MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

Nicotine Vapes

Safety and Disposal for Michigan Schools

Introduction

Schools and other educational institutions are experiencing an increase in the use of electronic cigarettes (e-cigarettes) and vaping devices, referred to as electronic nicotine delivery systems (ENDS) in U.S. Environmental Protection Agency (U.S. EPA) regulations. In response, these items are often confiscated and require safe handling and disposal by school administrators. The waste streams generated from this practice are not household hazardous waste. These items typically include:

- E-cigarettes or vaping devices, also called vape pens[1]
- Liquid nicotine, also called e-liquids or e-juices, generally packaged in small containers called cartridges, vials, or pods for use in e-cigarettes or vaping devices
- Lithium-ion batteries.

Regulatory Overview

E-cigarettes or vaping devices contain two hazardous components:

1. Liquid nicotine or nicotine residues
2. Lithium-ion batteries

Nicotine is hazardous because it is toxic at very low levels. Lithium-ion batteries contain hazardous substances like lithium, which can cause chemical burns and poisoning if the battery is broken or leaks. The batteries can also overheat, posing a fire safety hazard. When the casing of a lithium-ion battery is broken, it can ignite upon being exposed to the air and burn vigorously. Additionally, when lithium-ion batteries catch fire, they can release poisonous gases and chemicals into the air, posing a health hazard.

[1] Under the federal hazardous waste pharmaceutical rules promulgated for healthcare, e-cigarettes and e-juices are also collectively referred to as electronic nicotine device systems or ENDS as identified above. Uniquely, the federal hazardous waste pharmaceutical rules ***not only*** apply to traditional healthcare providers (like doctors, nurses, and pharmacists), but also to vape shops offering ENDS for sale to consumers.

Safe Handling and Disposal

DO NOT:

- Pour nicotine liquids down the drain.
- Rinse or wash nicotine liquids out of e-cigarettes.
- Put e-cigarettes or hazardous components of e-cigarettes in the trash or recycling bins.
- Dismantle single use e-cigarettes.
- Bring e-cigarettes to a Drug Enforcement Administration (DEA) Take-Back Day event. DEA collections are only for individual consumers, because items discarded by residents from their homes are subject to different environmental regulations than those that apply to schools and businesses.

The sewering of nicotine is specifically prohibited under national environmental regulations enforced by the U.S Environmental Protection Agency (EPA) and the Michigan Department of Environment, Great Lakes, and Energy (EGLE). Liquid nicotine is prohibited from being disposed in ANY drain, whether it is a sink, toilet, or other access to the sanitary sewer, storm sewer, or on-site septic systems. Used or unused cartridges or pods cannot be thrown in the regular garbage, either. Special waste profiling and approval is required by the landfill for that disposal to be lawful, and it is generally not granted because of the hazards discussed above.

DO:

Take the following three steps to protect yourself, students, the school, and the environment.

STEP 1: Safely Accumulate Collected E-cigarettes and Nicotine Liquids

Prepare the ENDS for safe storage as described below, and preferably keep them in a locked, fire safe cabinet until the disposal vendor packages, labels, marks, and secures the waste for safe transport and disposal[2].

[2]A contract should be established between the person (school, ISD, or other county/municipal entity authorized to assist with proper disposal) offering these materials for shipment and the disposal vendor assisting with proper transport and disposal. Depending on the materials being offered and the amount (both collected and accumulated over time), the shipment may need to be documented using either:

1. A hazardous waste manifest and the contractor would be required to have substantial training to meet the national U.S Department of Transportation (DOT) regulations, or
2. A shipping document meeting Michigan's liquid industrial by-products regulations.

Contractors that package, label, mark, and secure the waste for shipment can document the shipment for the person offering it, by signing the manifest or shipping document on behalf of the "offeror." However, that must be noted on the manifest or shipping document by adding the words "on behalf of" where the transporter signs in box 15 of the manifest or where they sign the shipping document confirming they have taken possession of the waste for transport.

Intact Single Use e-Cigarettes

Place each individual e-cigarette in a separate, clear, sealed plastic bag to prevent the batteries from short-circuiting and catching fire.

