



Rural Water Training & Tech Assistance Program for SDWA Compliance

Case Study

Osawatomie State Hospital; Osawatomie, Kansas



★ Osawatomie

Background

The city of Osawatomie, Kansas, is located 61 miles southwest of Kansas City and has a population of approximately 4,293. The city operates a surface water treatment plant. The water source for the city is drawn from the Marais Des Cygne River. In January 2021, KRWA Technical Assistant Stewart Kasper was contacted by Richard Zaroban from the Osawatomie State Hospital regarding five Legionella positive samples that were collected at the hospital.



Legionella is found in natural water sources the world over and, under certain circumstances, will multiply and grow to dangerous levels. Legionella bacteria thrive in warm environments from 77° to 108° Fahrenheit and in water that has become stagnant in a distribution line or tower. Insufficient disinfection and an inadequate cross control program can be significant factors for large-scale Legionella numbers. The EPA has established a Maximum Contaminate Level Goal (MCLG) of zero for Legionella, which is a non-enforceable guideline.

The term legionella originates from a tragic event that occurred during a rally of Vietnam war veterans (in jargon the Legionnaires) held in July 1976 at a hotel in Philadelphia when 221 of the attendees contracted acute pneumonia; 34 of them died.

Site Visit

On January 28, 2021, Stewart met with three representatives of the Osawatomie State Hospital and Helen Holm, the district engineer for the Kansas Department of Health and Environment, Northeast District Office at Lawrence, Kansas. It was determined that the hospital uses approximately 1,500,000 gallons of water every month or 50,000 gallons per day during the visit. The hospital has a 178,000-gallon elevated water storage tank on site.

This example of technical assistance was provided by the Kansas Rural Water Association under a contract administered by the National Rural Water Association; funding was provided by the U. S. Environmental Protection Agency.

Case Study

The tank is typically filled to 75 percent capacity or 133,500 gallons. With 133,500 gallons, the hospital has almost three days of supply. KRWA staff member Kasper explained that the hospital could lower the water level to 30 percent, leaving just more than 50,000 gallons of water in the tank. A concern, however, would be a reduction of pressure for the facility. Kasper recommended that they find an outlet or fire hydrant close to the bottom of the tank and install a pressure gauge. He also suggested that they record the pressure and water level in the tank to determine how low the water level could be held and still maintain adequate pressure in the hospital facility, ideally around 60 psi.

Kasper explained that lowering the water level in the storage tank would help in two ways. First, the age of the water in the tank would be shortened as cycling of the supply would be more frequent. Doing so should allow improved maintenance of the chlorine residual throughout the system. On the day of the visit, Kasper checked chlorine residuals at three locations: 1) upstream of the storage tank; 2) downstream of the storage tank; 3) in the admission building's basement. There was a good chlorine residual reading of 2.7 mg/L upstream of the storage tank; downstream of the tank, the reading dropped to 0.8 mg/L. Kasper explained that if the hospital were a public water supply, the water leaving the storage tank would not be in compliance with Safe Drinking Water Act regulations. State regulations require a 1.0 mg/L total chlorine residual throughout the entire distribution system. The third location, in the admission building basement, had no chlorine residual.

During the visit, Kasper found that the backflow device between the hospital and the city had not been tested since 2005, per the tag on the device. Kasper explained that it is good practice to test that device on an annual basis and the smaller devices leading to the cooling water sample line next to the boilers. As stated earlier, bacteria thrive in warmer environments. If the water is allowed to get close to the boilers, it could heat up to the desired temperature of Legionella. When that happens, as long as the water is not allowed near the distribution system, the situation should not pose a problem. However, when Kasper inspected the water supply to the boilers, he could not find any backflow device on the boilers themselves. This is important because when water is heated, it will expand. This is called thermal expansion. As long as the pipes do not leak or burst, the heated water will then be pushed back through the piping and possibly out into the primary distribution system that holds the potable water. If the Legionella started in the feed lines into the boilers, pushing it back into the distribution could cause the five positive sites.

Based on the information above, KRWA staff member Stewart Kasper made the following recommendations:

1. Install backflow preventers on both boilers, isolating each from the distribution system, and have the existing preventers tested for effectiveness.



Founded in 1866, Osawatomie State Hospital (OSH) is licensed by the State of Kansas to provide care and treatment for adults diagnosed with psychiatric disorders regardless of ability to pay. OSH serves individuals from 36 counties in Kansas in collaboration with 12 Community Mental Health Centers (CMHCs).

2. Lower the water level in the storage tank to 50 percent and monitor pressure readings as close to the bottom of the tank as possible.
3. Collect a second set of Legionella samples and submit to a second lab. Kasper offered to assist with the sample collection. He explained that it is crucial to collect the samples as close to the same time as possible at each location to ensure similar water quality for both labs.

Follow-Up

On February 12, 2021, Stewart made a follow-up visit to the hospital. They discussed his recommendations from the previous visit. The hospital had obtained a backflow device for the boiler, and they discussed options for testing the existing backflow device. The hospital was still working on increasing the chlorine residuals in the distribution system.

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