

LIFT Scholarship Exchange Experience for Innovation & Technology (SEE IT)
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TRIP REPORT

SCHOLARSHIP UTILITY: New York City Department of Environmental Protection

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ATTENDEES: Adam Reaves, Matt Warne, Dale Borchert

TRIP DATES: September 13-15, 2022

UTILITIES/SITES VISITED:

- Aurora Water, Binney Water Treatment Plant;
- Denver Water, North Water Treatment Plant Construction Site;
- North Texas Municipal Water District Wylie Water Treatment Plant

TECHNOLOGIES/INNOVATIONS SEEN:

- UV/Advanced Oxidation
- UV/State of the Art Laboratory
- Ozone/Chlorine dioxide

TRIP BACKGROUND and RATIONALE:

NYCDEP Water Treatment Operations teams are currently investigating innovative technologies in Water Treatment. First, the team is interested in technologies for attacking taste and odor constituents that may become more prevalent as climate change increases algae growth in some reservoirs. Second, as part of the City's Filtration Avoidance program, NYCDEP is required to design a filtration plant for its Catskill-Delaware System. This trip provided opportunities to see a new state of the art treatment plant under construction, as well as to see advanced oxidation and ozone generation systems in operation on larger scale plants.

TRIP SUMMARY:

During September 2022, a team from the New York City Department of Environmental Protection (NYCDEP) Water Treatment Operations Directorate (WTO) travelled to Colorado and Texas as part of the Water Research Foundation Scholarship Exchange Experience for Innovation & Technology Program (SEE-IT) scholarship program. The program provides resources for water suppliers to go and see the operations of other systems, to compare programs and listen to operational strategies and water quality characteristics that impact other sources.

The NYCDEP/ WTO team first visited Aurora Water in Aurora, CO, a suburban City of Denver, Colorado. The Binney Water Purification Facility was completed in 2010 as part of Aurora's Prairie

Water system, with a capacity of 50 MGD. The Facility incorporates UV treatment with advanced oxidation, as well as biological activated carbon filtration and absorption. A part of their water is also sourced from indirect potable reuse. NYCDEP recently converted a filtration plant from a sand/antracite filter media to a sand/granular activated carbon (GAC) filter media. DEP's engineering consultants recommended a visit to Aurora to talk about GAC specifications and experiences with Carbon vendors. While the focus on the visit was a discussion on GAC, the NYC team also spent time learning about Aurora's advanced oxidation system and laboratory test procedures for evaluating carbon. The mini-Binney pilot plant was also toured, to understand how different types of carbon can be piloted in the plant.

Following the team's visit to Aurora, they then travelled to Golden Colorado, just past the Coors brewery, to see the construction of Denver Water's North Water Treatment Plant. When completed, this new plant will have a capacity of 75 MGD, utilizing UV disinfection. As part of the Filtration Avoidance Program that NYC's Catskill-Delaware system is required to maintain, NYC is also required to design a new filtration plant, in case our Filtration Avoidance status changes. Having an opportunity to see how Denver was constructing their plant provided an opportunity to see state of the art construction processes, as well as new technologies, as they were being built. Additionally, the team travelled to downtown Denver to tour the nearly completed NWC laboratory. A partnership with Colorado State University, this new laboratory is located in the CSU Spur campus, which is a free public learning destination for all people in Denver.

Finally, the team travelled to Wylie, TX, to visit the North Texas Municipal Water District's Wylie Water Treatment Plant, and specifically, the world's largest ozone facility. Located on a 500-acre campus, this facility can treat up to 840 MGD and serves over 80 communities in a 2,000 square mile service area. The components of an ozone facility are complex, and the team was fortunate to arrive while a unit was opened and being serviced. The generators produce 3,900 pounds per day of ozone, and their system is comprised of 13 generators with a peak production capacity of 50,700 pounds per day. Generator rehabilitation is a preventive maintenance activity. In the pictures below, the dielectric tubes used to convey power and provide the interstitial space for oxygen to flow and be converted to ozone are shown removed from the units for inspection and maintenance. In addition, this plant also uses chlorine dioxide to kill off zebra mussels and iron and manganese control in raw water before they enter the plant.

Why did you select the specific utility and technology for the visit?

Aurora Water was selected as they currently use Granular Activated Carbon and advanced oxidation for taste and odor control. Denver Water was selected as they currently are building a state-of-the-art treatment facility using technologies that NYCDEP may consider in their treatment plant design; North Texas Municipal Water District was selected as they are the largest ozone facility in the world and was of comparable size to what a similar system would be if designed for New York.

On your visit, do you think this technology/approach works for your utility?

At Aurora, advanced oxidation with UV light may be an option for taste and odor control. For Denver Water, observing the size of the facility and the space available brought perspective to the smaller footprint that our system needs to work on. For North Texas Municipal Water District, ozone generation is a process we are investigation, and chlorine dioxide is a system that we are installing in some areas.

How useful was the trip in your decision-making process?

The trip was extremely useful in our decision-making process. The perspectives gained from the experiences that each water supplier shared with us were well worth the investment.

What were some of the trip highlights and takeaways?

Understanding how small our footprint is and how different a larger footprint is for providing treatment systems.

Observing the several components of an ozone system. One unit was even opened for maintenance while we were there.

Seeing an advanced oxidation system in operation.