By Lonnie Boller, Surface Water Tech

Water Systems Need to be Prepared to Help Maintain Chlorine Residuals During Summer Months

It is challenging to maintain chlorine residuals in distribution systems as warm water temperatures can cause residuals to dissipate. A chlorine residual is crucial as it is an important indicator that contaminants have not entered the distribution system and the water is safe to drink. Drinking water regulations require a minimum of 1.0 mg/L combined chlorine residual or 0.2 mg/L of free chlorine residual to be maintained throughout and at the far ends of the distribution system. This can be a difficult challenge and even more difficult for a consecutive system that does not have direct control over the chlorination of it's water. As most operators know, all water systems are required to take at least one daily chlorine residual in the distribution system. These residuals should be taken at different locations rotating throughout the system to ensure that all parts of the distribution system have an adequate chlorine residual. These residuals should be recorded in a log or other suitable manner so that it is documented that the residuals were taken and were adequate. These records must be maintained by the utility for at least ten (10) years as required by state regulations.

The problems resulting from warmer water temperatures are one of the reasons that many calls to KRWA are requests to help systems maintain adequate chlorine residuals in storage tanks and distribution systems during the warmest months of the year. When dealing with low chlorine residuals, the system should first increase the residuals in the storage tanks. Most elevated storage tanks in Kansas fill from the bottom and supply the system back through the same line. Depending on the system's operation and the hydraulic factors, some of the water can often remain in the storage tank without being replaced by incoming fresher water. It may help to change the control settings to lower the storage levels before the tank is resupplied. I recommend overflowing the storage tank and collecting a sample of the overflow water to determine the chlorine residual. If there is little or no residual in the storage tank, flushing this water to the distribution system will not improve residuals. In most systems, it is vital to get a good chlorine residual in the storage tank, and then the distribution system can be flushed.

As we all know, maintaining adequate chlorine residuals is very important to ensure customers receive safe, bacteria-free water and that the system is compliant with regulatory requirements. It is also not uncommon for biofilms to build up in storage tanks and within the distribution system's piping. Most systems that have trouble maintaining chlorine residuals in the summer months have surface water or purchase surface water

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with combined chlorine residuals. If your system is capable of doing a free chlorine burnout, I recommend doing it before the warmer temperatures arrive, possibly in March or April. Free chlorine is a much more potent disinfectant than combined chlorine. Free chlorine will help remove bacterial growths, commonly referred to as biofilms, in the storage tank and the distribution system. These biofilms are generally not harmful to the customer and may not show up in regular bacteriological testing of the water. A burnout is where a free chlorine residual is maintained in the distribution system and storage tank for approximately two to four weeks instead of the regular combined chlorine residual. Some systems do a free chlorine burnout in the spring and fall seasons. This has proven to help maintain better chlorine residuals. Some systems may not be able to do a free chlorine burnout due to purchasing water from two or three different entities. In that case, operators may want to consider installing rechlorination equipment at a pressure booster station. This would help increase chlorine residuals in both the storage tanks and distribution system. Rechlorination at the point of purchase will allow your system to control chlorine residuals rather than relying totally on the supplier. When rechlorinating water, the chlorine dosage must be such that additional disinfection byproducts are minimized or not formed. This is accomplished by rechlorination only enough to form monochlorine. In all situations, it is essential to understand the chemistry of chlorine and ammonia reactions and to record precise and accurate chlorine residuals. When rechlorinating water, the reaction of the chlorine and ammonia does not occur instantly. The operator may have to sample downstream to determine the increased chlorine residual and make additional adjustments.

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Most rechlorination systems only need to be operated during the warm summer months. I work with some systems every year before starting up the rechlorination equipment. These systems replace the chemical feed tubes, injectors, and pump tubes allowing the system to confront the warm weather months with a minimum number of problems. That's good planning. Summer is just around the corner; have your system as prepared as possible.

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