NATIONAL COMMUNICATION GUIDANCE: PFAS AND BIOSOLIDS MANAGEMENT

WHAT ARE BIOSOLIDS, AND WHY DO WE APPLY THEM TO LAND?

Wastewater treatment plants clean wastewater by using naturally-occurring microorganisms to consume waste, then separating solids from liquids. The separated solids are further treated to reduce pathogens and break down organic matter. At the end of this treatment process, biosolids – a carbon- and nutrient-rich product – are produced. Biosolids treated to meet federal and state standards are a renewable resource that is often beneficially used as an alternative to synthetic fertilizer.

LAND APPLICATION OF BIOSOLIDS:

Builds soil health. Biosolids land application enriches the soil by returning nutrients and organic matter back to the land. Biosolids contain elements essential for plant growth, including nitrogen, phosphorus, and many other nutrients. Unlike synthetic fertilizer, the high organic content in biosolids also increases soil aeration and water retention. This can mitigate soil erosion and nutrient leaching which are common challenges with modern farming practices. Use of biosolids in place of synthetic fertilizer offers a low-cost way for farmers to invest in their land and promote a local, circular economy.

Fights climate change. Biosolids land application both directly and indirectly decreases CO2 in the atmosphere. Because biosolids are high in organic matter, land application sequesters carbon for significant periods of time. Furthermore, biosolids land application offsets the use of synthetic fertilizers which are carbon intensive to produce.

Conserves Landfill Capacity and Reduces Greenhouse Gas. Landfill space is limited. Fewer landfills are willing to accept biosolids because organic matter increases the production of methane, a potent greenhouse gas. (US EPA reference: https://www.epa.gov/gmi/importance-methane) Some states have placed restrictions on the use of landfills for biosolids in an attempt to mitigate climate change as well as address concerns associated with landfilling wet wastes like biosolids.

REGULATION & HISTORY:

Biosolids land application is regulated under the Clean Water Act by the U.S. EPA (40 Code of Federal Regulations Part 503) to support and ensure responsible recycling. The EPA regulates the quality and amount of biosolids that can be land applied and, in that way, limits the amount of metals and pathogens that end up in the soil. Typically, biosolids contain similar concentrations of metals as natural soil and 99% of pathogens found in wastewater are destroyed in the treatment process. The EPA requires regular testing of biosolids that are land applied. EPA reviews available information on pollutants in biosolids every two years to determine if they might pose a risk to human health or the environment, requiring additional regulation.

NATIONAL COMMUNICATION GUIDANCE: PFAS AND BIOSOLIDS MANAGEMENT

WHY IS THERE CONCERN ABOUT PFAS IN BIOSOLIDS?

Per- and polyfluoroalkyl substances (PFAS) have been used extensively for manufacturing a wide range of products in the industrial and commercial sectors since the mid-1900's. Eliminating the non-essential use of PFAS is the long term solution. When it became known that some of these PFAS compounds pose significant health concerns, investigations revealed the presence of these chemicals in various consumer products, including food wrappers, cleaning agents, clothing, upholstery, cosmetics, cookware, etc. PFAS compounds persist in the environment long after they are introduced. Because of this characteristic and their widespread use, PFAS are unfortunately found almost everywhere in the environment, including rainwater and household dust, and biosolids are no exception. Wastewater treatment plants are passive receivers of waste from the community and do not produce or use PFAS in their processes, thus, PFAS concentrations in wastewater and biosolids tend to reflect the industrial and domestic practices in society.

While the vast majority of biosolids have PFAS levels that are far less than that of household items like cosmetics, carpets and even some organic food, some wastewater treatment plants have received higher levels of PFAS than expected due to facilities that use or produce PFAS discharging to their sewer system. Reported issues of high PFAS presence in biosolids land application are linked with significant waste loads generated by industries or direct application of residuals coming from the industrial sources before PFAS was a known issue. These exceptions are often highlighted in the news and can unfairly represent all wastewater utilities and all biosolids.

WHAT'S BEING DONE TO MITIGATE THIS CONCERN?

As part of the EPA's biennial regulatory review, they have identified PFAS as a class of pollutants that merit additional study. EPA is conducting a science-based risk assessment to determine if there is a need for additional regulation. Development and implementation of any new standards will occur through a formal administrative process that allows for public input. If any standards are adopted, compliance is monitored through the Clean Water Act's enforcement provisions. This compliance mechanism is already well established for compounds currently regulated in land-applied biosolids.

Research by academic institutions is also being conducted to understand the behavior of PFAS in the environment. Early results have found that the movement of PFAS in soil or within a crop are dependent on the type of PFAS compound. However, PFAS studies on land-applied biosolids have found minimal leaching past two feet deep and minimal plant uptake, though more studies on different crops, soil types, and climates are ongoing.