PFAS and Recycling: Putting Them in Perspective

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North East Biosolids & Residuals Association

Recycling organic "wastes" benefits society and the environment. Throughout the U. S. and Canada, biosolids[1] (treated wastewater solids), paper mill residuals, composts, and other organic residuals are commonly recycled to soils. This recycling does amazing things. It enhances soil health, recycles nutrients, sequesters carbon, reduces fertilizer & pesticide use, strengthens farm economies, restores vitality to degraded lands, and puts to productive use residuals that every community has to manage. (Wastewater treatment is a vital public health service, and it creates residual solids that have to be managed!) Sustainability & healthy soils require recycling organic residuals. Properly treated and tested, they are not "wastes."

Biosolids & residuals - like animal manures - are recycled on farms, building healthy soils.

Trace PFAS are in biosolids, paper mill residuals, composts, & soils.

Of course they are, because these materials reflect the chemistry of our daily lives. PFAS are a family of chemical compounds commonly used in many different products we encounter in our daily lives, which is how we are exposed to them and how they end up in trace amounts (parts per *billion* or less) in wastewater and biosolids and other residuals. They are also sometimes called perfluorinated compounds (PFCs, a less precise term). The two most prominent PFAS are PFOA and PFOS. They have recently gained attention because of high levels of contamination of drinking water by industries, including at Hoosick Falls, NY; No. Bennington, VT; and Merrimack and Pease Tradeport, NH. Other drinking water contamination has resulted from the use of PFAS-containing aqueous film-forming foams (AFFF) used in firefighting, especially at military sites and airports. Because of their extensive use and persistence, traces of PFAS are now found throughout the world, including in the most remote environments. However, mere presence does not mean there is risk. Biosolids and other residuals are not *sources* of PFAS; they convey them. In the 2000s, PFAS were found in typical biosolids (not industrially-impacted) in concentrations of tens to hundreds of parts per billion (ppb). Recent tests of land-applied Northeast biosolids show significantly lower levels (Figure 1), likely due to the phase-out of PFOA and PFOS over the past decade. Initial data show no evidence that routine recycling of modern biosolids and residuals leads to groundwater impacts at levels greater than the U. S. EPA health advisory level[2].

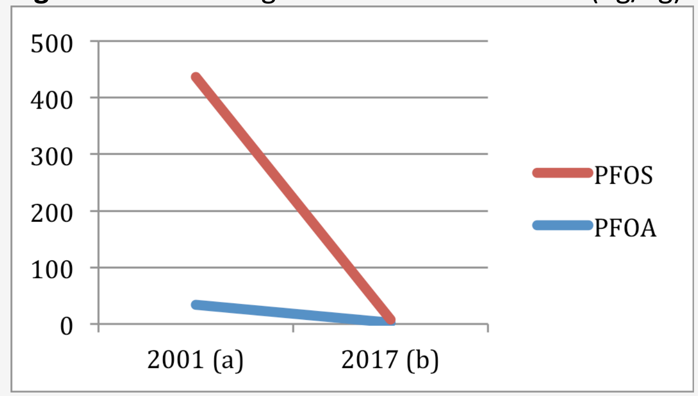
[1] **About biosolids**

Biosolids have been widely used on farms and other lands across North America for decades. Sixty percent (60%) of U. S. wastewater solids are applied to soils. Seattle, San Francisco, Los Angeles, Denver, Chicago, Boston, Concord, Augusta, Burlington, and hundreds of other communities recycle their biosolids. Many major land grant universities have studied biosolids use on soils and accept the practice, finding little risk when used according to regulations. Every U. S. state and Canadian province regulates and allows biosolids use on soils. U. S. EPA, USDA, and U. S. FDA all support biosolids recycling. Thousands of research publications over 45+ years and two major reviews by the National Academy of Sciences have found biosolids use on soils presents "negligible risk" and that "there is no documented scientific evidence that the Part 503 rule [federal regulation] has failed to protect public health." https://www.nebiosolids.org/resources/#/scientific-basis-for-biosolids-use/

PFAS exposure from biosolids/residuals is unlikely & minimal.

Risk assessments by states (ME, NH, NY, VT, etc.) have determined that direct contact, inhalation, or ingestion of typical biosolids and other recycled residuals pose no significant health risk, including from the traces of PFAS they contain. Typical levels of PFAS in modern residuals are 10 times less than the most stringent direct contact standard for soils, which is 300 ppb (ME, VT). And when biosolids/ residuals are applied to soils, they are diluted, further reducing potential exposure.

Figure 1: Decreasing PFAS levels in biosolids (*ug*/kg)



(a) Mean of U. S. biosolids, 2001 (Venkatasen and Halden, 2013)
(b) Mean of New England land applied solids, 2017 (n=20), including 17 biosolids, 2 paper mill residuals, & 1 water treatment residual)

Risks to human health from PFAS are uncertain.

Modern humans have lived with traces of PFOA and PFOS in our blood for decades. In some epidemiological studies, PFOA and PFOS have been linked to several negative health effects. Other research has found some health impacts of PFAS in some lab animals, but not in others. Research has also ruled out correlations between PFAS and some other negative health impacts. But, out of caution, regulatory agencies are urging reduced exposure.[2] Learn more about health risks at https://www.atsdr.cdc.gov/pfc/health_effects_pfcs.html.

Compost grows healthy lawn in many important places (Liberty Park, NJ). Recycling programs create jobs &economic activity.

Your exposure to PFAS is mostly in interior environments, food, & products.

And exposure to PFOA and PFOS is diminishing. Drinking PFAS-contaminated water is also considered a potential significant route of exposure. Regulators and water quality & biosolids/residuals professionals are working to understand and reduce any significant potential risks from PFAS. Removing harmful chemicals from daily use is the best solution for reducing potential risks, and the two leading PFAS – PFOA and PFOS – have been phased out.

States risk disrupting recycling programs if they over-react to PFAS concerns.

States have already been taking appropriate actions to address cases of serious drinking water contamination from industrial activities. Now we encourage – and NEBRA is proactively advancing – continued research and monitoring to address uncertainties. It also makes sense to phase out any persistent and bioaccumulative PFAS. However, current science is too limited to support setting regulatory standards for PFAS in biosolids & residuals. And doing so may negate the numerous environmental benefits of recycling programs, disrupt businesses, kill jobs, discourage testing and learning, and waste resources.

2 Cautionary actions to reduce exposures

In 2016, U. S. EPA established a highly protective public health advisory level for drinking water for PFOA & PFOS, separate or combined, of 70 ng/kg (parts per trillion or ppt*). And, because these two compounds were the most widely used and are some of the most persistent, U. S. EPA has facilitated a voluntary phase-out of their use in this country over the past 15 years. Only a few states (e.g. MN, NJ, VT) have adopted drinking water standards or advisory levels lower than the EPA advisory level. **Most states have <u>not</u> adopted any additional advisory level or standard; they properly rely on the U. S. EPA advisory level.**

**1 part per trillion (ppt) = 1 second in ~32,000 years*

References & details available; contact info@nebiosolids.org