



The Western Virginia Water Authority (Authority) is a regional water and wastewater provider serving 180,000 customers in the Roanoke Valley of Virginia. Considered an independent political subdivision of the Commonwealth, the Authority formed twenty (20) years ago with a



regional focus to consolidate water resources and infrastructure. Our member localities include the City of Roanoke, the Counties of Roanoke, Franklin and Botetourt and the Towns of Fincastle, Boones Mill, Vinton and Iron Gate. The Authority also has bulk service contracts with the City of Salem, Bedford County through its own public service authority and the Town of Rocky Mount.

Authority staff operate four (4) reservoirs with a combined storage of 10.1 billion gallons and more than 16,000 acres of protected watershed, two (2) major and eleven (11) minor water treatment plants that include a mix of surface and ground water and 1,338 miles of distribution main. Wastewater

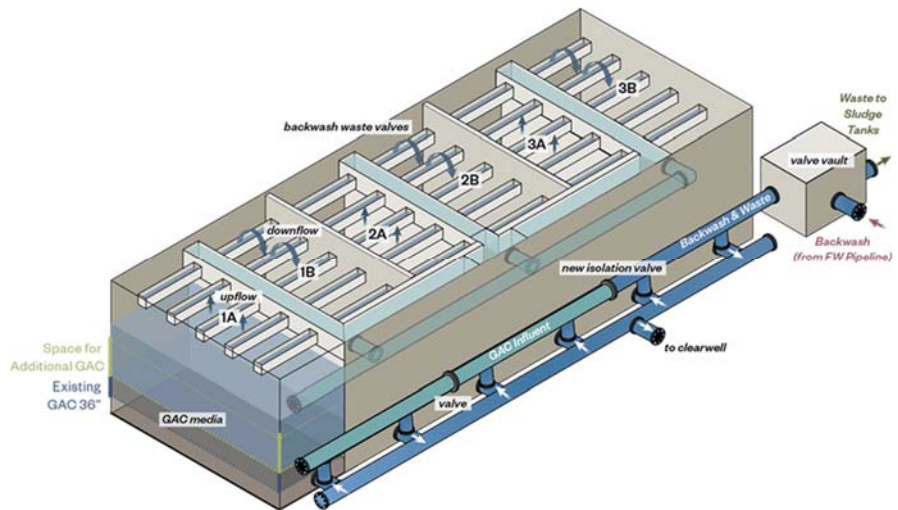
assets include six (6) treatment plants and 1,071 miles of sewer mains. Annual operating revenues are \$81M. Capital Improvements average \$20M per year. Approximately half of the Authority's customers are located in the City of Roanoke, which has a median household income of less than \$49,000 per year.

In 2020, the Authority began PFAS testing of its surface water sources. Staff did not expect to find many compounds, as the Authority is located at the top of the Roanoke River watershed and there are very few municipal or industrial dischargers upstream of our reservoirs. Agriculture primarily consists of small lot cattle and hay operations and forestry. As expected, none of the surface water reservoirs tested had positive results for PFOA or PFOS, the two most common PFAS compounds of concern. However, the Spring Hollow Reservoir, our second largest at 3.2 billion gallons, did have concentrations of hexafluoropropylene oxide dimer acid (HFPO-DA) more commonly known by the trade name GenX above EPA's Lifetime Health Advisory (HA) of 10 parts per trillion (ppt). The compound is a polymerization aid in the manufacture of fluoropolymers, which are important in the manufacture of semiconductors, airplane components, electronics, and communications systems.

With the help of state agencies, Authority staff were able to locate the source of this compound and stop its discharge into the Roanoke River. Concentrations in the reservoir have diminished over time but still require reductions to meet the HA for GenX. It should be noted that there is no effective water treatment for any PFAS compounds. However, the compounds can be filtered and transferred to other media such as activated carbon. The reservoir's treatment plant had a rudimentary activated carbon system that staff adapted for HFPO-DA filtration. This meant reducing average day production from eight (8) million gallons per day (mgd) to four (4) mgd. As a short-chain PFAS compound, HFPO-DA has low attachment affinity to the carbon so the

activated carbon is exhausted quickly and must be replaced every two to three months. Annual operating costs have increased by 67% due to activated carbon usage and pumping water from other sources to make up production losses. These are direct costs and do not include the social costs of frequent carbon change-outs. The Authority is spending \$13.5M to upgrade the activated carbon filtration

system at the Spring Hollow to restore the eight (8) mgd capacity but these improvements will not be enough to utilize the plant's full permitted capacity of eighteen (18) mgd.



HAZARD INDEX EQUATION =

$$\begin{aligned}
 & ([\text{GENX}_{\text{WATER}}] / [10 \text{ PPT}]) + \\
 & ([\text{PFBS}_{\text{WATER}}] / [2000 \text{ PPT}]) + \\
 & ([\text{PFNA}_{\text{WATER}}] / [10 \text{ PPT}]) + \\
 & ([\text{PFHXS}_{\text{WATER}}] / [9.0 \text{ PPT}])
 \end{aligned}$$

If the sum of these ratios exceeds one (1), then the water system is out of compliance. The denominators in these ratios are the Health Advisories (HA).

The proposed Maximum Contaminate Level (MCL) for GenX involves a calculation known as the Hazard Index. Ratios for four compounds, GenX plus three other PFAS compounds, are calculated by taking test results and dividing by the compounds' HA values. These are then summed and if the total value exceeds one (1), the water system is out of compliance. In the Authority's case, only one

compound is present so the compliance point is the HA. However, if two compounds are present, then the compliance point for each compound becomes half the HA. For three, it is one-third and for all four it is one-quarter the HA. EPA has indicated they may add additional compounds to the Hazard Index calculation making compliance exceedingly difficult.

EPA Health Advisories for water are calculated in such a way that if consumption by individuals is below the HA, they will not suffer adverse effects over their lifetimes. EPA does not quantify the degree of effect above the HA. For two or more compounds, the Hazard Index calculations essentially require water systems to treat to compliance points significantly lower than what EPA concedes is safe over an individual's lifetime. The Authority believes this flaw in the methodology should be resolved to reduce capital and O&M costs for ratepayers while still providing the protection EPA intended.

Additional information, along with weekly test results for HFPO-DA that are posted for customer review can be found on our website at <https://www.westernvawater.org/water/water-quality/learn-about-pfas>.