

Rapid changes in the technology field can make high-technology equipment like computers, televisions, telephones and other products obsolete very quickly. Unwanted equipment may be a hazardous waste when disposed and possibly subject to state and federal regulations. Many government agencies and manufacturers are attempting to find solutions for this growing waste stream. Information about some projects is found at www.deq.state.mi.us/ead/recycle/recylink.html by clicking on the "Electronics" category.

How is hazardous waste regulated?

All generators of waste, except households, are responsible for determining if their waste is a hazardous waste. Hazardous wastes can either be included on specific lists or exhibit hazardous characteristics. This determination can be done by knowledge of the waste or by testing the waste. The Toxicity Characteristic Leaching Procedure (TCLP) is the test used to determine if a waste exhibits a toxicity characteristic. Wastes found to be hazardous are subject to the hazardous waste management regulations (Part 111 of Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (PA 451) and Subtitle C of the Federal Resource Conservation and Recovery Act of 1976, as amended, and administrative rules). The specific management requirements will depend on the company's hazardous waste generator status (see sidebar), and whether the material can be managed under the alternative universal waste regulations in R 299.9228. Those requirements are summarized in the Department of Environmental Quality (DEQ) *Universal Waste* publication at www.deq.state.mi.us/ead/pub/tas/univwast.pdf. Nonliquid wastes found not to be hazardous waste are subject to the state solid waste regulations (Part 115 of PA 451). This publication does not address transporter and processor or recycler requirements. The DEQ is the primary regulating agency in Michigan for waste generators. Computer models containing capacitors and transformers manufactured before 1980 may also contain PCBs which are regulated by the US Environmental Protection Agency under the Toxic Substances Control Act (TSCA).

Hazardous Waste Generator Status Categories

In ONE month, the total amount of ALL nonacute hazardous waste is generated and accumulated at the following volumes:

Large Quantity Generator (LQG): more than 2,200 pounds [and/or 2.2 pounds or more of acutely and severely toxic hazardous waste is generated.]

Small Quantity Generator (SQG): 220 pounds to less than 2,200 pounds. Accumulation never exceeds 13,200 pounds.

Conditionally Exempt Small Quantity Generator (CESQG): less than 220 pounds. Accumulation never exceeds 2,200 pounds.

There are also storage time limits and other requirements. For more information, or to obtain Michigan's hazardous waste regulations and publications, visit the Waste Management Division Internet site at www.deq.state.mi.us/wmd or contact the DEQ Environmental Assistance Division at 800-662-9278 or your local DEQ Waste Management Division district office. The electronic federal regulations are at www.access.gpo.gov/nara/cfr.

What components of electronic equipment are likely to be considered hazardous waste?

Computer monitors and television sets TCLP tests done on cathode ray tubes (CRTs) contained in computer monitors and television (TV) sets show variable results. Color CRTs always exceeded the 5.0 mg/L limit for lead and black and white CRTs sometimes exceeded the limit. Because the CRT, by weight, represents a major portion of a computer monitor and TV, the DEQ anticipates that most will be hazardous waste when disposed. However, since CRTs meet the definition of *electric lamp* in Michigan they may be managed as a universal waste. See the publication *Universal Waste* for management requirements. Some monitors/CRTs may also contain barium and older models may contain cadmium. Flat screens may contain mercury.

Circuit boards/printed wiring boards Boards are found in many types of electronic equipment such as computers, TVs, radios, telephones, and other electronic hardware. Some electronic boards may contain various metals including lead, silver and gold. There is a wide range of board composition. The DEQ is not aware of any way to distinguish whether these boards would be hazardous waste by its appearance. Boards, as well as intact electronic equipment containing these boards, may be managed as scrap metal if sent for recycling and would be exempt from most hazardous waste regulations [R 299.9206 (3)(b)] if handled properly.

Batteries and switches, sensors, & relays

Electronic equipment, including computer motherboards, often contain batteries and sometimes mercury switches, sensors, and relays. The batteries may contain mercury, cadmium, and lithium; and switches, sensors and relays may contain mercury, cadmium, and precious metals like palladium, rhodium, and platinum. Batteries and mercury switches are likely to be hazardous waste but can be managed as universal waste. Other items containing heavy and precious metals would be subject to hazardous waste requirements.

