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Abstract Title: Ozone Treatment Optimization and Advanced Controls

Abstract: The City of Arlington, Texas, owns and operates the 97.5-mgd John Kubala Water Treatment Plant (JKWTP) and the 75-mgd Pierce-Burch Water Treatment Plant (PBWTP). Both plants were originally designed with conventional treatment processes and were upgraded in 1998 with a two-stage ozonation process followed by biological filtration. The plants treat water from multiple reservoir sources with challenging water quality conditions, including total organic carbon (TOC) concentrations ranging from 4 to 9 mg/L, manganese levels averaging 55 ug/L with seasonal peaks exceeding 500 ug/L, and seasonal geosmin levels as high as 300 ng/L. Source water quality can change dramatically within a few hours. While both plants produce high-quality finished water that meets all regulatory drinking water requirements, the City was looking at ways to reduce labor and other operating costs associated with the ozone systems.

In 2016, the City began the process to improve its aging ozone system with an added objective of increased efficiency. The project replaced or upgraded aging infrastructure, including diffusers, ozone generators, ozone destruct units, gas flow control valves, gas flow meters, ventilation, and safety systems. Oxidation-reduction potential meters were added to improve pre-ozone process control. Finally, a new ozone process control strategy was implemented to provide robust automated control to maintain continuous ozone oxidation and disinfection treatment objectives during changing water quality and flow conditions.

This presentation will include discussion of the challenges encountered and key factors that helped contribute to the overall success of implementing process enhancements and advanced controls into an existing SCADA system and operations procedures. The lessons learned from this project may be used by various water industry professionals including water utility personnel, SCADA implementers, and consultants to provide meaningful physical and operational enhancements to existing ozone feed systems.