing lead or mercury, certain pesticides, and organics.
 - Waste and number are located in the “D” list. Potential “D” list wastes pertaining to lithographic printing are on page 5.
 5. **Severely toxic waste.**
These wastes contain 1 ppm or more of a severely toxic material and are regulated at quantities of 1 kg or more. “S” list wastes are not expected to be found in the lithographic printing industry and are not included.

Questions To Use With Hazardous Waste Categories Chart

If the answer to any question below is “yes”, the waste is hazardous.

1. **Is the waste from a listed source; part A-1 and A-2 of the chart?**
If you have wastes of this type, they are easy to identify by checking your sources with those in the lists.
2. **Is the waste a discarded commercial chemical product; part A-3 of the chart?**
Usually these wastes result from a decision to reduce inventory and discard an unused chemical product.
3. **Is the waste a characteristic waste; part B of the chart?**
It may be easy to judge that a waste is ignitable, corrosive, or reactive, based on your own knowledge. Toxicity usually must be shown through laboratory work, using the Toxicity Characteristic Leaching Procedure (TCLP) and testing for the constituents.
4. **Is the waste severely toxic; part B-5 of the chart?**
This is a short list of wastes of special concern.
5. **Is the waste a mixture of a listed waste (part A of the chart) and another waste?**
The entire resulting mixture must be managed as a hazardous waste, based on the quantity status of the generator.

“D” LISTED WASTES OF 1996

EPA HAZARDOUS WASTE NUMBER	MATERIAL	EXTRACT CONCENTRATION MILLIGRAMS PER LITER (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	Cresol	200.0***
D016	2,4-D (2,4-Dichlorophenoxyacetic Acid)	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13**
D012	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	Heptachlor (and its Epoxide)	0.008
D032	Hexachlorobenzene	0.13**
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D008	Lead	5.0
D013	Lindane (1,2,3,4,5,6-hexa-chlorocyclohexane, gamma isomer)	0.4
D009	Mercury	0.2
D014	Methoxychlor (1,1,1-trichloro-2, 2-bis(p-methoxyphenyl)ethane)	10.0
D035	Methyl ethyl ketone	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 (C10H10C18, Technical chlorinated camphene, 67-69 percent chlorine)	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 Silvex (2,4,5-Trichlorophenoxypropionic acid)	1.0
		0.2
D043	Vinyl chloride	
001D *	Copper	100
003D *	Zinc	500.0

* Michigan Act 451 of 1994 designated hazardous waste; not a U.S. EPA designated hazardous waste.

** Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.

*** If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol concentration is used and regulated at 200 mg/l.

**Potential “F” Listed Wastes
in the Lithographic Printing Industry**

Acetone	Cyclohexanone	Methyl Isobutyl Ketone (MIBK)	1,1,1-Trichloroethane
Benzene	2-Ethoxyethanol	Methyl Ethyl Ketone (MEK)	1,1,2-Trichloroethane
n-Butyl Alcohol	Ethyl Acetate	Nitrobenzene	Trichloroethylene
Carbon Disulfide	Ethyl Benzene	2-Nitropropane	1,1,2-Trichloro-1,2,2-Trifluoroethane
Carbon Tetrachloride	Ethyl Ether	Ortho-Dichlorobenzene	Trichlorofluoromethane
Chlorinated Fluorocarbons	Isobutanol	Pyridine	Xylene
Chlorobenzene	Methanol	Tetrachloroethylene	
Cresols and Cresylic Acid	Methylene Chloride	Toluene	

**Potential “K” Listed Wastes
in the Lithographic Printing Industry**

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)
-----------------	------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----

**Potential “U” Listed Wastes*
in the Lithographic Printing Industry**

EPA HAZARDOUS WASTE NUMBER	CHEMICAL ABSTRACT SERVICES NUMBER	MATERIAL	HAZARD CODE**
U116	96-45-7	Ethylene Thiourea	(T)
U122	50-00-0	Formaldehyde	(T)
MICHIGAN HAZARDOUS WASTE NUMBER	CHEMICAL ABSTRACT SERVICES NUMBER	MATERIAL	HAZARD CODE**
166U	106-88-7	1,2-Epoxybutane	(T)
070U	123-31-9	Hydroquinone	(T)
077U	Class-02-0	Lithium	(T)

* Unused commercial products containing any U listed chemical, i.e.: off-specification, past expiration date, etc.

** The primary hazardous properties of these materials have been indicated by the letters: C (corrosive), I (ignitable), R (reactive), and T (toxic).

Note: The above “F”, “K”, and “U” lists are in abbreviated form. If there is any question about a specific chemical or chemical waste, you must refer to the Michigan and federal hazardous waste regulations.

Decide whether further evaluation is needed.

After following the preceding steps, you may already know that your waste falls into one or more hazardous waste categories. Once you know ALL of the categories, you need to determine every hazardous waste number that is applicable. If you have questions, ask the MDEQ Waste Management Division or your trade association to help you determine whether you have properly evaluated your waste. The MDEQ will help you even if you place a telephone call anonymously.

