Re-Emergence or Have They Emerged?
Same Old Contaminants but New Tricks

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Background/Objectives. Emerging contaminants have been shown to be prevalent in surface and groundwater and identified as posing a potential environmental, ecological or public health risk, for example, organic emerging compounds such as 1,4-dioxane, and per- and polyfluoroalkyl substances (PFASs). In addition, there are inorganic emerging contaminants such as boron found as a constituent in coal ash residuals, recently regulated by way of the USEPA Coal Combustion Residual (CCR) rule and can also serve as a tracer for leaking impoundments.

Approach/Activities. A variety of batch, column tests and a field effort were conducted to evaluate the removal efficiencies of the following organic compounds: 1,4-dioxane, and PFASs, and inorganic compounds: boron, mercury, arsenic, and selenium using advanced oxidation technologies combined with low-cost sorptive treatment approaches. The advanced oxidation technologies evaluated included mixtures of permanganate and persulfate, and a slow-release form of persulfate that resulted in Mn-activated persulfate. The sorptive amendments include a manganese-functionalized activated carbon, a variety of low cost metal oxides, as well as an industrial byproduct that is being evaluated for beneficial reuse.

Results/Lessons Learned. Laboratory test results indicate 99% removal of As, B, Hg, and Se from coal ash leachate and variable removal efficiencies of short chain PFASs (e.g., perfluorobutane sulfonate (PFBS), and perfluorobutanoate (PFBA). In addition, results from a 2017 ESTCP field demonstration conducted at North Island Naval Station will be shared where >99% removal of 1,4 dioxane (and chlorinated volatile organic compounds) was achieved using a passive slow-release in situ chemical oxidation approach.