Businesses need to determine if the waste they generate is hazardous or non-hazardous. If the materials used, or the process generating the waste changes, or there are other impacts from business operations that change the waste (e.g. cross contamination from aerosol overspray), you must re-evaluate the waste characterization. The regulations do not require a specific timeframe like annually to re-evaluate the waste. However, you may want to check to see if the disposal company has a retesting schedule.

Be sure to keep any records obtained during your waste determinations (i.e., test analysis results, safety data sheet [SDS], or other documentation such as product information from a supplier or manufacturer) for at least three years from the time the waste stream was last sent for treatment, storage, or disposal. These records are required to be maintained and available for review in the event of an inspection.

Who can do waste characterizations for a business?

A business may either:

- **Hire a consultant** or use a disposal company’s waste characterization services. Be aware that the waste generator is still ultimately responsible for meeting the waste regulations. As such, understanding the basic principles of waste characterization is key to ensuring compliance and ensuring that your vendor services are adequate to ensure compliance.

- Characterize the waste themselves by either:
  - Using knowledge of the material and process it came from. Information on the SDS or other supplier and manufacturer literature may be useful when you have unused product needing disposal. A SDS often provides information about the flashpoint, pH, or if a discarded product is a hazardous waste. A SDS is not completely reliable for determining if a used material is hazardous waste because it does not include information about contaminants that might be in the waste from use. A waste stream may be presumed to contain certain constituents above regulatory thresholds for compliance purposes, but disposal facilities may still require testing before accepting the waste.
  - Having a representative sample of the waste tested.

What are testing requirements?

When characterizing, contact the receiving treatment and/or disposal company before testing. They may require specific tests or only accept data from specific laboratories. Ask the disposal company for a list of required tests, the purpose for the tests, approved testing methods, and acceptable laboratories. This should prevent you from spending money to perform unnecessary tests that do not meet the disposal company’s requirements. The waste rules identify which laboratory methods must be used. If the waste is from cleanup activities, see the methods in the *Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria* and discuss your cleanup situation with MDEQ staff before testing.

It is wise to obtain estimates from two or more laboratories. In some cases, the tests will save you money by showing that you do not have hazardous waste. When hiring testing services, use a reputable firm and obtain a written contract. The contract should clearly identify which specific services the company will provide. For example, instead of vague language about sampling waste, identify:

- Who is responsible for collecting samples?
- Who will arrange to have it analyzed?
- Who will arrange to have an expert look at the analysis results?
- Who will determine if the waste is hazardous and at which regulatory limit?
Waste samples being sent to laboratories are exempt from most of the hazardous waste regulations if it meets certain conditions. Submit the smallest sample amount as possible for testing (typically less than one gallon), and the laboratory may return any remaining waste sample to the generator. The exemption no longer applies when the sample is determined to be hazardous waste and is no longer needed for waste characterization purposes.

Contact the laboratory about its procedures for accepting samples. When shipping the sample, you must meet U.S. Postal Service or U.S. Department of Transportation (U.S. DOT) labeling and shipping requirements. U.S. DOT questions can be directed to Michigan State Police, Commercial Vehicle Enforcement Division at 517-241-0506 or the U.S. DOT at 800-467-4922. If these agencies’ regulations do not apply to the sample, it must be packed so it does not leak, spill, or vaporize. Waste samples being shipped to a laboratory are not required to be manifested, but the following information must accompany the shipment:

- 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.

What are common laboratory tests?

The paint filter test or test method 9095 found in the U.S. EPA publication SW-846 is a method used to determine the presence of free liquids in a representative sample of waste. A predetermined amount of material is placed in a paint filter. If any portion of the material passes through and drops from the filter within the 5-minute test period, it contains free liquids. If these wastes are not regulated under the hazardous waste regulations, they are regulated under Part 121 of Act 451 as a liquid industrial waste unless otherwise specifically excluded by the statute.

The Toxicity Characteristic Leaching Procedure (TCLP) test is used to determine if a waste exhibits a toxic characteristic that makes it a hazardous waste. If a sample of waste when tested using the TCLP test method is found to meet or exceed established hazardous constituent limits in the rules, then the waste is a characteristic toxic hazardous waste. The TCLP test method or test method 1311 is found in the U.S. EPA publication SW-846. It simulates typical solid waste landfill conditions and predicts whether toxic chemicals in the waste are likely to leach and eventually impact surface water or groundwater. If you are familiar with your process and know the constituents used in the process, it is not necessary to analyze your waste for every chemical in the waste. Nor do you have to analyze the waste for every constituent included on the “D” list when evaluating your waste. For example, you may only need to perform a TCLP analysis for metals and volatiles if you know that the other constituents found in Table 201a of the Part 111 Rules of Act 451 are not present in the waste. If you are unsure of the types and concentrations of hazardous contaminants present in the waste, another cost-effective option is to first run a total analysis on the sample. If the waste is 100% solids, divide the total analysis constituent concentration by 20 and then compare the resulting theoretical concentration to the regulatory limit in Table 201a of the rules. If no theoretical concentration equals or exceeds the regulatory limit, the solid cannot exhibit the toxicity characteristic and the TCLP does not need to be performed. This is sometimes referred to as the 20 time rule. If the waste is a liquid or contains both liquids and solids, refer to the U.S. EPA TCLP Questions for use of totals analysis in lieu of TCLP analysis. For additional U.S. EPA information on use of totals analysis for waste characterization, go to www.epa.gov/rcraonline and search for “Total Waste Analysis.”

