

A decorative graphic in the top right corner consisting of several overlapping, semi-transparent geometric shapes, primarily triangles and quadrilaterals, in shades of light blue, teal, and green.

Managing Vape Waste

2026 Michigan Environmental Compliance Conference

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US EPA

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Outline

1. E-cigarette introduction
2. Scale of the waste problem
3. Roles of FDA & EPA
4. Why are e-cigarettes RCRA hazardous waste?
5. How is the disposal of e-cigarettes regulated by RCRA?
6. Possible solutions under RCRA
7. EPA websites & FAQs

E-cigarettes

come in many shapes,
sizes, and types.

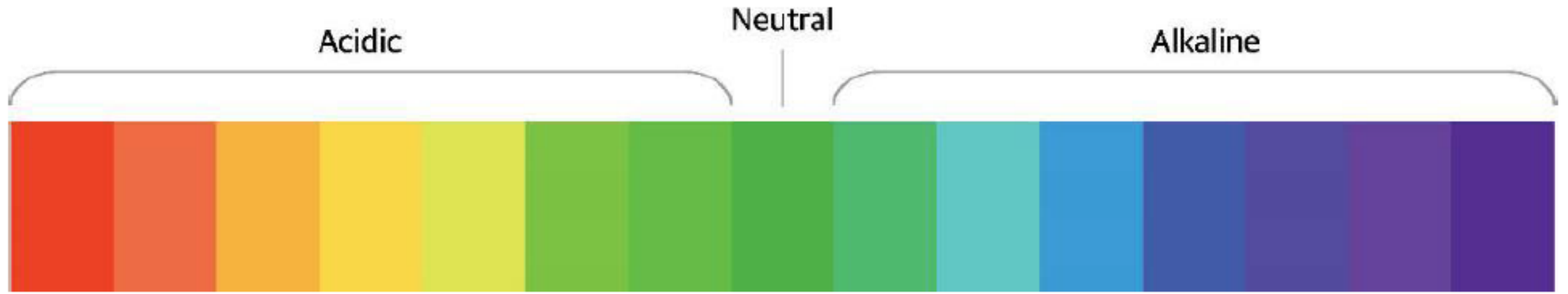


e-cigarette = vape

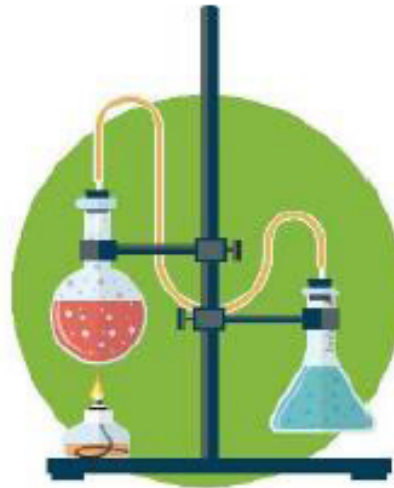
[CDC.gov/Vaping](https://www.cdc.gov/Vaping)



