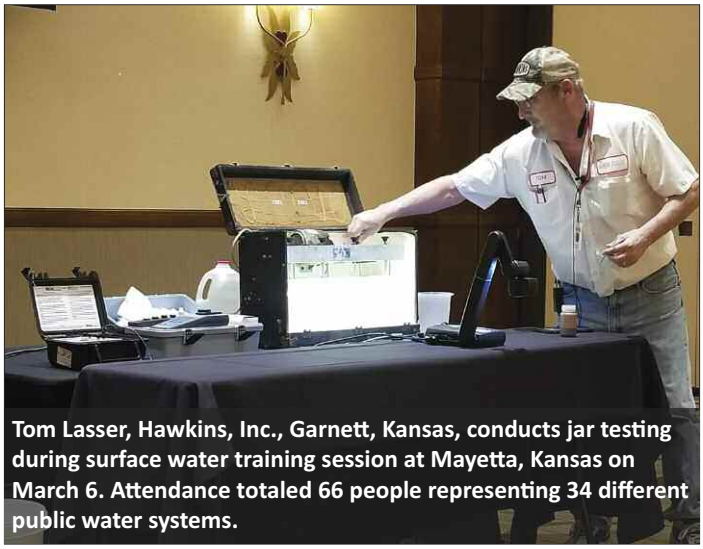
By Monica Wurtz, Technical Assistant

KRWA Conducts Surface Water Treatment Training



Tom Lasser, Hawkins, Inc., Garnett, Kansas, conducts jar testing during surface water training session at Mayetta, Kansas on March 6. Attendance totaled 66 people representing 34 different public water systems.

While 433 community water systems in Kansas obtain their water from ground water, the majority of Kansas' population, approximately two million people, receive water from community water systems which utilize surface water sources. There are 72 community water systems in Kansas that draw water from rivers, lakes, or reservoirs and four systems obtain ground water which is "under the direct influence" of a surface water source. For those systems with a surface water source, the treatment process can be both complex and expensive in order to remove contaminants and be in compliance with regulations. On February 27 and March 6, 2019, Kansas Rural Water Association (KRWA) hosted two training sessions which focused on surface water treatment. The following is a description of the information that was provided during the classes.

Treatment chemicals

The first presentation of the class was provided by Tom Lasser, Hawkins, Inc. , Garnett, Kan. In his 14 years with Hawkins, Tom has worked with water systems to find new products that can reduce chemical costs. During Tom's presentation, he discussed the importance of understanding each system's source water in order to know the right chemicals to treat the water. At each session, Tom brought a raw water sample from a local surface water system and conducted a live jar test demonstration. Jar testing is a way for surface water systems to simulate a full-scale water treatment process. Operators can experiment with different types and amounts of treatment chemicals to determine what will work best with their system's raw water. Tom started each jar test by analyzing the pH and Total Organic Carbon (TOC) levels in the raw water. Then in each of the four jars (beakers), Tom added varying doses of aluminum sulfate (alum) as a coagulant and started mixing. The alum reacted with organic matter in the raw water and started to form flocs. At the end of the mixing period, the class was able to observe as the flocs would settle on the bottom of each beaker. Once again, Tom would pull a sample from each beaker and analyze the pH and TOC levels to determine which beaker had the optimal alum dosage.

During Tom's presentation, he also described his method of calculating chemical dosage. Tom provided each class with a "cheat sheet" of his most commonly used equations. He then took the class through several examples using a variety of variables in order to calculate pounds of product (chemical) needed for the treatment process.

Filtration

The next presenter was Jim Stout, CAS Constructors, Inc., Topeka. Jim has been the Warranty Service Director for CAS Constructors since 1987 and he has been involved with many water system design/build projects. During Jim's presentation, he discussed the importance of filtration in the surface water treatment process, common types of filters used in Kansas, and the proper maintenance of filter materials. Filtration is necessary in the treatment of surface water because there are certain microbiological contaminants in raw surface water that cannot be killed or removed through disinfection. The only way to remove these contaminants is through filtration. Jim's presentation included several photographs of common anthracite/sand/gravel filters, membrane filters and reverse osmosis filters. He talked about issues associated with filter backwash cycles and explained how operators should perform

filter assessments. An assessment may be as simple as a glance at the individual filter effluent (IFE) turbidity reading, the head-loss gauge, or the filter run-time. When a filter is performing at a substandard level, special studies may be used to determine the type and extent of the problem. Special studies include flow metering, filter probing and media excavation, rise rate and bed expansion, media size and condition, mudball content, and floc retention analysis. Jim brought a few of the probes that he utilizes for media excavation for the classes to see.

CT Calculation

The final presenter was Helen Holm, Kansas Department of Health and Environment (KDHE). Helen works in the KDHE Northeast District office in Lawrence. Helen performs sanitary surveys of public water systems and inspections of wastewater facilities in her district. During Helen's presentation she explained how and why surface water treatment systems must conduct CT calculations. The main purpose of conducting CT calculations is to ensure adequate disinfection. CT calculations take into account different factors such as: pH, temperature, different disinfectants, baffling factor, and disinfection byproducts. The equation for CT = C x T x T10, where C = disinfectant concentration in mg/L, T = time in minutes, and T10 = baffling factor. Baffling factor takes into account different components that affect disinfectant contact time such as the position and/or type of inlet, outlet in pipes and basins, pipeline length to width ratio, intra-basin baffles, etc. Helen's presentation also included an explanation of how to utilize KDHE's CT Calculation worksheet to ensure systems are providing adequate log reduction. Log reduction relates to the percentage of microorganisms physically removed or inactivated by a given process. Surface water treatment requires 3-log removal (99.9 percent) for Giardia and 4-log removal (99.99 percent) for viruses. The data required to complete the CT Calculation worksheet includes: disinfection segments (basin, filter, pipe, clearwell, etc.), type of disinfection (free chlorine, ozone, etc.), peak flow rate (gallons per minute), residual disinfectant concentration (mg/L), temperature (Celsius), pH, contact time volume (gallons). Once the appropriate data is entered in the worksheet, the calculation will reveal if adequate log removal has been achieved.

These KRWA hosted training sessions were well attended with 38 in attendance at Parsons and 66 in attendance at Mayetta. KRWA again thanks the presenters – Tom Lasser, Jim Stout, and Helen Holm, for their time and effort in making these training sessions a success. KRWA's mission is to provide education and leadership necessary to enhance the effectiveness of Kansas' water and wastewater utilities. If you have a suggestion for a training topic, a specific presenter, or if you would like for KRWA to host a training session at your facility, please contact the KRWA office at 785-336-3760 or contact a KRWA staff member.

Monica Wurtz began work with KRWA in October 2013. She previously worked at the Kansas Department of Health and Environment and also worked at US EPA Region 7 for four years. Monica is considered a national expert on various drinking water regulations.