In other situations, you may only need to know if a liquid waste is ignitable and can request a flashpoint test; or to find out if it is corrosive, request or perform a pH test.

Special tests are required if you have drums or containers of mixed or unidentified old waste. You may be able to minimize laboratory testing costs by providing information about your waste streams and operations that were previously collected during your waste survey.
Although it is not commonly done, you may be able to conduct some tests on your own to determine if you have hazardous waste. For example, used oil can be tested on-site using commercial test kits to determine if it contains total halogens greater than 1,000 ppm requiring it to be handled as a hazardous waste. Discuss these testing options with your permitted and registered waste transporter; licensed treatment, storage, and disposal facility (TSDF); or licensed recycling company to see if they will accept these test results.

What are the waste characterization steps?

A. Conduct a waste survey to identify all your waste streams. Hazardous waste may be generated in many areas of your business from the shop floor to offices. The following are some commonly overlooked wastes. The reasons why it may be a hazardous waste are noted in parenthesis.

- Spent fluorescent lamps or bulbs and other lighting fixtures (toxic for mercury).
- Disposable rags containing free liquids with a flashpoint of less than 140 degrees Fahrenheit or used with a listed solvent (ignitability, spontaneous combustion, used with “F” listed solvents).
- Spent activated carbon media, included in some air filters and other equipment (contains “F” listed solvents).
- Used solvents with low flashpoint (toxic, ignitability).
- Used solvents with high flashpoints (toxic and ignitable contaminants).
- Drain or sump sludge, including loading/unloading area trenches (toxic and ignitability due to gasoline from trucks).
- Painting materials and waste including paint thinners, enamel reducers, epoxies, primers, enamels, solvent-based paints, and paint booth filters (contains “F” solvents, metals, ignitability).
- Aerosol cans that are not empty (contains “U” or “P” chemicals, ignitability).
- Solvent-based adhesives (ignitability).
- Batteries - lead acid and dry cell (toxic for lead and mercury, corrosive).
- Used water-based or synthetic lubricating fluids containing high concentrations of heavy metals (toxic metals of concern include lead, chromium, cadmium, and barium).
- Listed wastes mixed with another non-hazardous waste.
- Office computer equipment (may contain lead in the cathode ray tubes, batteries).
- Discarded, unused chemical products from inventory reduction activities (any of the commercial chemical products on the “P” and “U” lists in the state or federal regulations).
- Medical kits containing mercury thermometers or antiseptics containing mercury (toxic).

B. Identify if the material can be used “as is” for its original intended purpose without any processing (e.g. no filtering, chemical treatment, etc.) and thus can be used as a product and not be disposed of as a waste. Consider using material exchanges, associations, or other business connections to find another company that can use the product.

C. Identify if the material is a characteristic and/or listed hazardous waste as identified in “Part 2 Identification and Listing of Hazardous Waste” of the hazardous waste rules and Part 111, Hazardous Waste Management, of the Natural Resources and Environmental Protection Act 1994 PA 451 (NREPA). Be aware Michigan regulations identify more hazardous wastes than U.S. EPA under the federal Resource Conservation and Recovery Act (RCRA) and rules.

Consider these five questions when doing a hazardous waste characterization:

1. Is the unwanted material a waste (solid, semisolid, liquid, or gas)?
2. Is the material specifically excluded, exempted, or partially excluded from the hazardous waste regulations? See the complete descriptions in the Part 111 rules. Some commonly excluded materials include:
• Universal waste, which includes electric lamps (e.g. fluorescent and other mercury or lead containing light bulbs), batteries, antifreeze, devices containing mercury, consumer electronics, pesticides, and pharmaceuticals, all enjoy a partial exclusion
• Reusable shop towels or other textiles that do not contain free liquid and are sent to a commercial cleaning service, laundered and reused
• Scrap metal when recycled
• Some materials being recycled such as used oil and filters and lead acid batteries
• The remaining residue in “empty containers”

3. Is the waste a "listed" hazardous waste? To be considered listed waste, either the chemical or the process generating the waste is specifically included in the rules. Listed wastes include “F,” “K,” “P,” and “U” in the hazardous waste number. If listed hazardous waste is combined with other non-hazardous wastes, the combined waste is regulated as listed hazardous waste. See Chapter I of the U.S. EPA publication “RCRA Orientation Manual” for an overview of the “mixture and derived from” and the “contained in” rules along with an overview of hazardous waste characterization and exemptions/exclusions. For a printed copy, call 800-490-9198 to order document number EPA530-F-11-003.