Nicotine Salts Allow High Levels of Nicotine to be Inhaled More Easily



Nicotine Salts



Benzoic Acid



Free Base Nicotine

Nicotine Content of E-cigarettes



=

0.7 ml
5% nicotine

=



Nicotine Content of E-cigarettes



=

0.7 ml
5% nicotine

=



=

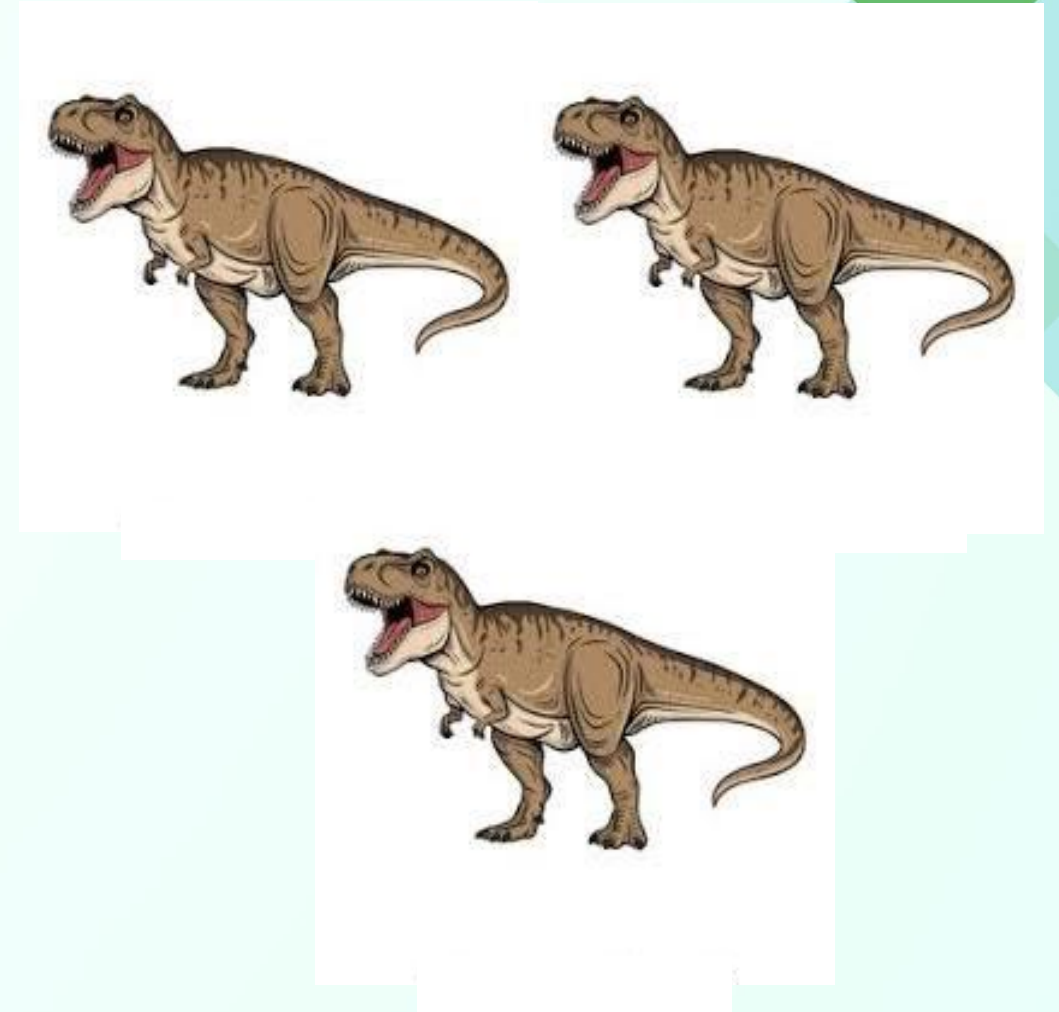
16 ml
5% nicotine

=



Scale of the Waste Problem

- In the US, we throw out
 - 5.7 disposable vapes *per second*
 - 500,000 *per day*
 - 182,000,000 *per year*
- The lithium used by the batteries in the disposable vapes sold every year weighs **30 tons**
 - equivalent to the lithium needed to create batteries for **3,350** electric vehicles



FDA's Role

- FDA has authority to authorize e-cigarettes/vapes as products.
 - PMTA = Premarket Tobacco Product Application
 - 45 e-cigarettes/vapes and components have FDA authorization.
 - Until last month, only tobacco and menthol flavors had been authorized.
 - No fruity flavors or designs that are attractive to kids had been authorized.
 - Mango & blueberry flavors were recently authorized for a specific device
 - All but one of the legal e-cigarettes/vapes that are authorized by FDA have removable batteries.
- 86% of the e-cigs/vapes currently on the market are **ILLEGAL**.
 - They are not authorized by FDA to be marketed in the U.S.
 - They are manufactured overseas (e.g., China).
 - Many have fruity flavors and designs that are attractive to kids.
 - Most do not have removable batteries – creating a waste problem

