

Improve quality and maintain cost with proper TOC monitoring in drinking water

Problem

A new drinking water facility foresaw challenges managing Total Organic Carbon (TOC) due to seasonal changes in reservoir source water. A reliable TOC detection strategy was required to meet quality standards, manage costs, and satisfy regulatory requirements.

Solution

The facility conducted a 2-month performance test with the Hach® BioTector B3500dw online TOC analyser prior to opening the new facility. The instrument assessed different sample streams, including raw, flocculation and sedimentation (floc/sed), Post Biofilter, and CFE.

Benefit

The B3500dw performed at 99.7% uptime while identifying changes in TOC contamination, which enabled the customer to meet the community's high water quality standards, environmental regulations, adjust for changes in TOC levels, and maintain control over disinfection costs.

Problem

A new drinking water facility utilising biofiltration predicted challenges managing TOC and Disinfection Byproducts (DBPs) due to the seasonal changes of their source water, which comes from a reservoir. They understood that the amount of naturally-occurring material in influent water can vary greatly day-to-day, and within a day, depending on the season, temperature, weather, and other factors. They recognised a need for an online, fast and reliable analyser they could trust to deliver precise analysis of their source water. TOC analysis of their source water was the right solution to satisfy Disinfection Byproduct Rules, maintain quality, and manage costs.

Solution

The facility explored various TOC monitoring options, and decided to move forward with the Hach B3500dw online TOC analyser for a 2-month performance test prior to opening. The B3500dw analyses process water in such a way that allows plant managers to optimise decisions regarding the control of naturally-occurring organics in drinking water processing facilities. The B3500dw achieves this by delivering results on incoming and outgoing water every 6.5 minutes; fast enough for plant managers to adjust disinfection to ensure compliance and cost efficiency. And the B3500dw satisfies EPA requirements by reporting TOC percentage removal results.

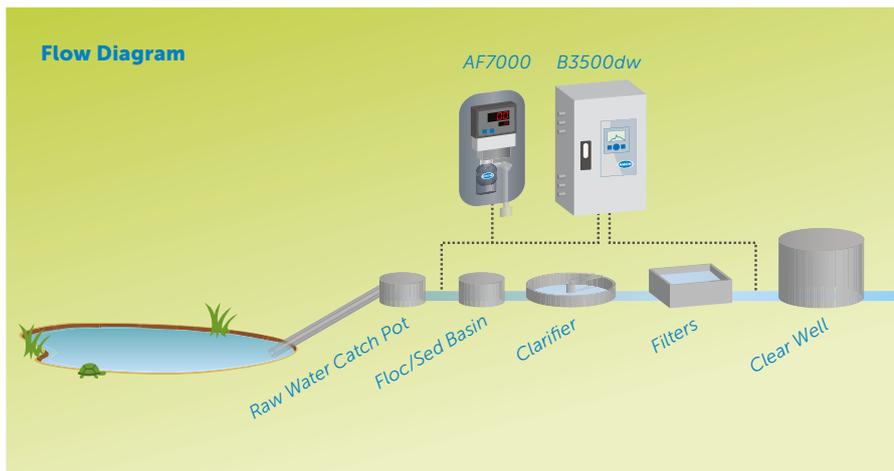


B3500dw Online TOC Analyser

Microbial Disinfection Byproduct Rules (DBPR)

The Microbial and Disinfection Byproduct Rules help balance the risks from microbial pathogens and disinfection byproducts. The latest revision of the DBP rules requires:

- 1) Water suppliers to evaluate the distribution system, known as Initial Distribution System Evaluation (IDSE), to identify the locations with high disinfection byproduct concentrations to establish sampling sites.
- 2) Water suppliers determine if they have exceeded an operational evaluation level using their compliance monitoring results. The operational evaluation level provides an early warning of possible future MCL violations, which allows the system to take proactive steps to remain in compliance. A system that exceeds an operational evaluation level is required to review their operational practices and submit a report to their state that identifies actions that may be taken to mitigate future high DBP levels, particularly those that may jeopardise their compliance with the DBPR MCLs.



1. The first channel of the B3500dw sips from a collection point as the water enters the treatment facility.
2. The second channel draws water from after the filters to then calculate and report the regulated TOC percent removal
3. A jar testing procedure is conducted to determine the correct coagulation dose.
4. The AF7000 streaming current meter provides operators instant knowledge and immediate control to any potential situation or needed chemical dosing adjustment
5. Changes are made to the caustic dose and coagulation.
6. A new baseline is established and the process is repeated.

BW3500dw Test

The drinking water facility worked closely with an engineering firm, which made projected estimates for how to treat the new source water, including caustic dosing, coagulation dosing, Floc/Sed basin contact time, and other estimates related to the biofiltration plant's performance.

During the startup phase, the engineering firm used the B3500dw, in combination with the AF7000 Streaming Current Analyser, to optimise several portions of the treatment process. The first channel of the B3500dw sipped from the raw water catch pot, the second stream was easily moved to sip from the backend of the filters. During this time compliant dosing was characterized with a standard jar testing procedure to determine the correct coagulation dose for the characteristics of the RAW water. The results of the jar test were used as the baseline for the initial baseline for the AF7000 streaming current monitor. The team made changes to the caustic dose and coagulation, and within 12 minutes could see positive results in TOC removal through the Floc/Sed basins. A new baseline was established on the AF7000. This process continued to optimally manage TOC removal.

The team also took advantage of the fact that they could easily use the available grab sample port on the B3500dw in the lab to analyse any sample point in the treatment process. For example, analysing post biofilters, or post CFE, allowed them to see how changes in caustic dosing impacted treatment performance, coagulant dosing, and TOC removal. Additionally, this allowed them to see in the impact that changes in caustic dosing had on the final quality of water produced by the overall treatment process. Lastly, optimising the enhanced coagulation process at the drinking water facility was expedited tremendously, and a significant saving on caustic was realised over what had been expected during plant design.

Throughout the process the team utilised the easy grab sample feature to run samples in different portions of the treatment process to help build a complete picture of how the treatment steps (Floc/Sed, Biofiltration, Settling and Contact Time, etc.) were working in unison and could optimise water quality and cost goals for the facility.

Conclusion

The B3500dw performed as promised by delivering 99.7% uptime, consistent results and convenient features. The new facility has since added a B3500dw to two additional locations to take advantage of fast online results instead of doing grab samples with plans to incorporate the B3500dw into the distribution system. B3500dw features includes:

- Monitors raw water, finished water, and calculate the percent removal and display all results every 6.5 minutes.
- Provides early warning signs of possible and/or future maximum contamination level violations.
- Allows facility operators to take proactive steps to remain in compliance by means of process adjustments to maintain control, no matter what is happening with your incoming water supply.
- Maintains control over coagulant feed and cost.
- Monitors and control naturally-occurring organics in your drinking water facility by means of TOC analysis.
- High uptime and reliability make the analyser easy to incorporate into plant management processes.