4. Does the waste exhibit a characteristic of hazardous waste? The waste could be ignitable, corrosive, reactive, or toxic. When reviewing toxicity, a waste is considered a characteristic toxic hazardous waste if the concentration of any of 40 hazardous constituents listed in Table 201a of the Part 111 rules is met or exceeded when tested using the TCLP. The waste is a severely toxic characteristic hazardous waste if any of the 7 substances found in table 202 are detected using totals analysis. Characteristic wastes include “D” and “S” in the hazardous waste number.

5. Is the waste subject to the Land Disposal Restrictions (LDR)?

D. If the waste is not hazardous waste, does it contain free liquids which would make it a Part 121 liquid industrial waste in Michigan? Does it meet any exclusion listed in Part 121? If you are unsure if liquids are present, it may be necessary to have a paint filter test done. Please note used oil has requirements under both Parts 121 and 111. Process wastewater discharged to an on-site system is an industrial wastewater discharge and generally requires a Part 31 groundwater discharge permit. It is not a septage waste subject to Part 117. Contact MDEQ Water Resources Division permitting staff for more details regarding on-site disposal of industrial wastewaters.

E. If it is not hazardous waste or a liquid industrial waste, is it a Part 115 solid waste, a Part 169 scrap tire, or a special waste like asbestos waste which is subject to a federal National Emission Standards for Hazardous Air Pollutants and the federal Toxic Substance Control Act? Does it meet any exclusion included in these regulations? See the MDEQ website about landfill prohibited wastes for waste that is prohibited from being disposed in a landfill.

F. In some instances, it may be necessary to determine if the material is a regulated medical waste or radioactive material or regulated under the federal Toxic Substances Control Act (TSCA) such as PCB waste.

Additional waste characterization resources

• RCRA Training Modules including “Hazardous Waste Identification”, “Exclusions”, and “Definition of Solid Waste and Hazardous Waste Recycling”
• Chapter 2 of the Michigan Manufacturers Guide to Environmental, Health and Safety Regulations for MDEQ information
• Use Internet tools such as the U.S. EPA Envirofacts Master Chemical Integrator and SDS information to search for chemical and hazardous waste information. SDS can be obtained from the product supplier, manufacturer, or Internet such as the SIRI SDS Index.

• Purchase characterization publications from private companies or associations. For example, the American Society for Testing and Materials has their ASTM Manual 42 RCRA Waste Management: Planning, Implementation, and Assessment of Sampling Activities. This is not a MDEQ endorsement for this manual.

• Discuss waste characterization requirements with the Office of Waste Management and Radiological Protection District Office.

Not properly characterizing waste and keeping documentation are common waste violations.

Summaries of waste generator types and status

Proper waste characterization is necessary for businesses to calculate the amount of hazardous waste they generate monthly and determine the waste regulations that apply to their waste. The less hazardous waste a site generates, the less regulation the site is required to meet under the regulations.

The solid waste regulations do not have generator categories. Check if there are local ordinances regarding frequency of solid waste pickup and/or privacy fencing requirements for dumpsters. Also check with the landfill and waste hauler regarding what wastes they will accept and how they must be packaged or contained, especially for special solid wastes like asbestos.

The tables below summarize three types of waste and their associated categories as established in the regulations. A business may need to notify about their regulated waste activity and apply for a Site Identification number (Site ID) using the EQP5150 form. The form instructions provide additional information about regulated waste activities requiring notification.

