

Disposal of Post-Consumer E-cigarettes

PUBLIC HEALTH LAW CENTER WEBINAR

FEBRUARY 11, 2021

KRISTIN FITZGERALD, US EPA



Outline

- Brief introduction to RCRA
- Status of e-cigs & components under RCRA
- Safety concerns
- Residential disposal
- Non-residential disposal
- Disposal by schools
- Recycling e-cigarette batteries

(Very) Brief Intro to RCRA

- RCRA hazardous waste regulations apply **when** an item is discarded or intended for discard and depend on
 - **Who** is generating the hazardous waste
 - Residence or
 - Non-residence (business, school, etc)
 - **What type** of hazardous waste is generated
 - Acute hazardous waste (nicotine is an acute hazardous waste)
 - Non-acute hazardous waste
 - **How much** is generated per calendar month

↑ generate per month

↑ RCRA regulations

- 3 RCRA hazardous waste generator categories



RCRA Status of E-cigs & Components

- **E-Liquids/E-juices** with nicotine are RCRA hazardous waste
 - Nicotine is an acute hazardous waste (P075)
 - Listed for toxicity
- **Lithium-ion batteries** are likely RCRA hazardous waste as both
 - Ignitable hazardous waste (D001)
 - Reactive hazardous waste (D003)
- **E-cigarettes** are RCRA hazardous wastes

Safety Concerns re: Batteries




From FEMA's U.S. Fire Administration*

U.S. Fire Administration

Working for a fire safe America

- The combination of an electronic cigarette and a lithium-ion battery is a new and unique hazard. There is no analogy among consumer products to the risk of a severe, acute injury presented by an e-cigarette
- Fires or explosions caused by the batteries used in electronic cigarettes are uncommon; however, the consequences can be devastating and life-altering for the victims
- The shape and construction of electronic cigarettes can make them (more likely than other products with lithium-ion batteries) behave like “flaming rockets” when a battery fails

Residential Disposal = HHW

- Disposal of e-cigarettes at residences is not regulated by EPA as hazardous waste
 - Exempt household hazardous waste (HHW)
 -  Some states are more stringent and regulate HHW
- Questions EPA has
 - How many household hazardous waste (HHW) collection programs are accepting e-cigarettes?
 - If so, what is being done with the collected e-cigs?
 - Are the e-cigarettes or components being recycled in any way?
 - Are the e-cigarettes being incinerated?
 - Any issues (e.g., fires) managing the collected e-cigarettes?

DEA Take-Back Days

In October 2019, DEA began accepting consumer e-cigarettes at its Semi-annual [National Prescription Drug Take-Back Days](#)



- DEA's Take-Back Days have been a resounding success, collecting millions of pounds of unwanted medicines for proper destruction
- The next DEA Take-Back Day is scheduled for April 2021
 - It appears that DEA will continue to accept e-cigarettes
 - DEA directs consumers to remove the e-cigarette battery
- Given the fire hazard that e-cigarettes pose, some have expressed concern about including e-cigarettes in these collection days
 - Do the risks outweigh the benefits?

Non-Residential Disposal \neq HHW

- E-cigarettes and components are regulated as RCRA hazardous waste when discarded
- Because of the nicotine, be aware of the acute hazardous waste monthly threshold
 - ≤ 1 kg acute HW/month = very small quantity generator (VSQG)
 - > 1 kg acute HW/month = large quantity generator (LQG)
- In [states where Part 266 Subpart P is in effect](#), healthcare facilities (including retailers) and reverse distributors must manage e-cigarettes as hazardous waste pharmaceuticals

E-cigs Confiscated at Schools

- Schools find themselves in the unexpected position of confiscating e-cigs from students
- EPA has received questions from schools about how to manage the confiscated e-cigs
- EPA is considering developing guidance for schools re:
 1. Safe storage and transportation of confiscated e-cigs
 2. How e-cigs might affect a school's RCRA generator category
 3. Proper disposal of confiscated e-cigs

Safe Storage of Collected E-cigs



- Given the hazards of e-cigarette components, it is imperative that collected e-cigarettes are stored in a safe manner prior to transportation and disposal
- We recommend
 - Following the Department of Transportation (DOT) regulations for lithium batteries during storage prior to transport
 - Wearing chemical resistant gloves when handling the e-cigarettes & components to prevent dermal absorption of nicotine (e.g., nitrile or latex gloves)

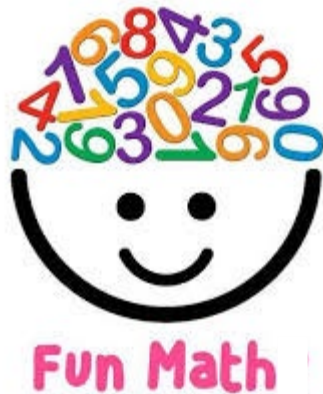
Safe Storage of Collected E-cigs

- **Intact e-cigarettes:** place each e-cigarette in a separate, clear plastic bag that is sealed (e.g. Ziploc bag)
- **Vials, cartridges and pods with e-liquids:** place in clear plastic bags that are sealed to contain any leaks and to minimize exposure of personnel. Provided the lithium-ion batteries are removed, multiple pods, cartridges or vials may be placed in the same sealed clear plastic bag

