

4-log Violation Leads to Lessons Learned

The city of McLouth is located in eastern Jefferson County in northeast Kansas. This city of 850 is home to Granite Street, where the city fathers constructed a road AROUND a large chunk of granite left behind by a glacier. The rock is so large, crews could not find the bottom, let alone move it, so the decision was made to leave the rock in place and pave around it. The city is also known for the steam engine logo embossed on the elevated water storage tank. The logo is a reminder of the annual McLouth Threshing Bee that has drawn large attendances over many years. However, it was a phone call regarding a Kansas Department of Health and Environment (KDHE) groundwater Rule violation that brought me to town in early May 2020,

The groundwater rule requires public water supplies (PWS) that utilize groundwater as a source to test their wells for E. coli if they have a total coliform positive test. Additionally, the PWS must sample its wells if one of the system's wholesale customers has a positive coliform test. Many PWS that are wholesalers opt to be 4-log certified. If a water system has enough chlorine contact for four logs (99.99 percent) of inactivation, then the system can become certified. Systems that opt-in must maintain a minimum chlorine residual at their point of entry and log the residual daily. PWS with a population less than 3300 people must log one residual daily while systems with 3300 people or more must continuously analyze the chlorine residual and

KDHE requires all PWS to maintain a 0.2 mg/L of free chlorine or at least a 1.0 mg/L of total chlorine throughout the distribution system. 4-log certified PWS must ALSO maintain a minimum residual at the point of entry to the distribution system.



The city of McLouth's elevated storage tank features the distinctive steam engine logo. Former McLouth City Administrator and current KRWA Board Member Carl Chalfant was instrumental in its design.

record each day's lowest residual. An advantage is that a 4-log system is not required to sample its wells due to a total coliform positive. This is also beneficial for systems with a large number of wells. McLouth is 4-log certified, so the water plant must maintain a minimum residual of 0.7 mg/L of free chlorine at the point of entry to the distribution system to ensure adequate contact time and remain in



Carl Chalfant, former City Manager at McLouth and now City Administrator at Washington and also KRWA Director, checks the head pressure gauge to verify the water level in the Aeralater's detention tank is correct. Carl donated a day of his time to assist McLouth operators in the water plant.



City of McLouth water operator John DeLaet looks on as KRWA Board Member Carl Chalfant diagnoses a problem with the water plant operating system.

compliance. This is often confused with the KDHE regulation requiring 0.2 mg/L of free chlorine a PWS must maintain throughout its distribution system.

I met with 2015 KRWA City Clerk of the Year and current City Administrator Kim Everly, Maintenance/Utility Workers John DeLaet and Dillon Sechrest and McLouth Mayor Keith Meador. The violation the city was addressing was the result of a misunderstanding about the minimum residual required. Again, it is easy to confuse the requirements if a water system is 4-log certified. KDHE requires all PWS to maintain a 0.2 mg/L of free chlorine or at least a 1.0 mg/L of total chlorine throughout the distribution system. 4-log certified PWS must ALSO maintain a minimum residual at the point of entry to the distribution system. McLouth operator-in-training John DeLaet was handed the keys to the water plant only a few months ago and was instructed to keep "at least a 0.2". Many operators have been placed in this situation. I've heard the same story from systems all around the state. John was mowing the park one day and he was in charge of the water system the next. Unfortunately for McLouth, that simple misunderstanding resulted in a violation for "Failure to Maintain Microbial Treatment". 4-log certified systems must maintain the minimum chlorine concentration to ensure the 99.99 percent inactivation of any possible microbes in the water. McLouth's monthly report had multiple days with measurements below the minimum. The city has distributed the required public notice and life has resumed.

While at the water plant, I noticed a large, blue contraption with multiple valves and gauges coming off of it. Upon inspection, I discover this small-town water plant includes a General Filters Aeralater. The Aeralater is a package plant designed to treat elevated iron and manganese and includes aeration, detention and filtration in a single unit. While Dillon and I shadowed John, he showed us how to operate the plant until he discovered a problem with the head pressure on the filters. After backwashing, which directs flow from two filters in operation to the third being backwashed, the head pressure on the unit was too high to operate the unit. After trying all of the tricks we could think of, John made the call to keep the plant off until he could

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Sometimes it pays for a group of younger operators to allow an old-timer work his craft and to learn from that operator's experience. It is also beneficial for more experienced operators to pass that knowledge along. In August 2020 alone, Kansas water systems lost three highly experienced operators in the southeastern portion of the state. These three men took almost 100 years of experience with them when they passed! It is important to all utilities, both water and wastewater, for experienced operators and clerks/office managers to make their knowledge available in the form of a handbook or manual. Like John experienced, many times the new person walks in on their first day with no direction. Creating a handbook or manual for new employees should be a priority for all utilities, because no one will be employed forever. KRWA has authored a series of handbooks, including *The Water Board Bible* and *The Operator's Handbook: Facts, Figures & More*, that are available for new employees, or seasoned ones looking to expand their knowledge. To obtain copies, call the KRWA office at 785-336-3760.

contact a former city operator for guidance. Luckily, McLouth purchases water from Jefferson RWD 13 in addition to operating its own wells, so a temporary shutdown is no big deal.

A few days later, after many traded phone calls and emails, we managed to meet one morning, determined to get the plant operating correctly. John, Dillon and I were joined this time by KRWA Director, Current City of Washington City Administrator and Former McLouth City Administrator Carl Chalfant. Carl was City Administrator in McLouth from 1990 until 2007. He was operating this plant while the rest of us were in grade school, so we knew Carl could fix the issue. He walked into the plant, looked it over and pressed a couple buttons on the control panel. After listening for about 20 seconds, Carl manipulated a couple of valves and had the plant operating. We were amazed and asked Carl to show us how to properly run the water plant. Since it was a rainy day, the contractors working on the City of Washington's water system improvements had taken the day off, so Carl agreed.

While walking through the plant, Carl noticed that the level control was not working correctly. This plant is operated by air pressure automatically manipulating the valves to maintain a consistent level in the detention tank. Carl and John spent the morning making adjustments and checking air lines for leaks. They eventually isolated the problem and John was able to order the proper replacement parts. Carl was able to fix an issue the rest of us didn't know existed.

WHATEVER IT TAKES!



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Carl Chalfant supervises McLouth Operator John DeLaet as he begins a backwash on the Aeralater water treatment plant.

It is important to all utilities, both water and wastewater, for experienced operators and clerks/office managers to make their knowledge available in the form of a handbook or manual.

A follow-up conversation with John and Dillon during a recent training session confirmed that the plant is currently operating better than it ever has for them.

I want to thank Carl for taking a day off from his current job to help out three youngsters who didn't know how to remedy a problem. It really shows how special this organization, KRWA, is when a member of the Board of Directors will donate his time to help a small water system. And remember, be sure what requirements your system has for a minimum chlorine residual, especially if you are 4-log certified. If you have questions about 4-log compliance, Emily Reichart is the KDHE Groundwater Rule Manager. She can be reached at Emily.Reichart@ks.gov or 785-296-5518. You can also call KRWA for assistance.

If you DO find yourself in McLouth to see the Boulder on Granite St, be sure to stop in at T & D's just down the street from City Hall. They aren't paying for an advertisement; I just think they have the best pork fritter sandwich in the state. It's as big as the plate it comes on.

Daryn Martin began work with KRWA in August 2019. He previously was a Water Program Inspector and Environmental Program Administrator at KDHE's Wichita office. Prior to joining KDHE, he worked as an operator in the El Dorado Water Treatment Plant. He holds a Class IV water operator certification.



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