

BACKYARD TRASH BURNING:



THE WRONG ANSWER



Levels of many air pollutants

are down across the United States thanks to successful government regulation and voluntary industry initiatives. To further the impressive progress achieved so far in cleaning up our air, it is essential to focus on a largely unaddressed source of air pollutants—backyard trash fires. Eliminating backyard trash burning is an important step toward a cleaner and safer environment.

What is backyard trash burning?

In many rural areas, where trash pick-up is not provided as a municipal service, families dispose of their household waste by burning it outdoors, commonly in 55-gallon steel barrels or sometimes directly on the ground.

A World of Difference: Backyard Trash Burning vs. Municipal Combustion



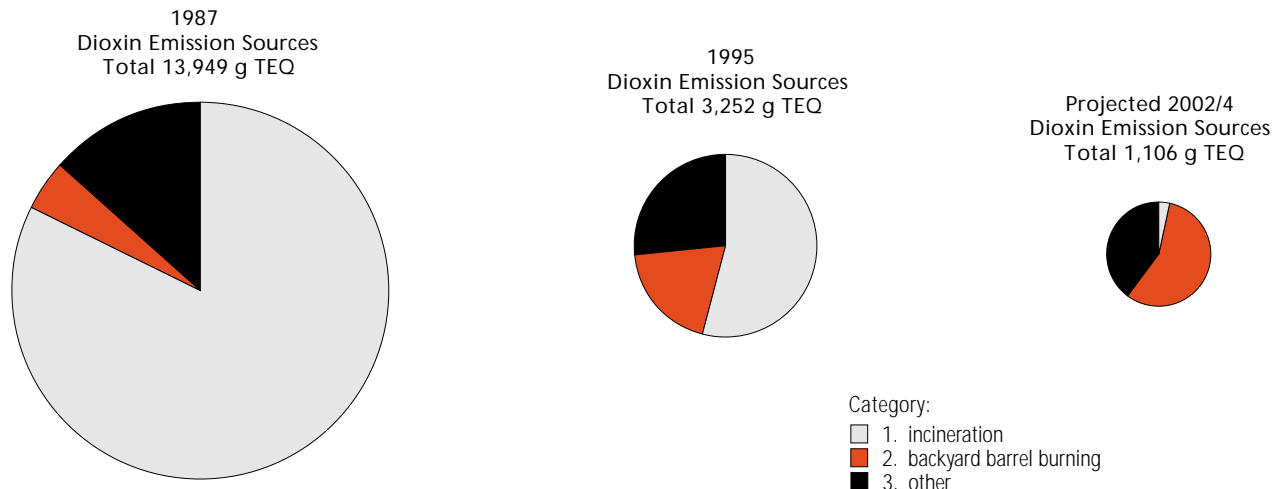
Backyard barrel burning of trash is currently a major source of dioxins to the environment. (Iowa Department of Natural Resources Photograph)

In contrast to municipal combustors, which operate under highly controlled conditions designed to reduce formation and emission of air pollutants, backyard trash burning is uncontrolled. The low temperature burning and smoldering conditions typical of backyard trash fires promote the formation of air pollutants including polychlorinated dibenzodioxins and dibenzofurans, sometimes collectively called “dioxins,” fine particulate matter and polycyclic aromatic hydrocarbons (PAHs). These pollutants form during backyard trash burning regardless of the composition of the material being burned. Modern combustors, on the other hand, are designed to burn waste efficiently at high temperatures and to minimize the conditions known to promote the formation of these combustion byproducts. Additionally, pollution control devices required on combustors remove many residual harmful substances before they are released into the atmosphere.

Dioxin Emissions From Regulated Sources are Declining

For decades, government, industry and environmental organizations have worked to reduce levels of dioxins in the environment and, consequently, in our bodies. That effort has resulted in significant reductions. Emissions of dioxins from US industrial and municipal sources have declined by **92 percent** since 1985.¹ This trend is illustrated on the next pages by the series of pie charts shown diminishing in size over time.

As Combustion and Other Dioxin¹ Sources Decline, Backyard Trash Burning Has Become an Increasingly Larger "Slice of the Pie"²



¹Dioxin here is defined as the totality of 7 dioxins and 10 furans. "TEQ" denotes "toxic equivalent," a quantitative measure of the combined toxicity of a mixture of dioxin-like chemicals.

²Charts for 1987 and 1995 are based on data from the "US Environmental Protection Agency Inventory of Sources of Dioxin-Like Compounds in the United States?1987 and 1995" <http://cfpub.epa.gov/ncea/cfm/dioxindb.cfm?ActType=default>. The 2002/4 chart is based on EPA projections assuming full compliance with regulatory levels by this period and the closure of a copper smelter (personal communication, Dwain Winters, US EPA, 9-9-02).

In addition to major declines in overall emissions, there have been significant changes in the *relative contributions of sources* of these emissions. For example, combustion (of municipal solid waste, sewage sludge and hazardous waste—the gray portions of the pie charts), which had been a major source of dioxins to the environment, is projected by the US Environmental Protection Agency (EPA) to become only a minor source by 2002/4. The EPA estimates that backyard burning of domestic wastes (the red portions of the pie charts) will be the major source of dioxin emissions in 2002/4.

Putting Out the Fires

Open burning is viewed by some as a low-cost, convenient solution for dealing with household waste, which it may be. Unfortunately, it is also highly polluting. A pound of waste burned domestically emits up to 10,000 times the pollutants emitted from burning the same pound of waste in an EPA-compliant municipal waste combustor.² A growing

awareness of the pollution associated with uncontrolled burning has prompted states and municipalities to take measures to discourage this practice. Communities must choose the most effective combination of educating, offering alternative practices (such as collection and disposal/recycling) and enforcing regulations in order to reduce backyard trash burning. Incentives, such as discounted trash service, may overcome initial resistance to adopting alternatives.³

Do the Math...

