PFAS and Biosolids

What are PFAS?

Per- and polyfluoroalkyl substances, or PFAS, are widely used, long lasting chemicals, components of which break down very slowly over time. PFAS are manufactured chemicals that have been used in industry and consumer products since the 1940s. There are thousands of different PFAS, some of which have been more widely used and studied than others.

Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS), for example, are two of the most widely used and studied chemicals in the PFAS group. PFOA and PFOS have been replaced in the United States in recent years. Because of their widespread use and their persistence in the environment, many PFAS are present at low levels in a variety of food products and in the environment. PFAS are found in water, air, fish, and soil at locations across the nation and the globe.

There are thousands of PFAS chemicals, and they are found in many different consumer, commercial, and industrial products. This makes it challenging to study and assess the potential human health and environmental risks.

Why is it a concern?

Scientific studies have shown that exposure to some PFAS in the environment may be linked to harmful health effects in humans and animals. However, research is still ongoing to determine how different levels of exposure to different PFAS can lead to a variety of health effects. Research is also underway to better understand the health effects associated with low levels of exposure to PFAS over long periods of time.

What's the difference between PFAS producers and receivers?

Drinking water treatment systems, wastewater treatment and recovery facilities, and municipal solid waste landfills are not "producers" or users of PFAS. None of these essential public service providers utilize or profit from PFAS chemicals. Rather, they are "receivers" of these chemicals used by manufacturers and everyday consumers, and merely convey and/or manage the traces of PFAS coming into these systems daily. To address the true sources of these chemicals, it is imperative to discontinue and phase out production and use (both domestic and foreign) at manufacturing facilities and find safer alternatives for heavy use areas such as firefighting training sites. As long as PFAS are elements of products used in our everyday lives, and background levels resulting from decades of manufacturing and use persist, these chemicals will continue to be found in "receiver" streams.

Are PFAS found in biosolids?

PFAS are commonly found in every American household, and in products as diverse as non-stick cookware, stain resistant furniture and carpets, wrinkle free and water repellant clothing, cosmetics, lubricants, paint, pizza boxes, popcorn bags, and many other everyday products. So, of course, PFAS can usually be found in small trace amounts in biosolids because these materials reflect the chemistry of our society. PFAS are being detected in biosolids in parts-per-trillion amounts. For some perspective, a part per trillion (ppt) is equal to one second out of 32,000 years.

Virginia Biosolids Council

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Two of the most common types (PFOS and PFOA) were phased out of production in the U.S. but are still present in some imported products. PFOA and PFOS are found in every American person's blood stream in the parts per billion (ppb) range, though those concentrations have decreased by 70% for PFOA and 84% for PFOS between 1999 and 2014, which coincides with the end of the production and phase out of PFOA and PFOS in the U.S.

What is being done?

The analytical methods needed to study and accurately monitor these chemicals at such trace concentrations are still in development for media other than drinking water. In addition, the extent of public health impacts remains unclear and is not fully understood. This underscores the need to better understand the complex science of PFAS exposure and impacts, verifiable analytical methods, and real-world risk before setting exceedingly stringent thresholds or limits.

The U.S. EPA recently updated the interim lifetime drinking water health advisories for two PFAS chemicals — perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). The new interim lifetime drinking water health advisories are 0.004 ppt for PFOA and 0.02 ppt for PFOS. These are advisories and not enforceable regulations.

EPA is actively researching PFAS to expand its understanding and therefore manage any risk. Federally funded research is being conducted in the following areas:

- understanding toxicity (dose and response relationships between PFAS chemicals and both humans and ecosystems),
- understanding exposure (how are people and ecosystems being exposed, and how are chemicals moving through the environment),
- assessing risk (prioritizing and figure out which exposures are most harmful), and
- identifying and planning effective treatment and remediation actions to prevent adverse effects.

As a foundational step, it is important that EPA identify and fully approve a standard method to identify PFAS in biosolids. EPA has currently identified a draft method for biosolids, with single lab validation. Multi-lab validation will follow and is expected in the next year.

What is being done in Virginia?

In Virginia, there is interagency PFAS task force that is examining the PFAS contamination issue and determining the most appropriate actions for both wastewater and biosolids management. The Virginia Department of Health and Department of Environmental Quality are working with U.S. EPA to address issues related to PFAS contamination. And, DEQ is currently completing a PFAS survey of industrial users, wastewater utilities and industrial direct dischargers. This information will form the basis for future sampling and monitoring requirements in permits.

The role of the Biosolids Council

To learn more about biosolids and PFAS, please visit our website (www.virginiabiosolids.com). Additionally, the Virginia Biosolids Council has a long history supporting important research on a variety of matters, including impact to biosolids on coastal soils and carbon sequestration. The Council and some of its individual members are supporting research to learn more about PFAS and biosolids and are partnering with researchers from the University of Arizona on a national research project addressing whether the land application of biosolids results in higher human exposure to PFAS. This project will investigate research plots around the country and address the impact biosolids have on groundwater as well as plant uptake in crops.

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