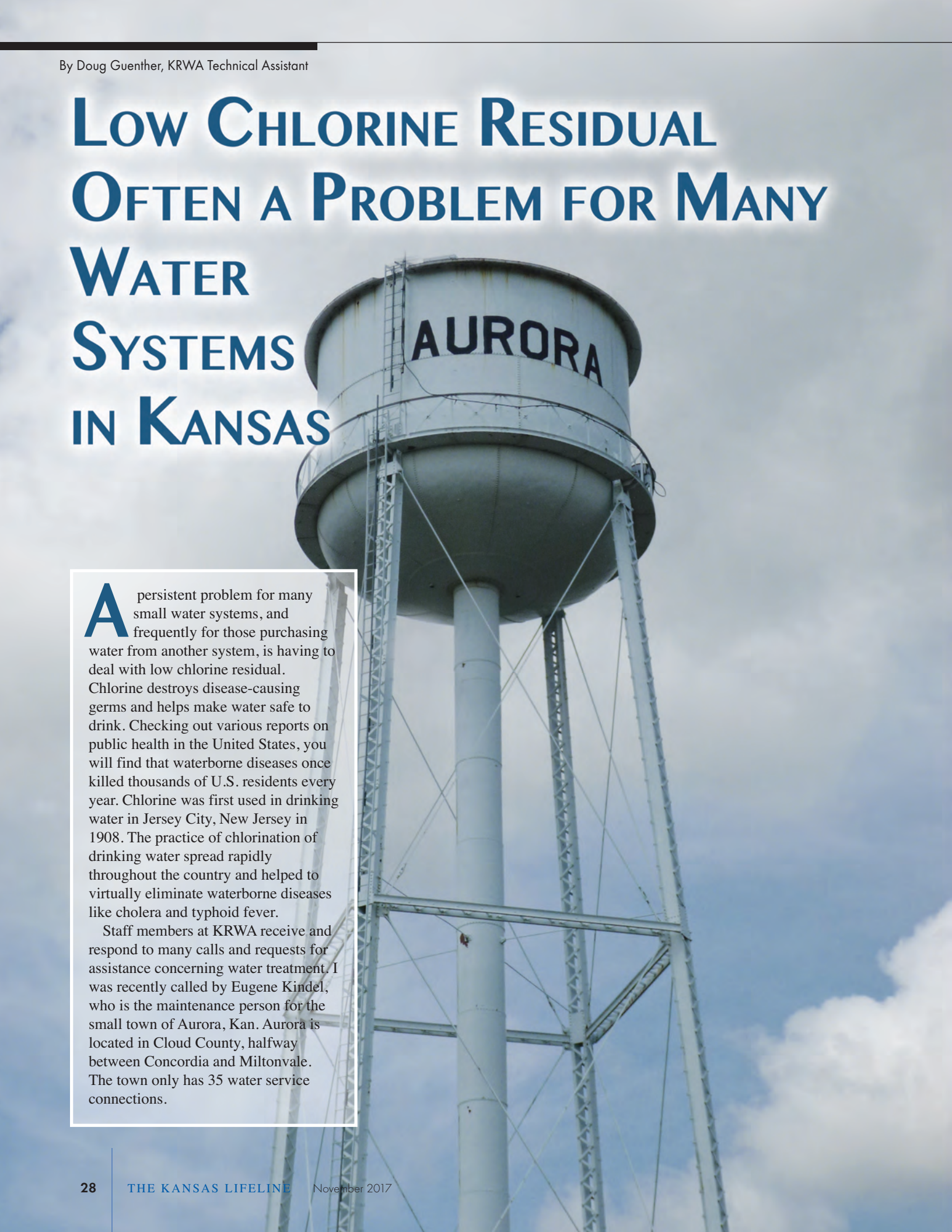
By Doug Guenther, KRWA Technical Assistant

Low Chlorine Residual Often a Problem for Many Water Systems in Kansas



A persistent problem for many small water systems, and frequently for those purchasing water from another system, is having to deal with low chlorine residual. Chlorine destroys disease-causing germs and helps make water safe to drink. Checking out various reports on public health in the United States, you will find that waterborne diseases once killed thousands of U.S. residents every year. Chlorine was first used in drinking water in Jersey City, New Jersey in 1908. The practice of chlorination of drinking water spread rapidly throughout the country and helped to virtually eliminate waterborne diseases like cholera and typhoid fever.

Staff members at KRWA receive and respond to many calls and requests for assistance concerning water treatment. I was recently called by Eugene Kindel, who is the maintenance person for the small town of Aurora, Kan. Aurora is located in Cloud County, halfway between Concordia and Miltonvale. The town only has 35 water service connections.

KRWA Technical Assistant Doug Guenther tutors Eugene Kindel, part-time operator at Aurora, Kan., in troubleshooting a chemical feed pump.

In the case of this call, Eugene reported that the city's chlorine residual dropped from 1.0 mg/L or higher Free to 0.6 mg/L and lower. Eugene had performed some maintenance on the chemical feed system but no improvement was realized in the residual.

Chemical quality

A first question I ask an operator who faces similar problems is if the chlorine product is new or if the public water system has changed the chemical supply. I have found that newly shipped chlorine products sometimes have had no efficacy. Sometimes product that has been on the shelf for an extended time loses its effectiveness also. The other problem is that later in summer and early fall, usage sometimes declines but the outside air temperature remains pretty high. Stratification can occur with the water in the storage tank(s). Another problem is wells having bacterial issues. Sometimes iron and sulfide bacteria can establish in the well. This creates a high demand for chlorine.

At Aurora we found that the metering tube cam was dirty in the peristaltic chemical feed pump. As a consequence it would not fully expand. That in turn limited the amount of pressure it could pump against and that resulted in lower dosage of chemical being injected into the water system. We cleaned the cam and injector of minerals and then reinstalled and returned the unit to service. The unit began providing a dosage of 2.0 mg/L Free chlorine. We left the unit at that setting. As a part-time operator, Eugene only measured chlorine residuals at his residence and a few other points around town and like most operators, did not focus on sampling at the production site.

I encourage all operators to check chlorine dosage at the production site. Often an operator will report the setting on the rotometer but not be aware of the dosage that is being provided.

During the last two months, I have diagnosed one storage tank stratification, three deliveries of inferior chemical products, four wells with iron bacteria and one with sulfide bacteria. I lost count of chlorinator breakdowns which needed to be serviced or be replaced.

I believe that operators need to carry their chlorimeters with them and know what the rate is at the production site versus just checking residuals in the distribution system. Too many chlorimeters are at static locations. The ability of chlorine to kill germs depends on both the concentration of chlorine in the water and the amount of time that the chlorine has to react with microorganisms (contact time). Chlorine destroys waterborne germs by penetrating their slime coatings, cell walls and resistant shells. Chlorine either kills the germs or renders them incapable of reproducing. Don't let your system be low on this critical public health safety measure.

Doug Guenther has worked as a Technical Assistant for KRWA for 17 years. Doug worked for the City of Oakley in the Water and Electric Department for eight years. He has also worked several years for an industry supplier. Doug is a Class II Certified Water Operator.