A Cost-Benefit Evaluation of PFAS Drinking Water Treatment

Kristen Musgrove (kmusgrove@brwncald.com) (Brown and Caldwell, Morton, Illinois, USA),
Tamara Sorell (tsorell@brwncald.com) (Brown and Caldwell, Brookline, New Hampshire, USA)
Jim Claffey (jclaffey@brwncald.com) (Brown and Caldwell, Ramsey, New Jersey, USA)

Background/Objectives. State drinking water standards for per- and polyfluoroalkyl substances (PFAS) continue to be driven lower, with values for some compounds now below 10 nanograms per liter (ng/L). These regulatory actions appear to ignore widespread exposure of humans to PFAS from other sources. The literature suggests that in most cases, drinking water consumption is a relatively minor contributor to overall PFAS exposure. It is thus questionable whether increasingly stringent standards are the best way to reduce overall exposure. This presentation explores the cost benefit of drinking water treatment for PFAS exposure reduction.

Approach/Activities. While quantifying overall PFAS intake in human populations from different sources is challenging, a literature review indicates that the largest category for human PFAS exposure is diet. Other sources include food packaging, dust, and textiles. As an example, for the commonly studied compound perfluorooctanesulfonic acid (PFOS), various published estimates suggest that drinking water does not represent more than half of daily human exposure until water concentrations exceed roughly 30 ng/L. PFAS removal from drinking water supplies requires advanced water treatment, which can be prohibitively expensive for municipalities. Available technologies for reducing PFAS include activated carbon, ion exchange, and high-pressure membranes. In addition to capital expenditures, the United States Environmental Protection Agency (EPA) has estimated that operational treatment costs would be in the millions of dollars per year for a municipality.

Results/Lessons Learned. Drinking water supplies contaminated above 30 ng/L due to localized PFAS sources will continue to be an appropriate target for treatment. However, the investment required to meet increasingly stringent PFAS standards well below that concentration may not be justified based on the overall impact on human exposure. In addition to drinking water treatment, other methods of reducing environmental PFAS exposures should be prioritized.