

The North Harris County Regional Water Authority (Authority) is the regional water entity created to negotiate for a long-term water supply for utility districts, municipalities, and independent well owners in northern Harris County. The Authority's primary mission is the delivery of an alternate water supply to reduce groundwater withdrawals in compliance with the mandates of the Harris-Galveston Subsidence District. The Authority's Groundwater Reduction Plan (GRP) includes purchasing treated surface water from the City of Houston, which is conveyed to the Authority's customers through a network of storage facilities, pump stations, transmission and distribution system pipelines.

This guidance document summarizes the best practices to prepare a water system to receive surface water, including guidance on customer notification and outreach, updating monitoring plans, storage tank operation and maintenance, and distribution system flushing.

### **Customer Notifications Prior to Chloramine Conversion**

The integration of surface water supplies involves transitioning from free chlorine to monochloramine disinfectant. Prior to surface water integration, public water systems are required to notify their customers about the change from free chlorine to monochloramine disinfectant. Customers need to be notified of the switch in disinfectants, as water in aquariums and dialysis equipment is filtered according to the disinfectant, with biological filters needed for the removal of ammonia. Notification made too close to the switch, or not at all, can lead to serious customer issues, as proper filter materials would not be installed in time for the disinfectant change. Per Texas Commission on Environmental Quality's (TCEQ) §290.47(h), notification of the use of chloramines must be provided to retail and wholesale customers at least 14 days before switching disinfectants. Notification must be maintained on site and made available to TCEQ during on-site investigations. Sample notification wording is [provided by the TCEQ \(2021b\)](#).

### **Updating Compliance Monitoring Plans**

Public water systems are required to notify TCEQ about the system's purchase of treated surface water. Integration of surface water will require updating of monitoring plans, as the use of chloramine disinfection has additional monitoring requirements. Updates to monitoring plans are specific to the water system. System size, current operational and monitoring practices, planned monitoring practices and other factors will determine the updates that are necessary to monitoring plans. TCEQ has a standardized template for [public water system monitoring plans \(2021c\)](#). Additional requirements on water quality monitoring and record keeping are in 30 TAC 290 Subchapter F and summarized in [Fact Sheet on Chloramine Requirements \(2021a\)](#). Per TCEQ's §290.110(c), public water systems are required to monitor the monochloramine, total chlorine, free ammonia and nitrate/nitrite levels periodically at different locations. This ensures that an adequate disinfectant residual is being maintained and that nitrification is not occurring in the distribution system.

### **Nitrification Action Plan and Management**

Nitrification is an unintended consequence of chloramine disinfection. Nitrification is the microbial oxidation of ammonia to nitrite and ultimately to nitrate. Nitrification results in loss of residual and other water quality issues. Per §290.46(f) and §290.46(z), water systems are required to develop a Nitrification Action Plan (NAP) and include it as part of their Monitoring Plan. A NAP establishes

monitoring procedures to detect nitrification in the system, as well as corrective actions to implement should nitrification be detected. A copy of the NAP must be located on-site and made available to TCEQ if requested. Additional NAP guidance and information is [available from the TCEQ \(2021d\)](#).

### **Directional Flushing Prior to Surface Water Integration**

Flushing water lines is one of the key operational procedures recommended prior to surface water integration. Flushing assists with removal of sediments, deposits, and biofilm accumulated inside the pipes. Flushing assists with maintenance of chlorine residual and an improvement of water quality in the system. A secondary benefit of flushing includes exercising of valves and fire hydrants which in turn helps with asset tracking and maintenance.

Systemwide flushing is recommended prior to integration of new water supplies. Unidirectional (directional) flushing offers the most benefits and is generally the best choice for a flushing program. The AWWA has published guidance on unidirectional flushing, including recommended flushing velocities of 3 feet per second (AWWA, 2015).

### **Storage Tanks and Maintenance**

The American Water Works Association (AWWA) G200 Standard for Distribution Systems Operation and Management (2015) establishes guidelines for storage tanks operation and maintenance. These guidelines, which include operating and inspection procedures, maintenance programs, and disinfection, should be followed for the effective operation of potable water distribution systems.

### **Review Phosphate Need and Dosage**

Water systems should re-visit the need for phosphate addition. Polyphosphates are generally added to sequester and manage iron and manganese in groundwater. Orthophosphates are typically added to coat the metal pipes and manage water quality issues in distribution systems. Blended ortho and poly phosphates are added to derive benefits from the two chemicals.

### **Public Education on Whole-House Water Softeners**

In addition, public water systems should conduct public education related to whole-house water softeners. Whole-house water softeners include ion exchange resin systems to remove hardness and soften the water. This exchange of calcium and magnesium ions with sodium ions can alter the stability of water, especially for surface water, which tends to be low in hardness and alkalinity, potentially leading to adverse impacts to premise plumbing and tap water quality. It is advisable for the homeowners to bypass whole-house water softeners to prevent these adverse impacts. Prior to integrating surface water, public water systems should initiate public education on bypassing of the whole-house water softeners to avoid issues related to premise plumbing and water quality aesthetics.

## References

AWWA. 2015. G200-15 Distribution Systems Operation and Management. 1 May 2015, doi:10.12999/AWWA.G200, Denver, CO.15

TCEQ. 2021a. Fact Sheet on Chloramine Requirements. URL: [https://www.tceq.texas.gov/assets/public/permitting/watersupply/pdw/Chloramine\\_Fact\\_Sheet.pdf](https://www.tceq.texas.gov/assets/public/permitting/watersupply/pdw/Chloramine_Fact_Sheet.pdf).

TCEQ. 2021b. Notifying Customers of Distributing Water with a Chloramine Disinfectant. URL: <https://www.tceq.texas.gov/drinkingwater/disinfection/changeover.html>.

TCEQ. 2021c. Public Water System Monitoring Plan. URL: <http://www.tceq.texas.gov/assets/public/permitting/watersupply/pdw/Monitoring%20Plan%20Template.pdf>. View through Internet Explorer only

TCEQ. 2021d. Controlling Nitrification in Public Water Systems with Chloramines. URL: <https://www.tceq.texas.gov/drinkingwater/disinfection/nitrification.html>.