Refillable e-Cigarette Components

Lithium batteries

If the vape is reusable and the battery can be safely and easily removed, remove the battery and manage it separately. Place each individual battery in a separate, clear, sealed plastic bag to prevent the batteries from short-circuiting and catching fire.

Alternatively, the battery terminals can be taped.

Students commonly do a "mech mod" like upgrade to a stronger battery. This can result in device instability and circumvent safety features. If in doubt, do not remove the battery and instead process as an intact single use e-cigarette.

Nicotine e-liquids (vials or loose cartridges/pods)

Place nicotine e-liquid vials, cartridges, and pods in a clear, sealed plastic bag. Multiple items can be put in the same bag.

Wear chemical resistant nitrile gloves to protect your skin from absorbing the nicotine and causing nicotine poisoning.

STEP 2: Determine the School's Hazardous Waste Generator Category

The options that schools have for disposing of hazardous waste depend on how much hazardous waste is generated each calendar month across the whole campus ***and*** how much is accumulated over time. Locations that generate more hazardous waste each month ***or*** accumulate more hazardous waste over time are subject to more regulation. If enough is generated in a month or accumulated over time, the generator is required to track their hazardous waste on a hazardous waste manifest from "cradle to grave," showing where it was first generated, who transported it, and where it was ultimately disposed. Nicotine is tracked using the P075 hazardous waste code, and lithium-ion batteries are tracked using the D001 hazardous waste code.

The hazardous waste regulations establish three hazardous waste generator categories – very small, small, and large quantity generators. The following table provides details about these categories and the amount of hazardous waste that can be generated each month. When making a generator category determination, ***ALL*** of the hazardous waste generated at the school must be counted for the calendar month – not just the hazardous waste pharmaceuticals (HWP) and ENDS. The same applies when reviewing the amount accumulated.

Waste Type	Very Small Quantity Generator (VSQG)	Small Quantity Generator (SQG)	Large Quantity Generator (LQG)
Non-Acute Hazardous Waste Generated Per Calendar Month	≤ 100 kilograms (220 pounds)	> 100 & < 1,000 kilograms	≥ 1,000 kilograms (2,200 pounds)
Acute Hazardous Waste Generated Per Calendar Month (includes *P075 Nicotine*) ★	≤ 1 kilogram (2.2 pounds)	≤ 1 kilogram (2.2 pounds)	> 1 kilogram (2.2 pounds)
Maximum Amount of Hazardous Waste that can be Accumulated On-Site	1,000 kilograms (2,200 lbs.) of nonacute, 1 kilogram (2.2 lbs.) of acute unless the site meets Rule 316 episodic generator requirements.	6,000 kilograms (13,200 lbs.) of nonacute, 1 kilogram (2.2 lbs.) of acute unless the site meets Rule 316 episodic generator requirements.	No maximum amount.
Maximum Time Period Before Waste Must be Shipped Offsite	No time limit.	180 days, unless shipping over 200 miles, then 270 days.	90 days.

If the school has an on-site nurse's office or clinic providing healthcare services, it may meet the definition of a "healthcare facility" and be subject to or otherwise have the option to manage HWP and ENDS under Part 111, Hazardous Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), and the rules promulgated thereunder, Rules 824 through 833 (the **HWP and ENDS Rules**). A flow chart to aid in determining applicability with these rules is provided on Page 4. If the school qualifies as a healthcare facility and is an SQG or LQG (see Table 2) when counting total hazardous waste, the site is ***required*** to manage their HWP and ENDS in accordance with the HWP and ENDS Rules.

If the school qualifies as a healthcare facility and is a VSQG (see above table) when counting total hazardous waste, the school:

1. **May opt into** managing HWP and ENDS in accordance with the **HWP and ENDS Rules**, ***OR***
2. May manage all non-pharmaceutical hazardous waste, HWP and ENDS in accordance with the Part 111, Rule 304 provisions (for traditional non-healthcare VSQGs) and using the optional provisions in Part 111, Rule 827; ***OR***
3. May manage all non-pharmaceutical hazardous waste, HWP, and ENDS in accordance with the Part 111, Rule 304 provisions (for traditional non-healthcare VSQGs).

