

**Speaker Name:** Chris Schulz

**Affiliation:** CDM Smith

**Coauthors:** Justin Kirchdoerfer and Derek Littlejohn

**Coauthor Affiliations:** City of Arlington, TX

**Abstract Title:** Ozone-Biofiltration For Controlling Extreme Taste and Odor Events In Arlington, TX

**Abstract:** The City of Arlington, TX owns and operates the 97.5 mgd John Kubala Water Treatment Plant ((JKWTP) and the 75 mgd Pierce-Burch Water Treatment Plant (PBWTP). The plants treat water from multiple reservoir sources with challenging water quality conditions for treatment by ozone including: total organic carbon (TOC) concentrations ranging from 4 to 9 mg./l, manganese levels averaging 55 ug/l with seasonal peaks exceeding 300 ug/L, and seasonal Geosmin levels as high as 300 ng/L. The City relies on a two-stage ozone and biological filtration system to control extreme taste and odor events in Lake Arlington during the winter/spring season, which primarily serves PBWTP. In 2016, the City and CDM Smith performed an engineering assessment of the ozone and biofiltration systems at both plants including:

- An analysis of source water quality and ozone treatment performance trends over a five-year operating period.
- Ozone bench-scale testing to establish an optimal design dose and treatment strategies for preozonation (oxidation) and intermediate ozonation (disinfection), including manganese and Geosmin challenge tests and the benefits of advanced oxidation with hydrogen peroxide addition or pH adjustment.
- Development of new automated “rapid response” control strategies for the ozone system to meet production and water quality goals under changing plant flow and water quality conditions, especially during taste and odor events.
- Design and construction of ozone system improvements including new ozone generator power supply units, generator dielectrics, instrument and control equipment, gasketless diffuser grids and an ozone control system that automatically adjusts the ozone dose to rapidly respond to changing flow and water quality conditions.
- Installation of a temporary full-scale hydrogen peroxide feed system for PBWTP with capability to deliver hydrogen peroxide to the preozone and intermediate ozone contactors.

The above investigations and ozone system improvements were completed in Fall 2016, just in time to combat a major taste and odor event on Lake Arlington. During the period January to March 2017, Geosmin levels in Lake Arlington increased from 300 to 1,000 ng/L with a one-day peak of 1,900 ng/L. These represent some of the highest taste and odor events ever seen in Texas. During this event, plant staff at PBWTP were able to make adjustments to the two-stage ozone system to ride through this major taste and odor event. This paper will present the results of the ozone engineering assessment for the JKWTP and PBWTP and the recent full-scale taste and odor event for the PBWTP, including the optimization of the two-stage ozone biological filtration process with hydrogen peroxide addition.