by Bob Kirby

Montgomery County RWD 11 addresses loss of chlorine residual

Many water systems experience loss of chlorine residual. Sometimes this problem is more acute in systems that purchase water from a larger system. Even though the water quality from the supplier may be good, the length of time the water is in the second distribution system can result in loss of chlorine residual which may result in water quality issues.

Regulations

As regulations that pertain to the use of chlorine, the byproducts that are formed by the disinfectant and the acute health risks associated with pathogenic bacteria continue to become more stringent, the more water systems will have to strive to stay ahead of the problems associated with each of these issues.

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Tech Assistant

Montgomery County Rural Water District No. 11 serves customers in an area north of Coffeyville in southeast Kansas. Like many rural water districts, this system experiences problems maintaining chlorine residuals to all areas of the distribution network. The District purchases water from the City of Coffeyville. After boosting the pressure, Montgomery RWD 11 sends water through 50 miles of pipeline ranging in size from 2-inch to 6-inch. Nearly 500 customers receive water from the district. The district utilizes two standpipes to maintain pressure during times of peak demand. Yes, they are side by side as seen in the photo; this is the result of an expanding district working to provide water service to those citizens who need it.

The district's proximity to Coffeyville creates a situation where a majority of the population served are in the southern boundary area while the homes get a little more spread out to the north. The regular monitoring of chlorine residuals over time has shown that the southern area with the higher number of homes closer to the source does not show regular signs of chlorine residual problems. In the northern portion of the district, routine flushing is required to maintain chlorine residuals at minimum standards.

Montgomery County RWD 11 serves customers in an area north of Coffeyville. The district has taken a number of steps recently to improve the quality of water for its patrons.

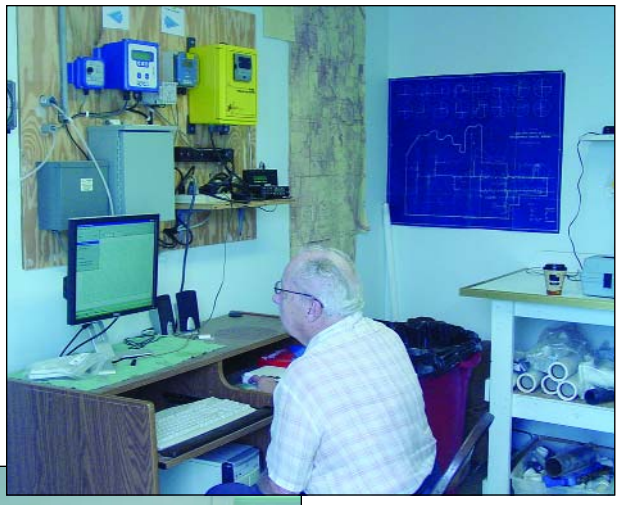
This flushing, while needed, has been time consuming and costly in terms of both water purchased and labor. A long-term solution to the problem that would ensure the quality of water in all areas of the district was needed.

Solutions

One step in finding a solution to the problem of low chlorine residuals was to determine a manner to rechlorinate the water purchased from the city. The source water for the district contained combined chlorine residual; this added another dimension to the problem of rechlorination. To overcome this and not create additional issues with overfeeding chlorine or with the regulatory requirements of the Kansas Department of Health and Environment, the district sought approval and installed flow meters, a continuous amperometric chlorine analyzer and flow-paced metering pumps to inject a sodium hypochlorite solution. The flow meters continuously monitor flow both into and out of the standpipes while the analyzer updates current chlorine residual levels. The flow-paced pumps ramp up when higher water demand is recognized and slow down for lower flows. The district can now control when and how much chlorine to feed to bring the levels back to what was present at treatment. Data loggers are used to track this information; the information is downloaded to a computer located at the site.

Double standpipes addressed

As mentioned earlier, the district utilizes two standpipes to accommodate peak flow conditions. A fairly unique characteristic of the standpipes in Montgomery RWD 11 is that the standpipes stand side by side separated by a distance of just a few feet. The standpipes were constructed in typical fashion with a single riser pipe extending just a couple of feet from the bottom of the tank. The tanks cycled continuously but would still stratify, leaving a column of water in the tank for extended periods of time. The chlorine



Above: Board member and district secretary Arlen Sollenberger downloads information regarding flow and chlorine residuals from the data loggers the district installed to track changes in water flow and quality.

Left: Manager for Montgomery RWD 11, Tony Pauzauskie reviews maps for the district. The district has added almost 11,500 feet of new HDPE pipe to assist in improving chlorine residuals.

residual would dissipate. In order to overcome this problem and create better flow conditions throughout the height of the tank the district decided to extend the riser pipes up the vertical length of the standpipes. The riser pipes were extended to 76 feet above the bottom of the tank. This allowed for better circulation of the water throughout the height of the tank.

Operators Bob Voelzke and Tom Pauzauskie utilize the district van to work on a small chlorine booster pump. The operators both agree that the work the district has done has been a great help in improving chlorine residuals throughout the system and allowed time for other projects.

Loops bypass dead ends

Dead end lines in the northern section of the district also contributed to loss of residual. The district realized that something had to be done about the dead end lines if the other steps that had been taken were going to be effective in alleviating the problems.

District personnel spent considerable time prioritizing the areas for loops within the distribution system to see which areas would provide the most benefit. The district then sought approval from the Kansas Department of Health and Environment to proceed with the project. In lieu of using PVC pipe the district opted to utilize high-density polyethylene pipe to close the loops. Utilizing reserve funds in addition to funds borrowed locally the district has installed almost 11,500 feet of new pipeline. Arlen Sollenberger, board member and secretary for the district, states, "These loops really help the flow in the northern areas of our district which has helped with chlorine residuals. Flushing has been reduced considerably." Operator Bob Voelzke echoed this sentiment, adding, "The loops are working great."

Water systems must continue to work towards improving operations to stay ahead of the ever-changing regulations. This will require a commitment from both staff and decision makers with open lines of communication. Tony Pauzauskie, manager/-operator for Montgomery RWD 11, has been successful in that regard. He says, "The board of directors has been good to work with on this project. These things take time. There are a number of changes coming and we are doing what we can to be prepared."