



# RILES

*Resource Institute for Low Entropy Systems*

## **Sewage Sludge: A Primer**

### **1) What is sewage sludge?**

Sewage sludge is a by-product of wastewater treatment. Where ever there are sewers, wastewater from drains and toilets carry wastes produced in a municipality to a wastewater treatment plant (WWTP). (Wastewater must pass through a wastewater treatment plant in the United States, with treatment levels established by the federal government.). In modern urban environments this waste includes industrial wastes, hospital wastes, commercial wastes, “human waste,” storm water runoff, and every other kind of hazardous, toxic, and biological waste material that goes down the drain. In Rochester, New Hampshire, the largest solid waste landfill in New England discharges some of its landfill leachate, a material that always contains persistent toxins, directly into the town's wastewater treatment plant. Rochester is not alone in accepting this material at its WWTP. Whatever toxins, hazardous materials, and other pollutants happen to partition to the sludge because of their hydrophilic properties, or are removed from the wastewater in the process of wastewater treatment, and are concentrated in the sludge, will remain in the sludge. Nothing in the treatment of sewage “treats”—e.g., detoxifies--it.

### **2) What is “biosolids”?**

In 1991, the Water Environment Federation (an association of sewage treatment plant operators, municipal sewage authorities, and commercial sludge haulers) established a “Name Change Task Force” which held a national contest to invent a more appealing name for sewage sludge. The winning word was “biosolids.” The Federation also established the “Biosolids Public Acceptance Task Force” whose purpose was to overcome the growing opposition to “land application” of sewage sludge. The Task Force received administrative and financial support from the division of the Environmental Protection Agency that finances the construction of sewage treatment plants.

### **3) What is the “land application” of sewage sludge?**

EPA has promoted the “land application” of sewage sludge since 1993 as the preferred method for municipal sludge disposal. Millions of tons of hazardous sewage sludge have subsequently been spread on farmland, school yards, and parks in the United States.

In February 2008, the McElmurrays, dairy farmers from Georgia, received an order and judgment issued by Federal Judge Anthony Alaimo of the 11th Circuit Court. The order addresses and confirms that there have been decades of deceit by the EPA and finds against the USDA and the EPA. It acknowledges that the sludge applications on the McElmurrays' farm were responsible for killing hundreds of dairy cattle and contaminating the milk supplies in several states. In the ruling, Judge Alaimo said, "senior EPA officials took extraordinary steps to quash scientific dissent and any questioning of EPA's biosolids program." (United States District Court Southern District of Georgia, *McElmurray v. U.S. Department of Agriculture*, Case 1:05-cv-00159-AAA-WLB Document 67, Filed 02/25/2008.)

Perfluoroalkyl substances (PFAS), so-called "forever chemicals," persist in the environment and bioaccumulate in animals. They have been associated with developmental and reproductive toxicity, cancer, and immune system dysfunction. Their presence in wastewater effluents and sewage sludge are of increasing concern because even the most high-tech, conventional treatment processes do not remove them from wastewater effluent or sewage sludge. Concentrations as high as 990 ng/g of PFOS and 241 ng/g of PFOA in processed sewage sludge (biosolids) have been reported (Sinclair and Kannan, 2006; Loganathan et al., 2007; Sepulvado et al., 2011).

In March 2019, Reuters reported that a Maine dairy farmer, Fred Stone, had to shut down his farm because of high PFAS levels in his cows' milk after decades of land applying sewage sludge. <https://www.reuters.com/article/us-usa-dairy-chemicals/the-curious-case-of-tainted-milk-from-a-maine-dairy-farm-idUSKCN1R01AJ>. As a result, the state of Maine is demanding that wastewater treatment plants test for PFAS, which they will inevitably find. <https://www.pressherald.com/2019/03/22/maine-dep-to-require-testing-of-sludge-for-forever-chemicals/>

#### **4) What are some of the documented hazardous materials in sewage sludge?**

In addition to toxic metals, pathogenic viruses and bacteria, some hazardous materials in sludge include: endocrine disruptors like brominated flame retardants (PBDEs, which are a lot like PCBs), phthalates like DEHP (a reproductive and developmental toxin), persistent and toxic ingredients in personal care products (e.g., triclosan and galaxolide), and pharmaceuticals.

A 2009 EPA study (“Targeted National Sewage Sludge Survey”) concluded that all sewage sludge contains toxic and hazardous materials, including large numbers of endocrine disruptors.

In 2018 the EPA published a report that stated, "The EPA's controls over the land application of sewage sludge (biosolids) were incomplete or had weaknesses and may not fully protect human health and the environment. The EPA consistently monitored biosolids for nine regulated pollutants. However, it lacked the data or risk assessment tools needed to make a determination on the safety of 352 pollutants found in biosolids. The EPA identified these pollutants in a variety of studies from 1989 through 2015. Our analysis determined that the 352 pollutants include 61 designated as acutely hazardous, hazardous or priority pollutants in other programs."

[https://www.epa.gov/sites/production/files/2018-11/documents/\\_epaig\\_20181115-19-p-0002\\_glance.pdf](https://www.epa.gov/sites/production/files/2018-11/documents/_epaig_20181115-19-p-0002_glance.pdf)

For a list of peer-reviewed, technical papers documenting hazardous materials in sewage sludge, see <http://www.sludgenews.org/resources/>

**5) Is there any process at the sewage treatment plant that detoxifies and/or removes hazardous materials from the sludge?**

No. The sole job of wastewater treatment is to reduce pollution in the effluent (the treated wastewater that leaves the plant): there is no treatment or "detoxification" of any hazardous or toxic material in the sludge.

**6) It is claimed that some industrial wastewater discharges are "pretreated" before they go down the drain. Does "pretreatment" mean that none of the "pretreated" hazardous or toxic wastes go down the drain?**

No. "Pretreatment" means only that the concentrations of the limited number of hazardous materials and/or conventional pollutants covered by a pretreatment program, for only a very limited number of industrial users, may have been lowered in the wastewater. For example, solid waste landfills that are lined collect millions of gallons of leachate. This leachate is piped to or trucked to wastewater treatment plants. Often there is a pretreatment agreement between the landfill operator and the wastewater treatment plant. This pretreatment plan is only concerned with the biological oxygen demand of the liquid, the organic matter that could drive up the BOD at the treatment plant, and has nothing to do with the PFAS and other hazardous chemicals in the leachate.

