PFAS in Biosolids: What to Know

Why is PFAS in biosolids?

PFAS (per- and polyfluoroalkyl substances) are manufactured chemicals widely used since the 1940s. While specific PFAS like PFOA and PFOS were phased out in the U.S. in 2006, they remain detectable in municipal wastewater due to their presence in household products and consumer goods. A portion of PFAS in wastewater influent inevitably ends up in biosolids. In 2022, approximately 56% of biosolids generated in the U.S. were beneficially used through land application, reducing fertilizer use and returning carbon to the soil.

EPA's Draft Risk Assessment

In January 2025, the EPA published the draft risk assessment for potential human health risks from PFOA and PFOS in land-applied biosolids and surface disposal. The assessment focused on 18 different exposure pathways for a hypothetical "farm family" that lives on or near a site where biosolids are disposed of over a ten-year period. The assessment assumes the farm family subsists primarily on the crops, milk, meat, eggs, and drinking water at the site.

Key findings include:

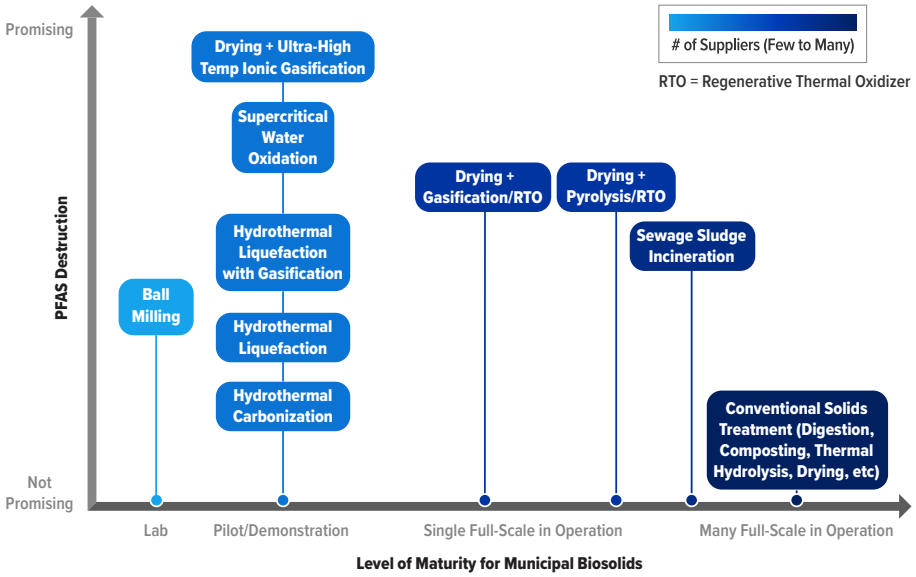
- EPA's acceptable risk thresholds may be exceeded for the farm family under some modeled scenarios when biosolids containing 1 part per billion (ppb) of PFOA or PFOS is land-applied.
- Human health risks may occur from drinking contaminated groundwater near inadequately lined surface monofills with sewage sludge containing 1 ppb PFOA or 4-5 ppb PFOS.

The draft risk assessment focused on the hypothetical farm family and did not assess risks to the general population who typically have a diverse diet and are not in close contact with land-applied biosolids. The risk assessment also encourages initial risk reduction through PFAS source control and strategic biosolids application in areas less susceptible to potential impacts.

Impacts on Biosolids Management

While federal regulations have not yet been promulgated, the EPA's recent actions signal potential future regulatory direction. These actions may prompt state or local authorities to impose their own limitations on biosolids management. Facilities may also face reduced acceptance of biosolids for land application or landfilling due to perceived risks and liability concerns.

To adapt, utilities may need to invest in alternative management approaches, including destructive technologies thst are being researched (see figure). Such changes could increase operating costs and require more fertilizer use for agriculture. New processing systems will also require significant capital. Due to the financial burdens and technical challenges this would impose, such systems may benefit from regionalization where large processing facilities serve multiple surrounding utilities.