* per Truth Initiative study

Illegal e-cigarettes marketed to kids



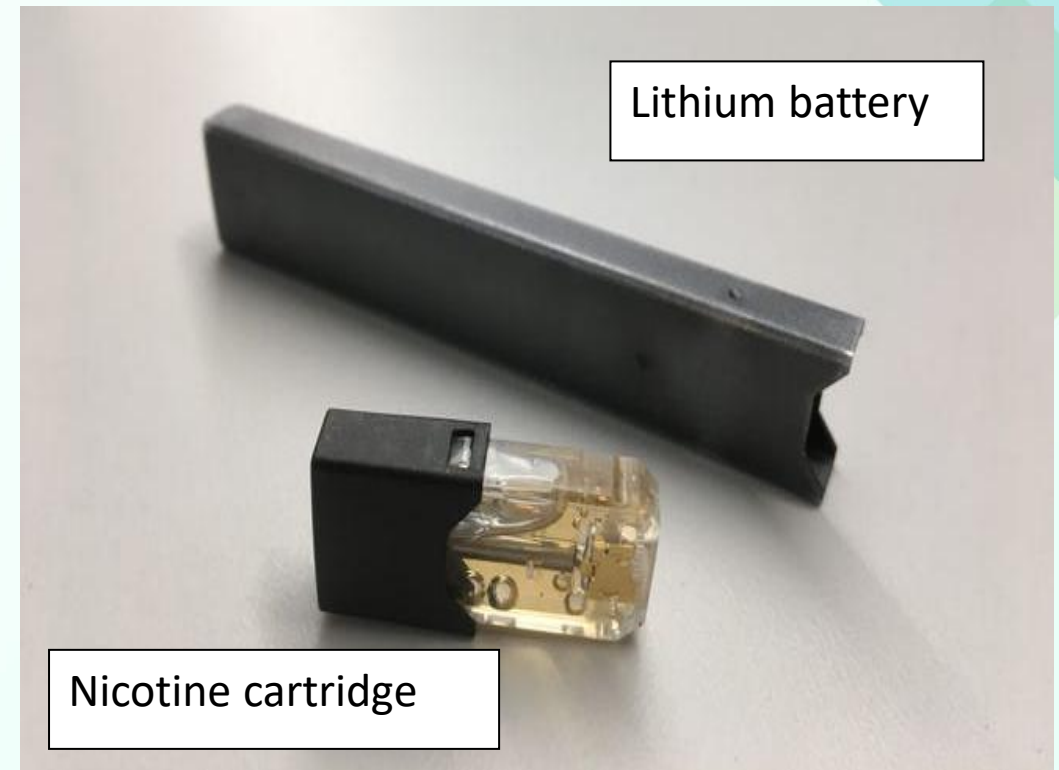
Source: New York Post

EPA's Role

- EPA has authority to regulate e-cigarettes/vapes as **hazardous waste** under the Resource Conservation and Recovery Act.
- EPA does not have the authority to institute extended producer responsibility for any waste stream, including e-cigarettes.
- The Infrastructure Investment and Jobs Act directs EPA and Department of Energy to develop a voluntary EPR framework for **batteries**, including batteries removed from e-cigs, but not e-cigs themselves.
 - Not intended to be a model bill.
 - Aimed at supporting states in EPR design and implementation.

Why are E-cigarettes Hazardous Waste?

1. **Nicotine e-liquid** is acutely toxic.
 - Poisonings and death have occurred from ingestion of nicotine e-liquids.
 - Nicotine is also dermally absorbed.
 - RCRA acute hazardous waste
 - HW Code P075
2. **Lithium-ion batteries** can catch fire, especially when damaged. Can be:
 - D001 (ignitable)
 - D003 (reactive)





Credit: Boise Fire Department

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A discarded vape's lithium-ion battery caused a fire within a garbage truck, which had to be dumped onto the street.