Common Hazardous Wastes at Schools

A few examples of common hazardous waste streams that might be found at a school include:

- Paints, stains, and solvents (maintenance)
- Laboratory chemicals
- Hand sanitizer
- Cleaning supplies
- Boiler chemicals
- Pesticides
- Vocational shop chemicals

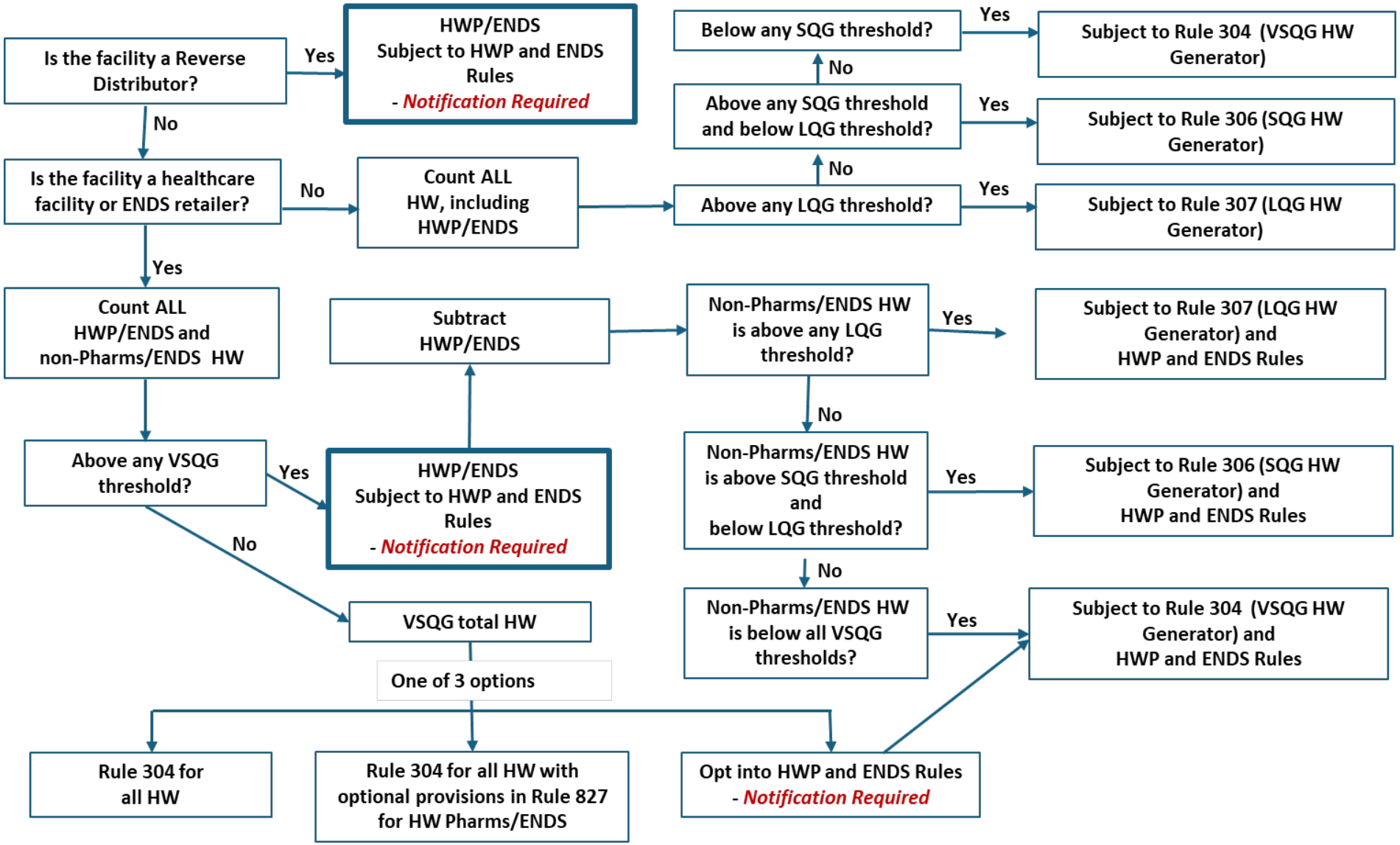
Additionally, some other commonly generated hazardous waste types can be managed under streamlined standards, called the universal waste standards. Michigan's universal waste types that can be managed under these standard include:

- Aerosol cans
- Antifreeze
- Batteries
- Consumer electronics
- Electric lamps
- Elemental mercury containing items
- Pesticides

The weight of these universal waste items can be excluded when making a generator category determination each month, so long as the universal waste standards are followed.

Keep in mind that the above generator category determination for schools that qualify as a healthcare facility is only to determine applicability to the **HWP and ENDS Rules**. It is not for determining the school's hazardous waste generator category for managing the other, commonly generated non-pharmaceutical hazardous waste from schools. Any HWP and ENDS managed in accordance with the **HWP and ENDS Rules *are not*** included when determining the school's hazardous waste generator category for non-pharmaceutical hazardous waste; therefore, a school that qualifies as a healthcare facility that is managing their HWP and ENDS in accordance with the **HWP and ENDS Rules *must recalculate*** its hazardous waste generator category for non-pharmaceutical hazardous waste, to determine the management standards that apply to non-pharmaceutical hazardous waste. See the Waste Webinar Series, Waste Characterization and Hazardous Waste Generator Status recorded webinar and our Michigan Guide to Environmental Regulations, Chapter 2, for more details on determining generator category.

HWP and ENDS Rules Applicability



- **Hazardous Waste Pharmaceuticals (HWP)**
- **Electronic Nicotine Delivery Systems (ENDS)**
- **Sewer ban and empty container standards for HWP/ENDS apply to all generators**
- **HWP and ENDS Rules are found in Part 111, Rules 824 through 833**

Counting Hazardous Waste from E-Cigarettes

Nicotine E-liquids

To exceed one kilogram (2.2 pounds) of acute hazardous waste to be a **large quantity generator**, it takes:

Greater than 1,000 Juul™ vapes (there is less than one milliliter of e-liquid in each Juul pod)

OR

Greater than 76 Elfbar/EB Create™ vapes (there is 13 milliliters of e-liquid in each Elfbar/EB Create pre-filled vape); or

Greater than 200 full 5-milliliter vials of e-liquids.

Importantly, even if your school **generates** less than one kilogram (2.2 pounds) of acute hazardous waste each calendar month, it becomes a large quantity generator if it ever **accumulates** more than one kilogram (2.2 pounds) of acute hazardous waste on site. To avoid that, ship e-cigarettes for disposal regularly.

Lithium-Ion Batteries

To exceed 100 kilogram (220 pounds) of non-acute hazardous waste to be a **small quantity generator**, it takes about 2,000 of the 18650-type lithium-ion batteries. For comparison, the 18650- type lithium-ion battery is 18 millimeters wide and 65 millimeters long, while a AA alkaline battery is 14.5 millimeters wide and 50.5 millimeters long. The lithium-ion battery also has more than twice the charge as an alkaline battery, having 3.6 volts instead of 1.5 volts.

STEP 3: Determine the Disposal Options

Disposal options depend on:

1. The hazardous waste generator category the school lands in each month.
2. Whether the school qualifies as a healthcare facility.

VSQG School Requirements Summary

Disposal Options	What to Do and Know
County or Municipal Program - for schools without on-site nursing or healthcare clinics.	• Contact your county or municipality to see if they offer disposal services to schools who generate VSQG amounts of hazardous waste. • Local governmental programs offering these types of services often manage household hazardous waste with VSQG hazardous waste and send it for hazardous waste disposal under the provisions of Part 115, Solid Waste Management, of the NREPA, Section 11521b, and the Part 121, Liquid Industrial By-Products, of the NREPA, requirements for any liquids. • Like any disposal or recycling service, expect to be charged a fee for the services. • See the VSQG and Liquid Industrial By-products Generator Guides. • Dispose of at a licensed hazardous waste incinerator.
Off-site consolidation by the intermediate school district (ISD) - for schools without on-site nursing or healthcare clinics.	• Contact the intermediate school district (ISD) with ownership and operational control over the school to see if they operate as an LQG and are thus allowed to consolidate the VSQG's hazardous waste for disposal with the ISD's hazardous waste under the provisions of Part 111, Rule 307(6). • See the VSQG Guide for the handling requirements for the generating location and the section titled "Controlling LQG Consolidation of VSQG Waste" for the handling requirement for the LQG offering consolidation and disposal assistance.