Safe Storage of Collected E-cigs

- **Intact batteries:** If the batteries are separate from the confiscated e-cigarettes, the terminals of the batteries should be protected by either:
 - Placing each battery in a separate, clear plastic bag that is sealed, or
 - Taping the terminals with a non-conductive tape such as electrical tape, duct tape or packing tape
 - Do not use masking tape, painter's tape or gift-wrap tape
- **Bulging/leaking batteries:** A lithium battery that is bulging or leaking is damaged and likely dangerous and should be placed in a bucket of sand to prevent a fire

School's RCRA Generator Category



Back of the envelope calculations for e-cigs, e-juices and batteries when determining a school's RCRA generator category

- Calculate the amount of **acute hazardous waste**/calendar month
- Calculate the amount of **non-acute hazardous waste**/calendar month

How many e-cigs = LQG?

Calculating the amount of **acute hazardous waste**, let's use Juul as an example:



Photo from TechCrunch.com

- A generator only needs to count the weight of the hazardous waste, not the weight of the container, when determining its generator category
- Each Juul contains 0.7 ml of e-liquid
- If we assume a density slightly greater than water, then each Juul contains approximately 1 gram e-liquid
- It would take > 1000 Juuls to exceed 1 kg **acute HW**/month and be an LQG

How many e-juice vials = LQG?

Calculating the amount of **acute hazardous waste**, let's use a vial of e-juice as an example:



- A generator only needs to count the weight of the hazardous waste, not the weight of the container, when determining its generator category
- Let's assume e-juice vial contains 5 ml of e-liquid when full
- If we assume a density slightly greater than water, then each e-juice vial contains approximately 5 grams e-liquid
- It would take >200 full 5-ml vials to exceed 1 kg **acute HW**/month and be an LQG

How many e-cigs/batteries = SQG?

Calculating the amount of **non-acute hazardous waste**:

- For e-cigarettes with battery, let's use Juul as an example:
 - Each Juul weighs just over 14 grams with a pod installed
 - It would take > 7000 Juuls to exceed 100 kg **non-acute HW**/month and be an SQG
- For lithium-ion batteries, let's use 18650 battery as an example:
 - It is slightly larger than a AA battery, weighing 45-50 grams
 - It would take about 2000 18650 lithium-ion batteries to exceed 100 kg **non-acute HW**/month and be an SQG
 - NOTE: CPSC has [issued a warning](#) against using single 18650s

If Schools are VSQGs

- Based on these rough calculations, we expect that many schools would be considered VSQGs
- We encourage schools that are VSQGs to contact their local HHW collection program to inquire about their policies about accepting
 - Hazardous waste from VSQGs
 - E-cigarettes and their components
- For states that have adopted the 2016 Generator Improvements Rule, VSQGs can consolidate their hazardous waste at an off-site LQG, provided:
 - The receiving LQG is under the control of the same person as the VSQG (e.g., a centralized school district location)
 - Certain labeling requirements are met
 - Certain accumulation limits are not exceeded at the VSQG

If Schools are Not VSQGs

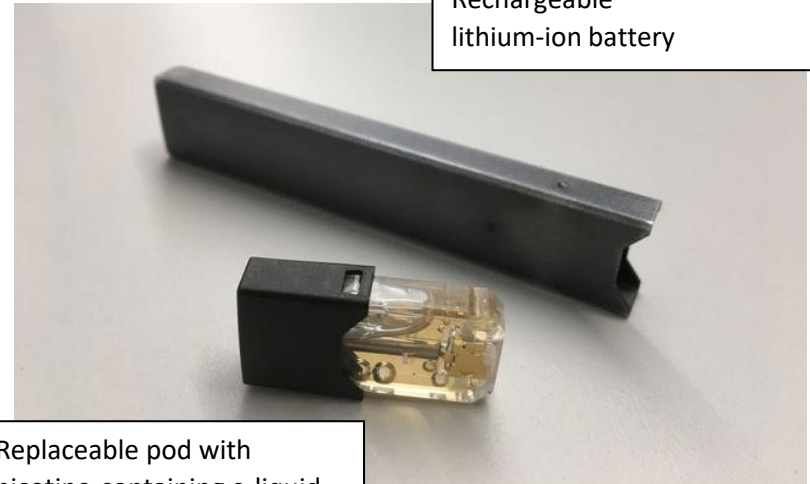
- Like all generators calculating their monthly generator category, a school must count all the hazardous waste that it generates each month
- Other sources of hazardous waste at schools
 - Laboratories
 - Auto maintenance
 - Shop/vocational classrooms
 - Cleaning supplies
- If the school is not a VSQG, the confiscated e-cigarettes must be managed along with the rest of the school's hazardous waste
 - If in a state where Subpart P is not in effect, manage e-cigs and components under standard generator regulations of Part 262
 - If in a state where Subpart P is in effect, manage e-cigs and components under Subpart P (if school has a clinic/nurse's office)