Additional information about electronic waste is in "Just Say No to E-Waste: Background Document on Hazards and Waste from Computers" at www.svtc.org/cleancc/eccc.htm.

Are there ways to reduce waste regulations & disposal costs for generators?

Unwanted electronic equipment may be managed through trade, donation, resale, or recycling instead of disposal. Before transferring the equipment to someone else, insure that logos are removed and that hard drives and other information-containing components are completely erased of sensitive data.

- Lease equipment and return it when the contract expires. Contact manufacturers/distributors about take-back programs.
- Donate **usable** equipment to schools or charitable groups. Explore potential tax benefits of donations **before** any transaction is begun. Some computer makers provide rebates on new equipment if old models are donated. Several Internet sites listing donation options include:
 - ✓ www.microweb.com/pepsite (PEP National Directory of Computer Recycling Programs)
 - ✓ www.nsc.org/ehc/epr2.htm (National Safety Council's Environmental Health Center)
 - ✓ www.pcsforschools.org (Computers for Schools)
 - ✓ www.cristina.org (National Cristina Foundation)
 - ✓ www.donateaphone.com (Donate a Phone for distribution to victims of domestic violence)
- Resell usable equipment. Call local used computer dealers for possible resale. A listing of these firms can generally be found in the telephone book yellow pages under *Computers & Computer Equipment-Dealers-Used*. List equipment on electronic material exchanges or go to www.deq.stat.mi.us/ead/recycle for more information.
- Participate in and support local computer recycling collection programs. It may be more cost efficient than contracting directly with recycling companies.
- Recycle equipment and handle as much as possible as universal waste. Several companies recycle used monitors, televisions and circuit boards. Go to www.deq.state.mi.us/ead/recycle and click on *Recycled Materials Market Directory, Miscellaneous* section for information. If you don't have Internet access, call 800-662-9278 for help in finding recyclers.

When considering recyclers:

- ✓ Get several estimates from different businesses;
- ✓ Ask what services are provided in their fee since there usually is a charge for recycling;
- ✓ Visit the recycling site to see how they handle collected equipment, if possible;
- ✓ Ask the recycler if they are in regulatory compliance or call the agencies that regulate the business to check. In Michigan, contact the DEQ District Office that oversees the area where the business is located. Depending on the activities at the recycling site, multiple DEQ divisions (Waste Management, Air Quality, Surface Water Quality, and Storage Tank) could have jurisdiction.
- ✓ Discuss the specific handling requirements with the recycler or reclaimer. It is not necessary to use a permitted and registered hazardous waste transporter when shipping electronic equipment as scrap metal or universal waste to them. However, if the materials are being reclaimed for precious metals and are not being managed as universal waste, then R 299.9803 requires the generator to have an identification number; meet manifest requirements; use a permitted and registered hazardous waste transporter; and keep records of the volume of materials stored at the beginning of the year, amount received or generated during the year, and amount remaining at the end of the year.

What if I don't want to recycle or can't reuse the unwanted equipment?

CESQGs and SQGs may find their generator status changed to a higher status level when hazardous electronic equipment is disposed, unless the business chooses to handle the equipment as universal waste. This change may affect how the equipment is accumulated, shipped, and the need to meet other applicable requirements including record keeping, staff training & emergency preparedness. For more guidance on these requirements, go to www.deq.state.mi.us/wmd under the hazardous waste icon. If the used equipment being shipped for disposal is considered a hazardous waste and is not being handled as a universal waste, then SQGs and LQGs would be required to have it hauled by a permitted and registered hazardous waste transporter to a licensed hazardous waste disposal facility and use a manifest. Unless the equipment is assumed to be hazardous waste, or you have some documentation that it is not a hazardous waste, it would be necessary to conduct an individual analysis for each piece of equipment. If the electronic equipment is **not** a hazardous waste, or it was a hazardous waste generated by a CESQG or from a household, and it does not contain liquids, it can be disposed at a licensed solid waste facility with their approval. Direct questions to your Waste Management Division district office hazardous waste program staff.



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