APPLICATION BRIEF

Central Alabama Water's Success with Real-time THM Monitoring for Long-term DBP Control



The Shades Mountain Filter Plant (SMFP) is an 80 million-gallon-per-day (mgd) conventional filtration/disinfection facility operated by the Central Alabama Water (CAW). The large open-air sedimentation basin at the front of the SMFP is susceptible to algae growth, particularly during the summer months of June through August. While algae growth is managed by adding chlorine, naturally occurring organic matter in the raw water reacts with the disinfectants to form trihalomethanes (THMs). Effluent THM values can be as high as 55 ppb during summer, which doesn't account for increased formation through the distribution system.

To ensure regulatory compliance with the Stage 2 Disinfection Byproducts Rule (DBPR), CAW implemented a THM mitigation strategy that includes aggressive tank fluctuations, pipe flushing, and extensive chemical treatment research. Before continuous monitoring of THMs, CAW focused efforts on organics removal and managing water age to combat THM formation at the plant and in the distribution system. Fluctuations in THM levels arriving from variable influent conditions affect process control changes that are difficult for CAW to characterize based on the frequency of quarterly grab samples and the turnaround time of in-house and external laboratory analysis. However, to truly monitor the success of their THM mitigation processes, CAW needed an analytical method that provided reliable data on THM levels in real or near real-time.



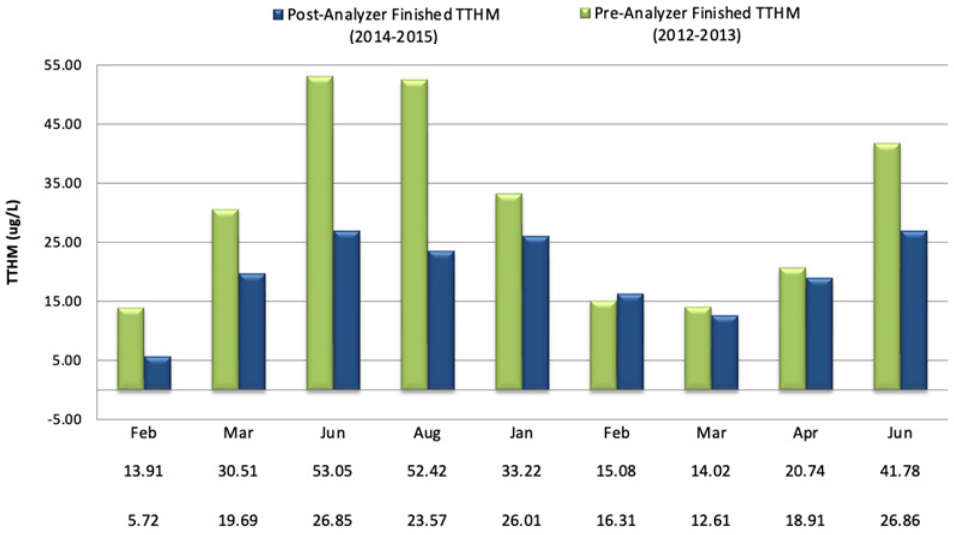


Figure 1: THM results for 18 months pre and post THM-100 analyzer

In September 2013, CAW evaluated the THM-100™ online analyzer manufactured by AMS to characterize and monitor THM levels at the SMFP. After a successful demonstration, CAW began using the online THM-100 monitor in full-scale operation at the SMFP. The THM results for 18 months pre- and post-THM-100 analyzer are detailed in Figure 1.

The previous strategy at the SMFP focused on removing organics to combat THM formation. However, the required use of chlorine entering the 4-acre open-air sedimentation basin to minimize biological growth elevated THM levels. CAW often conservatively operated its facility while waiting to receive results to ensure it remained in compliance with regulatory requirements. This approach resulted in extensive enhanced coagulation, which increased operational expenses on chemicals, sludge removal, processing, power, and other resources.

Benefits of the Online THM Analyzer

The online THM-100 monitor enabled CAW to optimize their chlorine disinfection process and minimize the formation of THMs in their treated water by providing the operational staff with immediate and accurate daily reports on THM levels. Following the Summer 2014 season, fluctuations in THM levels were reduced to maintain an average of 33 ppb instead of 55 ppb. Instant trending results were developed using the software reporting output of the online analyzer, providing important insight required to ensure regulatory compliance with the Stage 2 DBPR. THM formation has been lowered by as much as 50% since installing the THM-100 analyzer. The cost per THM analysis was reduced from $45/sample (lab-based method) to $3.75/sample (online THM-100 analyzer method), resulting in an annual savings of $173,000 in THM sampling and associated costs. The real-time high-frequency data on daily THM values has proved valuable to the THM mitigation strategy and optimization The real-time, high-frequency data on daily THM values have proved invaluable for shaping and optimizing THM mitigation strategies at the SMFP. By enabling proactive, data-driven decisions, CAW serves as a model for utilities seeking to modernize DBP control and protect public health.

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