Recycling Lithium Batteries

- Lithium batteries are recyclable
- Battery recyclers are only accepting batteries that have been removed from e-cigarettes
- Battery recyclers are not accepting entire post-consumer e-cigarettes
- Depending on the style of the e-cigarette, the batteries in e-cigarettes may not be easily accessible or removable, which makes recycling difficult

Recycling Lithium Batteries

- Some models of e-cigarettes have batteries that are intended to be removed or separated from the e-cigarette
 - Juul or other pod systems, the battery can be easily pulled apart from the pod



Recycling Lithium Batteries

Batteries can be
unscrewed
from some
e-cigarettes



Recycling Lithium Batteries

- In other models of e-cigarettes, the batteries are not designed to be removed or easily separated from the e-cigarette
- These are usually referred to as “disposable” or “single-use” e-cigs
- In this case, due to safety concerns, we discourage schools or others from disassembling e-cigarettes in order to recycle the lithium battery



Recycling Lithium Batteries

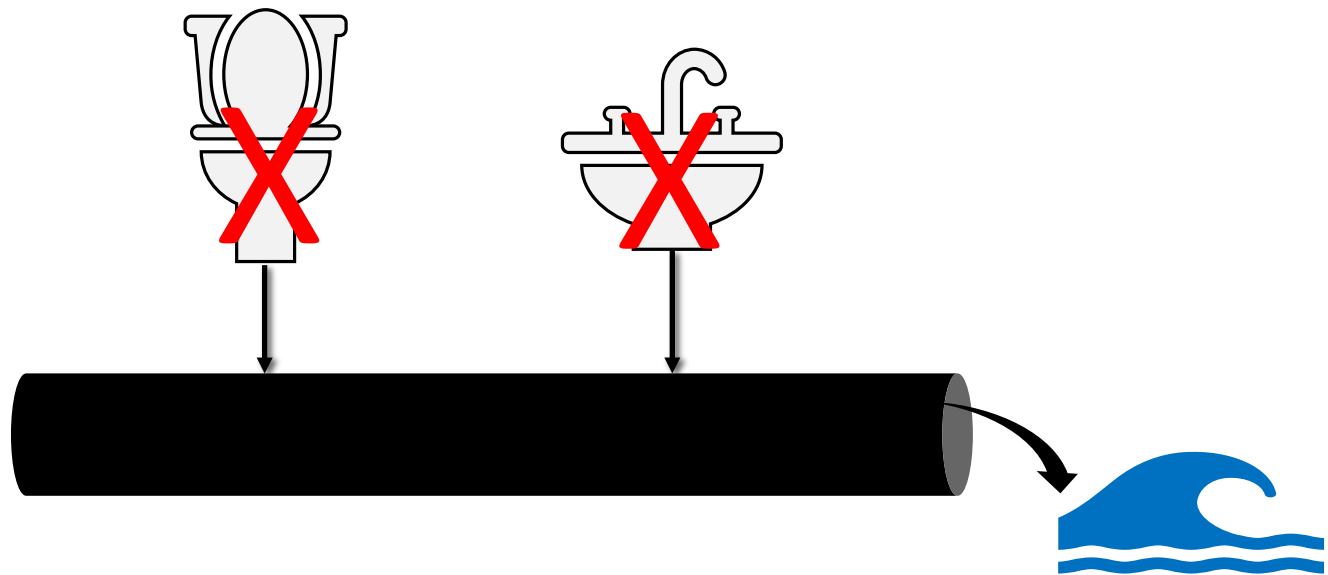
- EPA encourages schools to explore commercially available options for recycling ALL their batteries as Universal Waste (not just e-cigarette batteries)
- When managed as Universal Waste, the batteries do not have to be counted toward determining the school's generator category
- Battery collection boxes for recycling are
 - Sometimes FREE
 - Pre-addressed to the recycler
 - Postage-paid
 - DOT compliant

Recycling Lithium Batteries

- A school with a battery collection box must
 - Place the box in a supervised location at the school
 - Protect the terminals of the batteries with tape or by placing each battery in a separate clear plastic bag that is sealed
 - Seal and ship the box to the recycler by common carrier (e.g., UPS or FedEx)
 - Comply with the Universal Waste regulations
 - VSQGs can use the battery collection boxes but are not required to comply with the Universal Waste regulations

Do NOT Put Nicotine Down the Drain

- Nicotine-containing e-liquids must not be poured down the drain
- E-cigarette pods, cartridges and tanks must not be rinsed to remove the nicotine-containing e-liquids



Contact Information

Kristin Fitzgerald, US EPA

(703) 308-8286

Fitzgerald.Kristin@epa.gov

Brian Knieser, US EPA

(703) 347-8769

Knieser.Brian@epa.gov