

HRSD SWIFT Research Center PFAS Control

December 12, 2022

HRSD has been investigating PFAS removal through the SWIFT advanced water treatment process since 2019 when a year-long study was conducted. This study consisted of assessing removal of 27 PFAS compounds across the granular activated carbon (GAC) contactors and compared PFAS removal and other GAC performance metrics such as TOC removal with respect to bed volumes (BVs) treated. The maximum PFOS concentration observed during this study was 0.53 ng/L, the maximum PFBS concentration was 10 ng/L, and PFOA concentrations ranged between <0.50 and 4.9 ng/L. No GenX was detected. A correlation between TOC and total PFAS concentration (sum of short and long-chain PFAS compounds) was found in SWIFT effluent until ~15,000 BVs; and beyond this, the correlation between TOC and PFAS removal was not maintained. Based on the conclusions of this study, PFAS removal was not a driving factor in GAC operating conditions as SWIFT effluent PFAS concentrations met the EPA's 70 ng/L PFOA + PFOS proposed health advisory limit (HAL).

In June of 2022, EPA updated the proposed HAL to 0.004 ng/L PFOA and 0.020 ng/L PFOS. EPA's promulgated Minimum Reporting Level (MRL) for PFOA and PFOS is 4 ng/L. As the proposed EPA HAL is several orders of magnitude below the MRL, HRSD's current treatment objective is to maintain <4.0 ng/L for PFOA and PFOS in SWIFT Water. Based on the data from the 2019 study, the correlation between TOC and PFAS removal suggested that maintaining an effluent of 3 mg/L TOC in combined GAC effluent would be sufficient to reach <4.0 ng/L PFOA and PFOS. PFAS sampling for individual GAC contactor effluent also resumed in late June of 2022.

After reviewing PFAS data post June 2022, it was observed that the relationship between TOC and PFAS removal was not the same on this current run of the GAC contactors as compared to the 2019 study. SWIFT Water PFOA concentrations ranged from 9-13 ng/L at or below 3 mg/L TOC, as compared to the 2-4 ng/L at 3 mg/L TOC from the 2019. SWIFT GAC operations were immediately adjusted to provide most of the flow to a contactor with fresh GAC media in efforts to reduce effluent PFOA concentrations to below 4 ng/L. HRSD is in the planning phase of a pilot study to explore the root cause of the current elevated PFAS concentrations in GAC effluent at 3 mg/L TOC and relatively low BVs. HRSD's preliminary hypothesis is that this was caused by increased GAC media "age" and TOC preloading due to long periods of operation at high empty bed contact times (EBCT) and low flow. Also, increased backwashing of the contactors with extended service times could have caused spreading of the mass transfer zone. HRSD plans to pilot other processes for PFAS polishing including ion exchange.