Summary of the Waste Problem

- The multiple hazards of e-cigarettes correspond to **high costs** to manage the e-cigarettes at end of life (i.e., incineration or recycling).
- Higher costs for managing e-cigarettes provides a disincentive for collecting them.
- When they are collected, these higher costs are often borne by municipalities and schools, who typically cannot afford the costs.
- But not collecting e-cigarettes means more e-cigarettes in the municipal waste stream, increasing **fire risks**.
- Recycling of e-cigarettes is frustrated by **illegal vapes**, with non-removable/embedded batteries, making recycling expensive and losing the opportunity to recover critical minerals.

RCRA Is Not the Best Tool

- Solutions outside RCRA's authority would likely provide more effective and comprehensive approaches for e-cigarette management.
- That said, RCRA is the tool we currently have.
- EPA has developed and continues to develop guidance materials to encourage the safe management, recycling and disposal of e-cigarettes.
- EPA is also starting to explore new RCRA regulatory solutions.

Goals for Managing E-cigs

- Keep e-cigs out of the municipal wastestream
 - Do not put in curbside trash bins
- Recycle e-cigs and components when possible
 - But do not put in curbside recycling bins!



Residence



Not regulated

Whether
RCRA regulations
apply to the
disposal of any
hazardous waste
depends on
WHERE
the
hazardous waste
is generated

Non-residence



Regulated

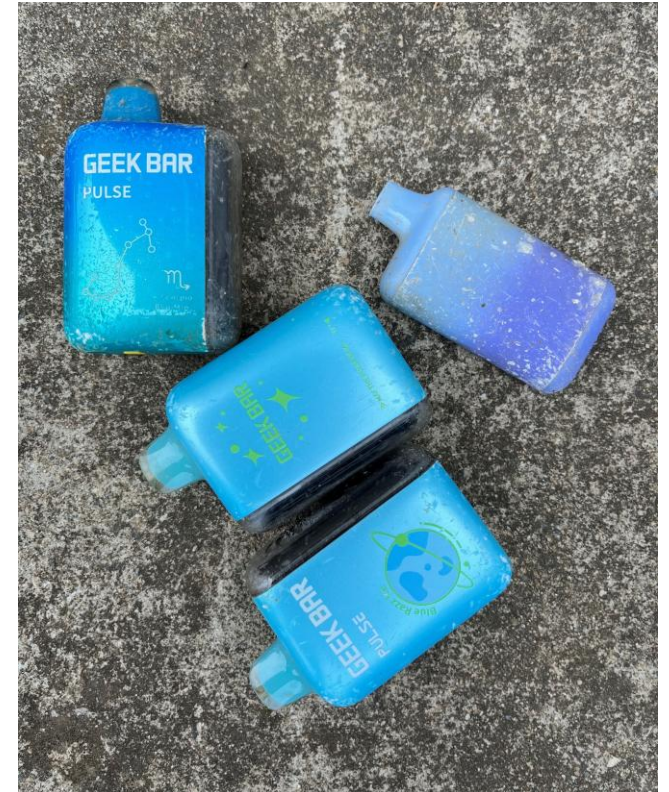
Unused CCP



Not regulated

Whether RCRA regulations apply to any secondary material being **RECYCLED** depends on whether it is **UNUSED** or **USED**

Spent Material



Regulated

Disposal & Recycling Options

WHEN	YOU CAN
The battery is removed from the e-cigarette	• Recycle the battery as UW batteries

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The e-cig is pre-consumer e.g. retailers, manufacturers	• Reclaimed CCP is not a solid waste • One recycler is accepting them currently

Disposal & Recycling Options

WHEN	YOU CAN
The battery is removed from the e-cigarette	• Recycle the battery as UW batteries
The e-cig is pre-consumer e.g. retailers, manufacturers	• Reclaimed CCP is not a solid waste • One recycler is accepting them currently
The e-cig is post-consumer generated at a household	• Exempt as HHW • Bring to HHW collection • Recyclers are starting to recycle this stream • Usually sent for HW incineration currently

Disposal & Recycling Options

WHEN	YOU CAN
The battery is removed from the e-cigarette	• Recycle the battery as UW batteries
The e-cig is pre-consumer e.g. retailers, manufacturers	• Reclaimed CCP is not a solid waste • One recycler is accepting them currently
The e-cig is post-consumer generated at a household	• Exempt as HHW • Bring to HHW collection • Recyclers are starting to recycle this stream • Usually sent for HW incineration currently
The e-cig is post-consumer <u>not</u> generated at a household	• Reclaimed spent material is solid waste • Regulated as hazardous waste • Recyclers reluctant to accept them currently • Usually sent for HW incineration

How Does RCRA Apply to Schools?

