

Flushing in WATER QUALITY

By Clare Pierson

In Alabama, state regulations require drinking water utilities to maintain a chlorine residual of 0.2 parts per million in their distribution systems. This requires utilities such as the Birmingham Water Works Board (BWWB) to continuously flush their system in order to improve or restore water quality.

The BWWB produces an average of 100 million gal of potable water per day. It has four treatment plants that receive water from the Cahaba River/Lake Purdy, Inland Lake and the Black Warrior River. The system has 51 storage tanks with a combined storage capacity of 75,776,000 gal of water. The utility serves a population of 600,000 people with a distribution network of 3,903 miles of pipe with 200,026 service connections. In addition, there are 13,185 fire hydrants in the system.

Routine or unidirectional flushing is used to remove sediment from distribution water mains throughout a system, especially in areas known for low chlorine residuals. The BWWB's Water Quality Operations Division wanted to continue this practice, as it considers flushing to be an integral component of maintaining water quality by not allowing water to become stagnant.

Strain on Resources

In 2005, the BWWB realized it was manually flushing the system 24 hours a day, seven days a week and using millions of gallons of water—in addition to sending crews out to various sites numerous times to do so. Some areas required additional time and resources to maintain adequate levels.



An Alabama water utility searches for a more efficient way of flushing its distribution system and finds the solution in automatic flushing

Table 1. Results of Hydro Guard Flushing/Chlorine Residuals at a Remote Location

	2004 Cl ₂ Residual (ppm)	2005 Cl ₂ Residual (ppm)
January	0.00	*N/A
February	0.10	0.66
March	0.20	0.56
April	0.30	0.87
May	*N/A	0.60
June	0.00	0.65
July	0.02	0.51

*N/A - No Cl₂ taken

For a water utility that prides itself on providing good water quality to its residents—as well as selling water to other utilities in the area and educating them on maintaining water quality—this was a huge problem. Although, according to Will T. Moore, BWWB's superintendent of the water quality division, it did not experience many customer complaints about issues like discoloration or taste; the problem had more to do with the wasting of resources and inefficiency.

In addition to this challenge, the Board also started implementing water restrictions due to severe droughts down South. The BWWB had to find a way to continue flushing the system to meet water quality requirements while facing increasing usage restrictions.

"In some areas it was a challenge to maintain a proper chlorine residual, and we did have to work with some water restrictions," Moore said.

In 2005, after learning about Hydro-Guard's automatic flushing technology from a distribution manager on site, Moore suggested to his colleagues that they purchase one unit and try it out. After seeing positive results, the BWWB decided to install nine more units immediately.

"We were able to keep a sufficient residual in one particular area [with the first unit], so it was feasible for us to purchase more," Moore said. "At this time, 18 are installed, we have three more scheduled for installation this month and nine more are being set up."

Hydro-Guard representatives tout the benefits of their automatic flushing units compared to a manual flushing program, including simple installation; the ability to flush systems during convenient times—usually at night; the ability to provide more systematic distribution of water over several hours through automatic programming; and a possibility of 80% water savings for utilities.

"With these units, utilities can program flush times and utilize the programming capabilities to figure out the best timing and best amount of water to flush," said Harold Mosley, director of marketing for Hydro-Guard. "We even have a flush duration calculator on our website to help users figure this out."

Enjoying Efficiency

Currently the BWWB has all 18 of its units programmed to run automatically between 12:05 a.m. and 2:05 a.m. each day, rather than the previous routine of manually flushing the system 24 hours per day. Table 1 shows the difference that Hydro-Guard's units have made in the ability of the BWWB to meet and exceed chlorine residuals. In 2004, the average ppm of chlorine over seven months was 0.088 ppm. In 2005, the average over seven months was 0.55 ppm.

"With Hydro-Guard, it is more economical," Moore said. "We used a couple hundred thousand gallons per week rather than a million gallons per week. We saved a lot of water, man-hours and fuel because we didn't have to send employees out to these sites frequently." **WWD**

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