To illustrate how polluting backyard trash burning is, the dioxin released by the backyard burning of 20 families' trash for a year is equivalent to that released by a state-of-the-art combustor serving 150,000 families.⁴ According to US EPA data, the average dioxin emission from large US municipal waste combustors in the year 2000 was 0.072 grams-TEQ.⁵ This amount is approximately the same as the weight of a 1-inch long straight pin (0.094 grams).

Does the Trash Composition Matter?

Some have suggested that the polyvinyl chloride (PVC, also known as vinyl) contained in trash is the source of dioxins when waste is burned. They believe this because PVC is a source of chloride, which, at some level, is necessary for the formation of dioxins. Scientific experiments show, however, that eliminating PVC from household waste does not prevent formation of dioxins. Rather, dioxin generation from backyard trash fires correlates best with variables related to combustion such as temperature and carbon monoxide.⁶

What's more, dioxins are commonly produced in virtually any combustion environment, and great quantities of chloride are not needed to produce them. In fact, a teaspoon of table salt contains 1,000 times as much chloride as is incorporated in the daily dioxin emissions of a typical municipal waste combustor.⁷ Even backyard burning of leaves or paper produces pollutants, including dioxins.

Looking Ahead...

Dioxin levels have declined significantly since 1987 thanks to the teamwork of government regulators, industry officials and environmental organizations. Backyard burning of trash, however, remains a significant, largely unchecked source of dioxins and other priority pollutants such as particulate matter and PAHs. The only effective way to address pollution from backyard trash burning is to work to reduce this poor environmental practice.



Case Study: Lee County Solid Waste Resource Recovery Facility

The Lee County Solid Waste Resource Recovery Facility in southwest Florida is a model of responsible waste disposal and efficient waste-to-energy conversion. This facility's operation provides stark contrast to the environmentally unfriendly and wasteful practice of backyard trash burning. The Covanta Energy Florida facility processes approximately 1200 tons of solid waste daily, serving an estimated 600,000 people and generating up to 39.7 megawatts of renewable energy. Trash is transformed into usable energy in a facility that uses state-of-the-art pollution control technology. If, instead of sending their trash to the waste-to-energy facility, Lee County residents burned their trash in backyard fires, they would generate **SIX TIMES** as much dioxin as the total amount of dioxins generated from **ALL 167** large unit US municipal waste combustors in the year 2000!⁸

For more information on solid waste-to-energy technology, visit the Integrated Waste Services Association at <www.wte.org>.

¹ "US Environmental Protection Agency Inventory of Sources of Dioxin-Like Compounds in the United States—1987 and 1995" On-line. Available: <http://cfpub.epa.gov/ncea/cfm/dioxindb.cfm?ActType=default> and personal communication, Mr. Dwain Winters, US EPA, 9-9-02.

² Emission factors for municipal waste combustors range are as low as 0.024 ng/kg-waste burned (Gullett, B.K, Lemieux, P.M., Winterrowd, C.K., Winters, D.L. (2000). PCDD/F emissions from uncontrolled, domestic waste burning. Organohalogen Compounds 46, 193-6).

³ Bi-National Toxics Strategy, Dioxins/Furans Work Group, Burn Barrel Sub-Group (May 17, 2001). Draft: Strategy/Implementation Plan for Reducing the Prevalence of Household Trash Burning (Trash burning) in Rural Areas of the Great Lakes.

⁴ A modular combustor with dry sorbent injection and fabric filter emits approximately 0.025 ng/kg-waste burned [US EPA Draft Final Report (Sept. 2000). Exposure and human health reassessment of 2,3,7,8-TCDD and related compounds, Part 1: Estimating exposure to dioxin-like compounds]. Adding 10% for ash content yields 0.0271 ng/kg-waste burned. In comparison, backyard trash burning emits approximately 200 ng/kg-waste burned [approximate baseline case taken from Gullett, B.K., Lemieux, P.M., Winterrowd, C.K., Winters, D.L. (2000). PCDD/F emissions from uncontrolled, domestic waste burning. Organohalogen Cmpds. 46, 193-6]. The ratio of these two figures (200)/(0.271) is approximately 7400. Assuming that a population of 600,000 people, or 150,000 families of four, are served by the modular combustor, one could apply the factor of 7400 (600,000/7400 = 81 people) to determine that approximately 20 families practicing backyard trash burning would produce the equivalent amount of dioxin that is generated from a modular combustor serving 150,000 families.

⁵ Personal Communication with Mr. Walt Stevenson, US EPA, 4-11-02. EPA emissions data are in units of g-TEQ (1989 NATO).

⁶ Gullett, B.K, Lemieux, P.M., Winterrowd, C.K., Winters, D.L. (2000). PCDD/F emissions from uncontrolled, domestic waste burning. Organohalogen Compounds 46, 193-6.

⁷ Winters, D. (2001). US EPA's Dioxin Reassessment: Sources, Fate, Exposure. Presentation to Stakeholder Consultation Workshop: North American Regional Action Plan: Dioxins and Furans, and Hexachlorobenzene, Mexico City, Mexico. October, 2001.

⁸ (400,000 tons/yr) (907.1kg/ton) = 3.63E8 kg/yr [The Lee County Facility processes approximately 400,000 tons of waste/yr-Personal Communication, Mr. Jeffrey Hahn, Covanta Energy.] (3.63E8kg/yr) (200ng dioxin/kg waste) = 7.26E10 ng/yr = 72.6 g/yr of dioxins from backyard trash fires if all trash were domestically burned. Compared to the total dioxin emissions from large municipal combustors in the year 2000: 72.6 g/12 g = 6.0.

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