Household Waste?

- Since 1984, EPA has relied on two criteria for determining whether a waste is a household waste
 1. the waste must be generated by individuals **on the premises of a temporary or permanent residence** for individuals; that is, a household
 2. the waste stream must be composed primarily of materials found in the wastes generated by consumers in their homes
- EPA does NOT consider a school to be a household/residence
 - Schools are not eligible to use HHW exemption

How Does RCRA Apply to Schools?

Universal Waste?

- Since 1995, when the first Universal Waste regulations were promulgated, EPA has said that
 - Embedded batteries may not be managed as universal waste batteries
- States that have added electronics to Universal Waste or have e-waste recycling programs, generally do not currently consider e-cigs to be electronics

RCRA Generator Category

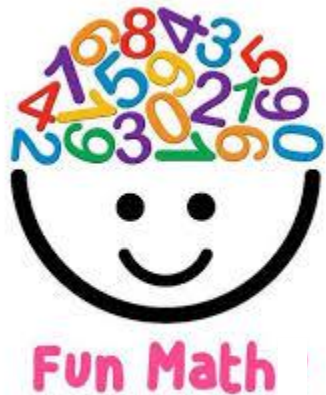
Nicotine e-liquids

You can count the weight of the acute e-liquid separately from the rest of the e-cig

Back of the envelope calculations

How much does it take to exceed 1 kg of acute HW and be an LQG?

- > 1000 Juuls (<1 ml each)
- > 60 Geek Bar Pulse (16 ml each)
- > 200 full 5-ml vials of e-liquid



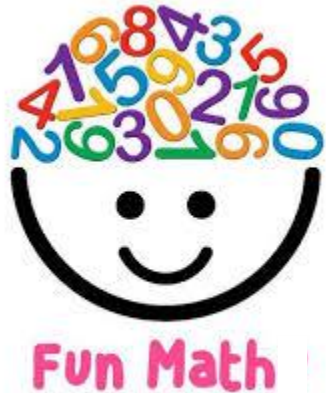
RCRA Generator Category

Lithium Batteries

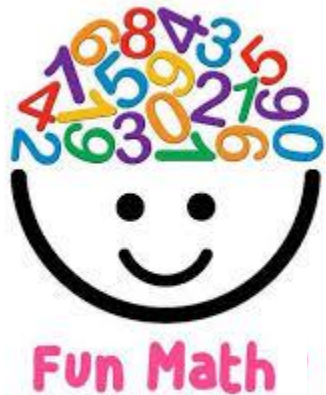
Back of the envelope calculations

How many does it take to exceed 100 kg of non-acute HW and be an SQG?

- $\approx$ 2000 18650 lithium-ion batteries
 - Cylindrical batteries in some e-cigs
 - A little bigger than AA battery
 - < 50 g each



RCRA Generator Category



Remember: Count your other HW too!

