

Pharmaceutical Waste

What is the best way to manage it?

Pharmaceutical waste, including prescription and over-the-counter (OTC) drugs, present a unique disposal challenge. For years, the common direction was to flush unused or unwanted drugs down the drain to prevent poisoning or drug use. However, we now know that flushing pharmaceuticals down the drain is harmful to our environment and to ourselves.

What risks do pharmaceutical wastes present?

Improperly managed pharmaceuticals can threaten ecosystems and our drinking water supplies. Flushed down the drain, pharmaceuticals mostly pass through typical wastewater treatment plants or septic systems. These biological systems are ineffective at breaking down the complex organic molecules present in pharmaceuticals. U.S. EPA researchers found concentrations of 56 active pharmaceutical ingredients from samples collected at 50 large municipal wastewater treatment plants across the U.S.¹ Once in waterbodies, pharmaceuticals have been observed to accumulate in aquatic life or pass into drinking water systems.

Landfilling presents a similar risk. Pharmaceuticals can be carried in water that percolates through the landfill, called leachate. This leachate is collected and then treated in on-site or off-site wastewater treatment plants, once again providing the pathway for pharmaceuticals to reach water bodies.

Drugs left in the home present risks as well, including accidental poisonings, misuse and potential deliberate abuse. According to the Product Stewardship Institute, seven out of 10 people who abuse prescription drugs get them from friends and family.² According to the U.S. Department of Health and Human Services, in 2017 over 11.4 million Americans misused prescription opioids. Over 130 people died every day from opioid-related drug overdose.³

How does Energy-from-Waste mitigate these risks?

Energy-from-Waste (EfW) facilities effectively destroy organic compounds including pharmaceuticals. The U.S. EPA, when considering options for the management of certain pharmaceuticals, concluded their management in an EfW facility to be “environmentally protective.”⁴ A pharmaceutical and personal care product (PPCP) test program at an EfW facility conducted by the Maine DEP demonstrated low emissions and effective destruction.⁵

Pharmaceutical Test Program Results

“[T]he emissions from the ecomaine [EfW] facility, whether combusting controlled substances or not, result in very low levels of VOCs and air toxics. The stack exhaust shows levels of most compounds actually below what is routinely measured in the ambient air in the Portland area. The ash results indicate a greater than 99.9% destruction of PPCPs during the combustion process.”⁶

How are air emissions controlled and monitored?

To minimize emissions, EfW facilities employ a carefully controlled combustion process with temperatures in excess of 2,000°F and sophisticated air pollution control equipment. 99.9 percent of what is coming out of the stack are normal components of air, including water vapor, nitrogen, oxygen and CO₂.

Air emissions from EfW facilities are heavily regulated by both the U.S. EPA and state environmental agencies and Covanta’s facilities perform well within these limits (Figure 1 on reverse). Emissions are monitored both continuously and with periodic testing. Emissions from EfW facilities are determined both through routine stack tests (performed at least once a year) and through continuous emissions monitors (CEMS). CEMS monitor flue gases continuously for carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO₂), opacity and carbon dioxide and/or oxygen. Facility operators monitor these parameters and adjust as needed to ensure proper operation and compliance.

Other regulated pollutants are checked through a rigorous stack testing program performed by a regulator-approved third party. The operating parameters under which the stack test is conducted (e.g., activated carbon addition rate, steam flow rate) set the standard for the facility's operation until the next stack test is completed. Operating the combustion process and air pollution control equipment in accordance with these standards ensures compliance.

Is EfW ash hazardous?

Ash from EfW facilities is tested routinely to confirm that it is non-hazardous per U.S. EPA regulations. No ash from Covanta's U.S. EfW facilities has ever been determined to be a hazardous waste. To comply with U.S. EPA regulations, ash is regularly tested for toxicity through the toxicity characteristic leaching procedure (TCLP).⁷ The TCLP test is intended to simulate a worst-case condition for any solid waste in a landfill for many years.

Has EfW Pharmaceutical Disposal been done before?

To date, over 5 million pounds of pharmaceuticals have been collected and destroyed from communities across the U.S. Combustion, such as in EfW facilities, is commonly used to meet the U.S. Drug Enforcement Agency's non-retrievable standard for controlled substances collected from consumers. Since 2010, Covanta has offered its Prescription for Safety (Rx4Safety) program, developed in cooperation with the Product Stewardship Institute (PSI) and the Prescription Pill and Drug Disposal Program (P2D2), as well as community drug take-back programs.⁸ Covanta's Healthcare Solutions group manages and destroys over 13,000 tons of pharmaceutical waste per year primarily through prepaid mail-back boxes, liners and in-store kiosks.

What other benefits does EfW offer?

Unlike a typical hazardous waste incinerator, EfW facilities are specially designed to recover energy from wastes, which offsets the need for electrical generation from fossil fuels and provides additional environmental benefits. Using an EfW facility can often reduce transportation costs and environmental impacts as well. For example, over 70 percent of state capitals are closer to an EfW facility than a hazardous waste incinerator.

References

¹ U.S. EPA (2013) *Concentrations of Prioritized Pharmaceuticals in Effluents from 50 Large Wastewater Treatment Plants in the US and Implications for Risk Estimation*. <https://www.epa.gov/water-research/concentrations-prioritized-pharmaceuticals-effluents-50-large-wastewater-treatment>

² Product Stewardship Institute, *Pharmaceuticals* webpage, accessed July 29, 2019. <https://www.productstewardship.us/page/Pharmaceuticals>

³ U.S. Department of Health and Human Services, *What is the U.S. Opioid Epidemic?* Webpage, accessed July 29, 2019. <https://www.hhs.gov/opioids/about-the-epidemic/>

⁴ See p 58049 of U.S. EPA (2015) Management Standards for Hazardous Waste Pharmaceuticals; Proposed Rule, *Federal Register*, 80, 186 (September 25, 2015), 58014-58092.

⁵ Pharmaceutical and Personal Care Product (PPCP) Test Burn Results, Presented by Dan Twomey MEDEP, Air Bureau <https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-RCRA-2007-0932-0151&attachmentNumber=3&contentType=pdf>

⁶ U.S. EPA (2009) *Hazardous Waste Characteristics: A User-Friendly Reference Document* <https://www.epa.gov/sites/production/files/2016-01/documents/hw-char.pdf>

⁷ 40 CFR §261.24

⁸ See p5836 of U.S. EPA (2019) Management Standards for Hazardous Waste Pharmaceuticals and Amendment to the P075 Listing for Nicotine, *Federal Register*, 84, 36 (February 22, 2019), 5816-5950.

Figure 1. Covanta 2016-2018 U.S. EfW Emissions compared to federal standards