While methods for destruction are being explored, source control remains the most cost-effective and equitable strategy to reduce additional PFAS release to the environment.

Recent Regulatory Actions

In addition to the recently published draft risk assessment, several other regulatory actions have been drafted or proposed that may impact wastewater utilities.

CERCLA Designation (July 2024)

EPA designated PFOA and PFOS as hazardous substances under CERCLA (Superfund), heightening concerns about potential liability within the wastewater industry. While the EPA has stated they do not intend to pursue litigation of wastewater facilities, this designation leaves facilities open to litigation from third parties. In response, legislation has been introduced in the U.S. Congress to provide exemptions for passive receivers of PFAS-contaminated waste, including water and wastewater utilities.

NPDES Permit Guidance (December 2022)

In a December 2022 memo. EPA issued guidance recommending states require utilities to implement comprehensive PFAS monitoring programs. Key requirements include: quarterly monitoring of PFAS in influent, effluent, and biosolids; updating Industrial User (IU) inventories to identify all potential PFAS sources; conducting quarterly monitoring of these IUs; and implementing discharge reduction measures if PFAS levels in biosolids indicate industrial sources. Several states (Michigan, New York, Wisconsin, and Colorado) are already implementing similar strategies.

National Sewage Sludge Survey

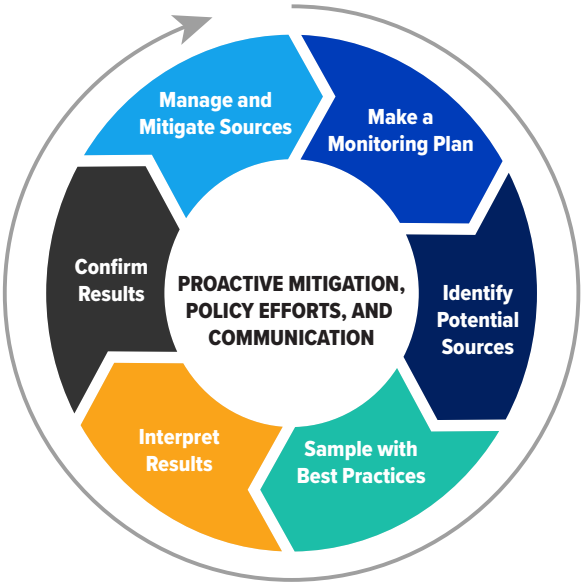
As part of the National Sewage Sludge Survey and proposed POTW Influent Study, 200-300 of the largest treatment plants would be required to take part in a PFAS characterization effort that will focus on PFAS concentrations in influent, effluent, and biosolids as well as samples from up to 10 industrial dischargers to the plants.

Effluent Guidelines

In *Effluent Limitations Guidelines Program Plan 15*, the EPA revised guidelines to include a PFAS standard on landfill leachate discharges to collection systems. While the details have not been announced, such limits on highly concentrated streams will reduce overall PFAS loading in wastewater influent and ultimately in the biosolids.

Recommended Actions

- Know your data – Sample your influent, effluent and biosolids, and compare your PFAS data to state or national studies to determine whether a local industrial source is likely.
- Reduce significant sources – Partner with contributing industries to identify and implement effective source control strategies.
- Master plan strategically – Identify options, understand costs for potential changes, and develop flexible pathways to diverse biosolids management approaches that can be taken upon specific regulatory or cost triggers.
- Talk to your neighbors – Find potential public and private partners that could participate in regional solutions.
- Communicate proactively – Develop public outreach communication campaigns to stay ahead of the issues. Talk to legislators to encourage support of a CERCLA exemption for passive receivers of PFAS. Educate stakeholders about the implications of changing biosolids management (e.g. costs, soil health, and greenhouse gas impacts).



Carollo's PFAS experts are leading industry efforts aimed at source control, water treatment, and piloting innovative technology. We stand prepared to assist you with all things PFAS, from public communication to strategic planning, aiding development of regional partnerships, and technology implementation.

For additional information, click on the QR code or contact:
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