

## Mixing & Aeration Reduce THM Levels by 53% in Water Tank



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The city of Rockville, Md., has taken a proactive approach to meeting water quality regulatory compliance for its drinking water system. An unexpected notice of violation for exceeding the maximum contaminant level of total trihalomethanes (TTHMs) in 2008, however, caused the city to critically examine water quality in its water distribution system.

Trihalomethanes (THMs) are chemicals that form when chlorine reacts with naturally occurring organic matter found in drinking water, such as Rockville's drinking water source, the Potomac River. After performing an initial distribution system evaluation for the Stage 2 Disinfectant and Disinfection Byproduct Rule (DBPR), the city realized that elevated TTHM levels may be hard to deal with in the future. Rockville's utility managers created an internal water quality team and worked with engineers from Hazen and Sawyer to analyze water

quality data and explore ways to lower TTHM levels. The analysis revealed a significant weakness: the 8-million-gal Hunting Hill storage tank.

### Lowering THM Levels

The tank was constructed in 1969 as an oversized steel reservoir located at ground level. With a low average daily turnover of 0.65 million gal per day, average detention time in this tank can exceed 10 days and result in high water age. THMs continue to form with time, so high water age creates higher levels of THMs (TTHM levels above 140 ppb have been measured in this tank). The city considered a range of solutions, including tearing down the tank and building a new elevated tank with less capacity and better turnover in its place.

Rockville Water Treatment Plant staff identified in-tank aeration as a possible tool for lowering THM levels in the distribution system. Because of the imminent arrival of the Stage 2 DBPR, the city felt urgency to get a solution designed, installed and operating as soon as possible.

"[The] public works [department] wanted to have the project finished and validated before the October 2013 start of Stage 2 sampling," said Rockville Civil Engineer John Hollida. Rockville's request for proposals (RFP) for the

project was released in late 2011. "Guaranteeing results was paramount for this project," Hollida said. "The RFP requested [that] proposers guarantee a minimum THM removal percentage. Furthermore, the city structured the contract to require a minimum of 30% THM removal, with a significant financial penalty if the aeration system failed to meet the performance goals."

Utility Service Group and its subcontractor, PAX Water Technologies, were awarded the contract to build an in-tank aeration system with active mixing, and by July 2013, the system was up and running and validation testing had begun. The final validation measurements were taken in September 2013, and results showed that the system removed an average of 53% of the THMs in the tank. The in-tank aeration system has remained in operation ever since.

"When public works started exploring water quality solutions for the Hunting Hill tank, there were not many tools at the city's disposal," Hollida said. "The tank itself is enormous, and one option was to take the tank down and replace it with an elevated tank. That would have cost the city between \$2 and \$2.5 million per million gallons of storage. Installing an aeration and mixing system ended up being the only viable option for saving this tank." **w&wd**

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