



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

MAY 08 2015

OFFICE OF  
SOLID WASTE AND  
EMERGENCY RESPONSE

Daniel K. DeWitt  
Warner, Norcross & Judd LLP  
900 Fifth Third Center  
111 Lyon Street, N.W.  
Grand Rapids, MI 49503-2487

Dear Mr. DeWitt:

Thank you for your letter of March 12, 2014, requesting EPA's determination regarding the hazardous waste status of e-cigarettes under the Resource Conservation and Recovery Act (RCRA). After reviewing your letter, the Agency has concluded that because e-cigarettes include cartridges that are containers of a commercial chemical product, specifically nicotine, e-cigarettes therefore may be regulated as acute hazardous waste P075 when disposed.

Nicotine as the Sole Active Ingredient of E-Liquids

Your letter indicates that the e-liquid in the e-cigarettes consists of a mixture of:

- nicotine (1 - 2.5%)
- flavorings
- propylene glycol
- vegetable glycerin
- polyethylene glycol 400

With respect to the non-nicotine ingredients, you state:

[t]hese are FDA-approved non-toxic liquids, with a slightly sweet taste, which are used in pharmaceuticals and as food additives and preservatives. Vegetable glycerin is a sugar-alcohol compound. Propylene glycol is used as a food preservative and is also commonly used in pharmaceuticals. It is also the solution used to create theatrical smoke. Polyethylene glycol 400 is a similar solution that is used in a variety of pharmaceutical formulations.

Nicotine is a commercial chemical product listed in 40 CFR 261.33(e) and is an acute hazardous waste (EPA waste code P075) when disposed. The term "commercial chemical product," as it applies to the RCRA hazardous waste listings, is defined in the comment under § 261.33(d):

The phrase "commercial chemical product or manufacturing chemical intermediate having the generic name listed in..." refers to a chemical substance which is manufactured or formulated for

commercial or manufacturing use which consists of the commercially pure grade of the chemical, any technical grades of the chemical that are produced or marketed, and all formulations in which the chemical is the sole active ingredient.

The EPA has previously interpreted “sole active ingredient” to mean that the active ingredient is the only chemically active component that performs the function of the product.<sup>1</sup> We have also previously stated that preservatives, surfactants,<sup>2</sup> fillers, solvents, propellants,<sup>3</sup> diluents (such as water or saline),<sup>4</sup> colorants and perfumes<sup>5</sup> are not active ingredients because they do not perform the function of the product (i.e., they are inert ingredients). The EPA also finds flavorings and sweeteners to be inert ingredients because they are not performing the function of the product.<sup>6</sup> Thus, the flavorings, propylene glycol, vegetable glycerin, and polyethylene glycol 400 are not active ingredients of the e-liquids you describe, leaving nicotine as the sole active ingredient in the e-liquid. Therefore, nicotine-containing e-liquids are considered P075 acute hazardous waste when discarded.

### Manufactured Articles

Your letter states:

[i]t appears to me that e-cigarettes are best categorized as ‘manufactured articles,’ and, therefore, should not be regulated as hazardous waste commercial chemical products (‘CCPs’). However, this conclusion is less than certain, and so I am seeking EPA's interpretation.

The EPA disagrees with your conclusion that e-cigarettes are “manufactured articles” under the RCRA regulations, as explained below.

In the preamble to a November 25, 1980 interim final rule (45 FR at 78541), the EPA specifically addressed “manufactured articles” when it clarified what is considered a commercial chemical product under RCRA:

EPA intends that the materials listed in § 261.33 include only those commercial chemical products and manufacturing chemical intermediates that are known by the generic name of the chemicals listed in paragraphs (e) and (f) of that section. Manufactured articles that contain any of the chemicals listed in paragraphs (e) and (f) are rarely, if ever, known by the generic name of the chemical(s) they contain and, therefore, are not covered by the § 261.33 listings. Should the Agency find it necessary to list any manufactured articles as hazardous wastes, it will initiate rulemaking to add these articles to § 261.33.

The preamble discussion identifies batteries and mercury vapor lights as examples of manufactured articles that would not be considered listed hazardous waste commercial chemical products. We have

---

<sup>1</sup> Dellinger to Barkholz, February 18, 2004, RCRA Online #14820; Springer to Murray, November 19, 2003, RCRA Online # 14686.