If you know or suspect that you have not fully evaluated your waste, you will need outside help, often from a testing laboratory or through your transporter or treatment, storage, and disposal facility (TSDF). Additionally, if you change any raw material and/or make a process change, you will need to re-evaluate the wastes generated. Before you engage a testing laboratory, check with the TSDF where you intend to send your waste. Find out whether the facility has a list of laboratory tests that they require, and the names of the laboratories from which they will accept data. This step will prevent spending money on laboratory tests that are not necessary or that do not meet the TSDF's requirements. If you determine that your waste is a hazardous waste, a TSDF has the right to require additional testing, because facility operators must ensure that the waste types accepted do not violate their permits or licenses.

Get help from a testing laboratory if necessary.

Laboratory testing of a sample of your waste may be necessary. This will provide documentation about the hazardous components and the characteristics of the waste. In some cases, the tests will save you money by showing that your waste is not hazardous after all.

It is not necessary to identify every chemical component of the waste in order to meet regulations and ensure adequate treatment or disposal. You should ask the laboratory to perform only those tests needed to determine the waste type, the hazardous characteristics, and any further testing required by the TSDF. However, if you have drums or containers of mixed or unidentified old waste, special tests may be required. You can help minimize the laboratory testing cost by providing the information which you have previously collected.

The prices charged for laboratory testing vary greatly, and it is suggested that you get estimates from two or more laboratories. It will cost several hundred dollars to test for all of the hazardous characteristics (in a case where all of the tests are needed). The laboratory tests for ignitability, corrosivity, and reactivity are relatively simple and inexpensive. Testing for the toxicity characteristic takes more time and is more expensive. Testing for the toxicity characteristic takes more time and is more expensive.

What do you do now and in the future?

If you have determined that you generate one or more hazardous wastes, use the chart on page 8 to determine which hazardous waste quantity category applies to you. Regardless of whether you are a conditionally exempt small quantity generator, a small quantity generator, or a fully regulated generator, you will need to take further action to manage your hazardous wastes. Contact your WMD district office staff for assistance with the regulations that pertain to you. If you are a conditionally exempt small quantity generator you will need to take far fewer compliance steps than if you fall into either of the other two generator categories. For more information, contact the MDEQ Hazardous Waste Program at (517) 373-9875 or the Environmental Assistance Center at 1-800-662-9278 and request copies of the *Michigan Guide to Understanding Hazardous Waste Management* or the *Small Quantity Generator Requirements* publications. For the future, consider implementing a pollution prevention program. If you eliminate or minimize hazardous materials use and hazardous waste generation at your facility, you may no longer be subject to the federal and Michigan hazardous waste regulations. For pollution prevention information, call the EAC at 1-800-662-9278.

4. Determining your facility's hazardous waste status.

The total quantity of all hazardous waste being generated and/or accumulated at your site is the basis for the state and federal regulations regarding your waste management. After a site inventory, you can determine which one of the three quantity categories, listed below, apply to you.

Hazardous Waste Quantity Categories

Conditionally Exempt Small Quantity Generator Limits — Less than 1 Barrel*

In one month, you generate:

- Less than 100 kilograms (220 pounds); this is approximately equal to less than half a 55-gallon drum, or 25 gallons**, AND
- You never accumulate 1000 kilograms (2200 pounds) or more at any time.

Small Quantity Generator Limits — 1 Barrel to 5 Barrels*

In one month, you generate:

- From 100 kilograms (220 pounds) to less than 1000 kilograms (2200 pounds); this is approximately equal to 1/2 to 5 drums, or 25 to 250 gallons**, AND
- You never accumulate 6000 kilograms or more.

Fully Regulated Generator Limits — 5 Barrels or more*

In one month, you generate:

- 1000 kilograms (2200 pounds) or more; this is approximately equal to 5 full drums or more, or 250 gallons**.

Acutely Hazardous and Severely toxic waste: Limits and Regulations

If you produce 1 kilogram (2.2 pounds) or more of an acutely hazardous or severely toxic waste as listed in the state and federal rules, in one month, you must manage that waste under the same regulations as for generators of over 1000 kg./month of hazardous waste (fully regulated generator). Acutely hazardous wastes are those in the "P" list and certain wastes in the "F" list, severely toxic wastes are in the "S" list.

Key: * 1 Barrel = 200 kilograms (440 lbs.) hazardous waste.

** Equivalent to a 55-gallon drum if the weight and volume of waste is equal to water.

Note: *Classifications are based on TOTAL site-wide weights/volumes of ALL hazardous wastes generated.*



Michigan Great Printers Project Partners:

MICHIGAN ENVIRONMENTAL
COUNCIL
(517)487-9539
(517)487-9541 FAX

PRINTING INDUSTRIES
OF MICHIGAN
(810)354-9200
(810)354-1711 FAX

MICHIGAN DEPARTMENT OF
ENVIRONMENTAL QUALITY
(800)662-9278
(517)241-0673 FAX