Visualization Tool for PFAS Interpretation and Identification of Non-Traditional Sources

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Background/Objectives. Since the United States Environmental Protection Agency (USEPA) issued the 70 parts per trillion health advisory for perfluorooctane sulfonic acid (PFOS) and/or perfluorooctanoic acid (PFOA) in 2016, a number of states have adopted this health advisory as an enforceable standard or promulgated even lower standards. PFOS and PFOA represent unique regulatory challenges because they have been widely used, have very low part per trillion drinking water criteria, are relatively mobile in the environment, and are persistent.

In response to the identification of per- and polyfluorinated alkyl substances (PFAS) impacts to public and private water supplies, numerous regional and local investigations of PFAS have been undertaken. These investigations have predictively revealed PFAS impacts from "traditional" PFAS sites, for example use and/or storage of aqueous film forming foam (AFFF) or fluoropolymer manufacturing facilities. However, because of the widespread use of PFAS in commercial, residential settings and in unsuspected industrial facilities/processes, these investigations have also revealed PFAS impacts at properties not traditionally associated with PFAS.

Approach/Activities. Data from multiple large and small PFAS sites have been evaluated to identify previously unknown or undiscovered sources of PFAS to the environment. A novel PFAS signature evaluation has been used to differentiate impacts from multiple PFAS sources and illustrate how the mixtures of PFAS compounds from a single source can vary as a result of fate and transport. Data have been analyzed to identify trends in PFAS presence/concentration among the several "non-traditional" sources. Comparison of PFAS concentrations at multiple locations within the same medium and between multiple environmental media allowed us to gather useful insights on PFAS spatial distribution and partitioning behavior for each of these non-traditional sources.

Results/Lessons Learned. PFAS investigation activities at multiple sites have resulted in the identification of a number of non-traditional PFAS sources in both rural and urban areas. Understanding that these non-traditional sources of PFAS can result in measurable impacts to multiple environmental media will become increasingly significant as states consider adopting the USEPA health advisory equivalent, or lower numerical values, as enforceable standards. Awareness and detailed characterization of these nearly ubiquitous non-traditional sources is also critical for the assessment and remediation of impacts at more traditional PFAS sites because impacts from the non-traditional sources are often found to be comingled with other larger PFAS impacts.