<sup>2</sup> Barnes to McLaughlin, March 14, 1989, RCRA Online #11405.

<sup>3</sup> Lowrance to Wayland, May 3, 1988, RCRA Online #11348.

<sup>4</sup> Barnes to Geary, April 25, 1988, RCRA Online # 11343.

<sup>5</sup> Clausen to Baltay, May 17, 1985, RCRA Online #12406.

<sup>6</sup> The exception would be if the P- or U-listed product's function was as a sweetener, as it was with saccharin before it was removed from the U-list (U202 was removed from the U-list on December 17, 2010, 75 FR 78918).



also stated that thermometers are manufactured articles and therefore are not considered listed hazardous waste for mercury (U151), although they could exhibit the toxicity characteristic for mercury (D009).<sup>7</sup>

The items we have previously determined to be manufactured articles - batteries, fluorescent lamps and thermometers – are all designed for a purpose other than to access the chemicals that are present in these manufactured articles. Specifically, one uses these articles for electrical energy (batteries), light (lamps) or to measure temperature (thermometers). One does not use these articles in order to access the mercury or lead or other chemicals contained in these articles. In contrast, one uses an e-cigarette specifically to access the nicotine e-liquid. E-cigarettes are intended to achieve exactly that purpose – i.e., to deliver or release the nicotine to the user. Therefore, EPA has concluded that e-cigarettes are not manufactured articles.

#### E-cigarette Cartridges as Containers of a Commercial Chemical Product

You state that "[m]y client intends to make and sell only pre-filled e-cigarettes. Therefore the nicotine solution will be incorporated into the e-cigarette and will not come in a separate cartridge or container."

We have concluded that e-cigarettes are more appropriately considered containers of a commercial chemical product (i.e., nicotine) because they have cartridges (i.e., small containers) that contain the nicotine e-liquid, whether these cartridges are pre-filled in the e-cigarette or come separately. The fact that the cartridge (i.e., container) may already be attached to additional parts of the e-cigarette is not relevant in determining whether it is a container of a commercial chemical product. In fact, e-cigarettes come in a variety of designs, many of which have removable and replaceable pre-filled nicotine cartridges. Other types of e-cigarettes are refilled by the user. E-cigarette cartridges are considered containers of nicotine (RCRA waste code P075), regardless of the style or design of the e-cigarette and regardless of whether the cartridge is integral to or detachable from the e-cigarette.

#### Recycling by Manufacturers and Retailers

Because the nicotine e-liquid is considered a commercial chemical product it is not considered a solid waste under § 261.2 if it is legitimately recycled and therefore is not subject to hazardous waste regulation. See the letter from Johnson to DeMuth (same date as this letter) for additional information about recycling nicotine from e-cigarettes and smoking cessation products.

#### Household Disposal

E-cigarettes that are disposed of by consumers at their residences are considered exempt household hazardous waste under § 261.4(b)(1) and are not subject to regulation as hazardous waste under the federal RCRA hazardous waste regulations. Those who manufacture or sell e-cigarettes out of their residence, however, are not eligible for the household hazardous waste exemption and therefore the e-liquids and e-cigarettes are subject to hazardous waste regulation when disposed.

#### Additional Information


Please note that this letter discusses only how e-cigarettes are regulated under the federal RCRA hazardous waste regulations. Under Section 3006 of RCRA individual states can be authorized to

---

<sup>7</sup> See question and answer dated August 1, 1989, RCRA Online # 13310; and question and answer dated August 1, 1996, RCRA Online #14012.

administer and enforce their own hazardous waste programs in lieu of the federal program. States that are authorized to implement the RCRA program have authority to promulgate regulations that are more stringent than the federal program. You should consult with the appropriate authorized state agency for any site-specific guidance. If you have any questions about the federal hazardous waste regulations discussed in this memo, please contact Kristin Fitzgerald at (703) 308-8286 or [Fitzgerald.Kristin@epa.gov](mailto:Fitzgerald.Kristin@epa.gov).

Sincerely,

A handwritten signature in black ink that reads "Barnes Johnson". The signature is written in a cursive style with a long horizontal flourish at the end.

Barnes Johnson, Director  
Office of Resource Conservation and Recovery