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>LIQUID INDUSTRIAL WASTE GENERATOR SUMMARY (includes most used oil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount generated in calendar month</td>
<td>Maximum amount that can be accumulated on-site</td>
</tr>
<tr>
<td>Liquid Industrial Waste and Used Oil Generator</td>
<td>Any amount unless exempted¹</td>
</tr>
</tbody>
</table>

¹See Parts 111 and 121 and used oil guidance for some possible exemptions

²Other regulations requiring containment and emergency planning may apply when threshold management quantities are met e.g. federal Spill Prevention Control and Countermeasure (SPCC) for oils and state Part 5 rules “Spillage of Oil and Polluting Materials”

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>UNIVERSAL WASTE¹ HANDLER SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handler Status</td>
<td>Amount of all universal waste accumulated at any time</td>
</tr>
<tr>
<td>Small Quantity Handler (SQH)</td>
<td>Less than 5,000 kilograms (11,000 lbs.)</td>
</tr>
<tr>
<td>Large Quantity Handler (LQH)²</td>
<td>5,000 kilograms (11,000 lbs.) or more</td>
</tr>
</tbody>
</table>

¹Universal waste includes electric lamps (e.g. fluorescent and other light bulbs), antifreeze, batteries, devices containing mercury, consumer electronics including computers, certain pesticides, and pharmaceuticals.

²If the LQH status is reached, the business must keep the LQH designation through the end of that calendar year.
It is necessary to know how much hazardous waste is generated in a calendar month when notifying about regulated waste activity. If a business is on the border of a generator status, the generator needs to keep a log showing when and how much hazardous waste was generated each month to verify the generator status determination. The following is an example of a log maintained on the container to document how much hazardous waste was generated monthly. The volume would need to be converted to lbs. or kilograms and compared to the generator status categories in Table 3.

<table>
<thead>
<tr>
<th>Date waste added</th>
<th>How much added</th>
<th>By:</th>
<th>Running total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/3/06</td>
<td>1 gal</td>
<td>George G.</td>
<td>1 gallon</td>
</tr>
<tr>
<td>1/15/06</td>
<td>6 gal</td>
<td>Pat M.</td>
<td>7 gallons</td>
</tr>
</tbody>
</table>

A company may lower their hazardous waste generator status, thereby lowering their regulatory burden if they implement waste minimization and pollution prevention practices. They may also choose to handle certain hazardous wastes as universal waste to reduce their regulatory burden since the weight of universal waste is not included when calculating a site’s monthly hazardous waste generator status.

<table>
<thead>
<tr>
<th>Generator Status</th>
<th>Amount of non-acute hazardous waste generated per month</th>
<th>Approximate volume of non-acute hazardous waste</th>
<th>Amount of acutely or severely toxic hazardous waste generated per month</th>
<th>Maximum amount of non-acute hazardous waste that can be accumulated on-site</th>
<th>Maximum time period before waste must be shipped</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditionally Exempt Small Quantity Generator (CESQG)</td>
<td>less than 100 kilograms (220 lbs.)</td>
<td>less than half of a 55 gallon drum, or 25 gallons</td>
<td>less than 1 kilogram (2.2 lbs.)</td>
<td>1,000 kilograms (2,200 lbs.)</td>
<td>No time limit unless amount exceeds 2,200 lbs.</td>
</tr>
<tr>
<td>Small Quantity Generator (SQG)</td>
<td>at least 100 kilograms (220 lbs.) but less than 1,000 kilograms (2,200 lbs.)</td>
<td>one-half to five drums, or 25 to 250 gallons</td>
<td>less than 1 kilogram (2.2 lbs.)</td>
<td>6,000 kilograms (13,200 lbs.)</td>
<td>180 days, unless shipping over 200 miles, then 270 days</td>
</tr>
<tr>
<td>Large Quantity Generator (LQG)</td>
<td>1,000 kilograms (2,200 lbs.) or more</td>
<td>five full drums, or 200-250 gallons</td>
<td>1 kilogram (2.2 lbs.) or more</td>
<td>No maximum amount</td>
<td>90 days</td>
</tr>
</tbody>
</table>

1 The liquid volume is only given as an estimate and is based on the waste having the same weight as water. Your liquid hazardous waste might have a different volume based on its weight. The regulations state amounts by weight.

2 Acutely hazardous wastes have “P” in their waste number and severely toxic wastes are those with an “S” in their waste number. Additional acutely hazardous wastes are identified by an (H) in the hazard code column of the other listings.

3 If you are registered at one generator status and have a monthly hazardous waste shipment larger than the accumulation quantity allowed at that status, and then you will need to update your generator status. If you ship a quantity of hazardous waste greater than the amount allowed to be generated at the notified generator status, have documentation justifying your generator status determination available for inspection. A generator may change their hazardous waste generator status throughout the year. If the monthly amount of hazardous waste generated varies substantially throughout the year, comply with the higher generator status requirements to ensure consistent compliance. The annual hazardous waste user charge for the site will be based on the highest generator status during the calendar year proceeding the billing year.

For additional resources, consider viewing our on-demand webinars at [www.michigan.gov/deqwaste](http://www.michigan.gov/deqwaste) under the “Introduction to Hazardous Waste Regulations Webinars or contacting the Environmental Assistance Center at 800-662-9278, or E-mail deq-assist@michigan.gov.

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