SQG and LQG School Requirements Summary

Disposal Options	What to Do and Know

Off-site disposal at a licensed hazardous waste facility using a licensed hazardous waste transporter and uniform hazardous waste manifest – for schools without on-site nursing or healthcare facility.	• The school must manage their HWP and ENDS along with any other hazardous waste that the school generates, in accordance with the hazardous waste generator regulations for SQGs or LQGs found in Part 111, Rules 306 and 307, respectively.
	• See the following EGLE resources for help with meeting the hazardous waste regulations:
	  ○ Summary of Hazardous Waste Generator Status and Accumulation Requirements
	  ○ Waste Webinar Series Recordings
	  ○ Michigan Guide to Environmental Regulations
	• Dispose of at a licensed hazardous waste incinerator.

Schools with On-site Nursing or Healthcare Clinic Requirements Summary

Disposal Options	What to Do and Know

If the school is a VSQG (when adding all hazardous waste, including non-pharmaceutical hazardous waste, HWP, and ENDS) and has an on-site nurse's office or healthcare clinic.	• These schools can manage HWP and ENDS in accordance with the VSQG requirements in Part 111, Rule 304 (see VSQG School Requirements above).
	• These schools can manage HWP and ENDS in accordance with the VSQG requirements in Part 111, Rule 304 (see VSQG School Requirements above), ***AND*** can use the optional provisions in Part 111, Rule 827 to:
	  ○ Send potentially creditable HWP to a reverse distributer under the optional provisions in Part 111, Rule 827.
	  ○ Contact the ISD or other municipal healthcare facility with ownership and operational control over the school that is operating in accordance with the HWP and ENDS Rules and have them consolidate the VSQG's HWP and ENDs for disposal with their waste in accordance with the HWP and ENDS Rules.
	  ○ Contact an LQG with ownership and operational control over the school's operating in accordance with Part 111, Rule 307 and have them consolidate the VSQG's HWP, ENDS, and non-pharmaceutical hazardous waste for disposal with the site's hazardous waste. See the VSQG Guide for the handling requirements for the generating location and the section titled "Controlling LQG Consolidation of VSQG Waste" for the handling requirement for the LQG offering consolidation and disposal assistance. Any VSQG school that ***opts into*** the HWP and ENDS Rules ***cannot*** utilize the LQG consolidation optional in the previous bullet. They may only utilize the consolidation option at another healthcare facility that has ownership and operational control over the VSQG. See the HWP and ENDS Guide for details on the management requirements at the consolidating location.

Disposal Options	What to Do and Know

If the school is a SQG or LQG (when adding all non-pharmaceutical HWP and ENDS and has an on-site nurse's office or healthcare clinic), the school is required to follow the HWP and ENDS Rules.	• The school must manage their HWP and ENDS in accordance with the HWP and ENDS Rules. The following resource is available for help with managing HWP and ENDS:
	  ○ EPA Subpart P Frequently Questions
	  ○ Subscribe to EGLE's Materials Management News and Info to receive notifications for upcoming webinars and additional guidance when published.
	• Dispose of at a licensed hazardous waste incinerator
	• The school must manage their non-pharmaceutical and ENDS hazardous in accordance with the hazardous waste generator regulations for their hazardous waste generator category when excluding HWP and ENDS. See the following EGLE resources for help with meeting the hazardous waste regulations that apply to non-pharmaceutical hazardous waste:
	  ○ Summary of Hazardous Waste Generator Status and Accumulation Requirements
	  ○ Waste Webinar Series Recordings
	  ○ Michigan Guide to Environmental Regulations