Must count ***all*** the hazardous waste generated on site during the calendar month to determine RCRA generator category; not just the e-cigs

Possible Solutions for Schools

If the school is a VSQG

1. EPA encourages schools that are VSQGs to contact their local [small business collection program](#) to inquire about their policies
 - Do they collect e-cigarettes and their components?
 - Unlike HHW collection, there will likely be a fee

Possible Solutions for Schools

Boulder County's Vape Aware Program for Schools

E-Cigarette Waste Disposal Kit Supplies



Used Battery Container
one per site
9.75"Lx7.75"Wx9.625"H
PIG: DRM136; Grainger
Item: 381P51



Nitrile or latex gloves
keep a few pairs on site



Vaping Guidelines Sticker
5"x5" Matte white Vinyl
Sticker
one per bin



Hazardous Waste Label
one per bin



Clear sealable bags
keep a few bags on site



Vape Bin Fill Line Sticker
4"x2" Clear Stickers

<https://bouldercounty.gov/environment/healthy-home/tobacco/vapeaware/>

<https://www.epa.gov/electronics-batteries-management/battery-collection-action-case-study-vape-aware-e-cigarette>

Possible Solutions for Schools

If the school is a VSQG

2. **Off-site consolidation:** allows VSQGs to consolidate hazardous waste off-site at an LQG, provided certain conditions are met
 - Can your school district identify a central location that is an LQG or can operate as an LQG?
 - HW incineration is **much cheaper** per gallon when
 - There is one pickup location instead of many
 - Incinerating 55-gallon drums vs 5-gallon pails (1/5 of the cost per gallon)

Possible Solutions for Schools

If the school is a not a VSQG

1. Does your state have a state-wide hazardous waste contract that your schools can access?
 - More convenient for schools to use an existing contract
 - Cheaper disposal costs for the schools
2. Does your state have a schools chemical cleanout program?
 - Would they consider adding e-cigs to the program?
3. As part of an ongoing proposed rule for universal waste lithium batteries, we are looking at the issue of embedded batteries

1. EPA Websites for Safe Disposal

1. For individuals

- Do not throw in curbside recycling or trash.
- Bring to HHW collection.
- <https://www.epa.gov/hw/how-safely-dispose-e-cigarettes-information-individuals>

2. For schools/small businesses

- Your RCRA generator category will determine your regulatory options.
- <https://www.epa.gov/hw/how-safely-dispose-e-cigarettes-information-schools-and-small-businesses>



2. EPA Memo for Recycling HHW Vapes

- Pre-consumer and post-consumer e-cigarettes from households are excluded from RCRA Subtitle C hazardous waste regulation when collected, stored and transported and treated, e.g., recycled.
- The household waste **exclusion applies to the entire collection and recycling supply chain** for household waste, provided the exempt household waste is kept separate from regulated hazardous waste.
- Likewise, the various waste streams that are generated from the disassembly, including the non-recyclable components that are sent for disposal, remain exempt from RCRA Subtitle C hazardous waste regulations as household waste, so long as they are kept separate from regulated hazardous waste.

Source: RCRAOnline Memo #[14974](#); January 27, 2026

3. Alternative HHW E-cigarette Collection

- HHW collection has traditionally been conducted by local governments (counties, municipalities).
- EPA developed guidance that offers best practices for alternative locations that might want to offer collection of HHW e-cigs (e.g., vape stores).
- Before e-cig collection starts:
 - Vape stores should **contact local and state government** agencies to be aware of any licensing, registration, or permitting that may be needed in order to collect waste.
 - Vape stores should plan for how to manage the HHW vapes.
- Vape stores must keep their own hazardous waste separate from the collected household hazardous waste to keep the HHW exemption.

4. FAQs re E-cigarettes

1. Are e-cigarettes hazardous waste when discarded?
2. Are e-cigarettes considered pharmaceuticals under part 266 subpart P of RCRA?
3. Are e-cigarettes considered hazardous waste pharmaceuticals under part 266 subpart P?
4. Are vape shops considered healthcare facilities under part 266 subpart P of RCRA?
5. When is a vape shop regulated under part 266 subpart P?
6. How is a vape shop that is a VSQG regulated under RCRA?
7. How is a vape shop that is not a VSQG regulated under RCRA?

<https://www.epa.gov/hwgenerators/frequent-questions-about-management-standards-hazardous-waste-pharmaceuticals-and#vape>

A series of overlapping geometric shapes, including squares and triangles, in shades of light blue, green, and teal, arranged in a diagonal pattern in the top right corner of the slide.

Questions?

Thanks for participating!

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