PFAS and Wastewater Facilities

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PFAS compounds are found everywhere in today's society. Given the wide use of PFAS-containing products, there are low levels of PFAS in groundwater, surface water, household dust, human blood, and even our national forests. Because of their ubiquity, PFAS compounds are likely to be present at some level in wastewater as well, despite the fact that municipal wastewater treatment plants are not sources of PFAS and do not add these chemicals during the treatment process. The question that arises is: how do we effectively manage PFAS compounds in wastewater?

Regulation under the Clean Water Act. The Wisconsin Department of Natural Resources (DNR) has been "delegated" authority to implement the provisions of the federal Clean Water Act. These provisions require permits for persons, including municipalities, which discharge wastewater into waters of the state. Permits include technology-based limits and water-quality-based effluent limits (WQBELs). WQBELs are derived from water quality criteria. Water quality criteria establish the levels of pollutants in a water body that are protective of uses such as public health and fish and aquatic life.

Wisconsin, like several other states, is currently developing numeric water quality criteria for certain PFAS compounds in surface water. The proposed water quality criteria for PFOS and PFOA are very low, at 2 parts per trillion (ppt) and 35-45 ppt, respectively.[1] These numbers are at the limit of detection and at the level found in most ambient (background) measurements. Municipal wastewater treatment plants cannot meet these limits through conventional treatment. If a permittee is not able to meet a WQBEL through treatment, its primary option is to seek a variance. Typically, a variance will impose an interim limit and require source reduction measures with the ultimate goal of meeting the limit. However, variances are far from automatic and if treatment is technically possible, variances will only be granted if costs are otherwise prohibitive.

Prevention, Not Treatment. The same source reduction measures that typically accompany a variance can be implemented without the uncertainty and costs associated with applying for a variance. Source reduction measures are critical to cost-effective reduction of PFAS because municipal facilities are not designed to treat toxic pollutants like PFAS. For conventional pollutants – suspended solids, biological oxygen demand, nutrients, and bacteria – municipal treatments plant can and do *treat* the wastes before discharge into surface waters through primary and secondary treatment. Those systems generally do not treat toxic pollutants.

The only known treatment processes for compounds as resilient as PFAS is reverse osmosis (RO) or activated carbon filtration. While these treatment systems may have potential at a small scale, they are not practical on the large scale necessary for implementation at a wastewater treatment facility. In order to effectively use an RO system, the water being treated needs to be reasonably free of particles that would clog the RO membranes. Thus, an RO system typically requires an ultrafiltration step prior to the RO itself. Filtering millions of gallons per day requires a large number of filters and the space to accommodate them. Further, operation of the system requires significant energy input as the water is forced through the microfilters and a high degree of maintenance to clean and maintain the RO filters. Once the RO process is complete, there are few options for disposing of the highly concentrated residual brine waste, most of which entail substantial transportation costs. One Wisconsin study for an RO system capable of handling 15 mgd of wastewater estimated capital costs were approximately $200 million and operating costs were more than $25 million per year. Such a facility would require approximately 300' x 350' of space, about the size of a football field. Currently in Wisconsin, there are 86 communities with treatment plants of 1 mgd or more and 10 facilities of 15 mgd or more.

The alternative to treatment is pretreatment, pollution prevention, and source reduction measures. The industrial pretreatment program has been part of the federal and state Clean Water Act provisions since its enactment. Pretreatment requires that industries treat or otherwise prevent toxic pollutants from entering municipal sewer systems. Communities impose parallel sewer use ordinance provisions that prevent toxic substances from being discharged into municipal sewers. For more diffuse sources of toxics, municipalities have developed pollution prevention and source reduction measures. These strategies have been successfully used for years to address compounds such as chloride and mercury. This same strategy could be adopted for PFAS

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as a practical method of preventing PFAS from entering a wastewater treatment facility in the first place.

Alternative regulation to the establishment of numeric criteria and associated WQBELs is crucial to advancing source reduction measures without the uncertainty and costs of applying for a variance. Pursuing non-numeric criteria would allow progress to be made while additional studies are conducted. If ultimately a numeric standard is warranted after evaluation of source reduction measures, that could be undertaken as an additional step. This type of stepwise approach has been used under the Clean Water Act many times, and would help reduce PFAS in our surface waters while avoiding the costly and unnecessary variance process for our communities.

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1. Different programs use different risk assessments and methods for developing standards with the result being that there will be different standards for groundwater and surface water.