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## DRINKING WATER TECHNOLOGIES AND WATER DISINFECTION

# DIGITAL INSIGHTS DELIVER TANGIBLE WATER SAVINGS

By Michael Willer, Director of Water Research, Buckman



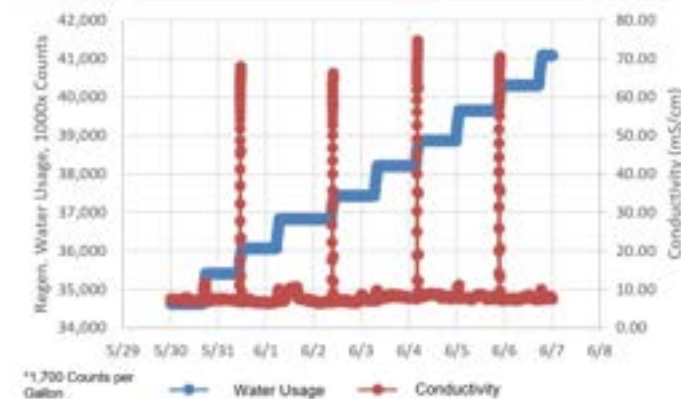
In today's economy, nearly every discussion about the business goals of a particular enterprise will touch on water in some manner. Businesses that consume water for utilities purposes, particularly in the Commercial and Institutional sectors, may be more concerned about water than ever before. Several factors are contributing to this increased attention to water, including corporate sustainability expectations, regulatory restrictions due to drought or conservation efforts, cost of fresh water and disposal, or efficiency initiatives to reuse water and reduce waste. Whatever the reason or combination of reasons, the result is increased attention to water use patterns and pressure to identify opportunities to use less water. At the same time, digital technologies have become pervasive in our world, and the cost has correspondingly decreased to such a point that it is now feasible to monitor potential sources of waste in a light industrial setting. With increased visibility to the water systems, the operational issues that arise in every system are becoming visible and no longer go undetected. The outcome is real insights into the root causes of these issues and recommendations to resolve them, which translates to tangible impact on the business goals of the enterprise.

In this article, a case study is presented in which a water softener was functioning as directed by the operators but with an unseen problem. In fact, if the operators were to be asked about the softener operation, they would have indicated that everything was functioning properly and no intervention was needed. Fortunately, this small chemical manufacturer in the US recently installed Buckman's Ackumen™ Boiler Management system, including a pretreatment monitoring module. It is common in the light industrial market for softeners to be used to pretreat the feedwater in order to remove hardness from the water before entering the boiler. Softeners are also a common source of problems due to maintenance issues, along with the need to keep brine tanks filled with salt. With the other priorities the operators have, the preventive maintenance of their water systems often fall to the wayside until bigger issues arise as a result. The Ackumen Boiler Management system helps fill this gap by monitoring the parameters relevant to proper softener operation and regeneration and alerting the operator only when an issue requires attention.

By monitoring water flow and conductivity during the regeneration cycles (Figure 1), it was readily apparent that the regeneration was occurring daily. Buckman's Remote Services Innovation team observed this pattern and assessed the need in light of the local water chemistry. With a relatively low hardness level in the makeup water, the team determined that the regeneration was happening too frequently. As a result, water and salt were clearly being wasted. In addition, it was observed that the conductivity was not increasing during regeneration of the alternate softener bed (every other day), indicating that it was not introducing sufficient brine. So even with frequent regenerations, the alternate softener bed was not regaining softening capacity. After sharing these findings with the Buckman sales rep and consulting with the customer, two additional consequences were attributed to the frequent regenerations. First, unnecessary load was being directed every day to the onsite wastewater system, thereby increasing the cost of waste treatment. And furthermore, due to the high frequency of brine usage, fines for chloride discharge

were being incurred from the municipality.

As a side note, the Ackumen Boiler Management system highlighted here is also capable of identifying other operational problems. Examples include undercycling the boiler, leading to increased water use and blowdown; regeneration line issues preventing flow of brine to the softener; low or empty brine tank; and other mechanical issues. Each one of these issues alone can result in operational problems of varying magnitude, and most are not immediately apparent when they



happen. Since boilers typically operate continuously, chances are high that problems will happen after hours or when operators are not nearby. The potential for these and other problems exists in every system, and having visibility to the system when they happen and an expert available to respond is extremely important.

For this small chemical manufacturer, a very modest investment in digital technologies, implemented in a system that was not seen as having any problems, delivered multiple benefits and reduced the total cost of operation. In this case, the operator likely set the regeneration frequency to daily just to "be safe" and ensure no hardness entered the boiler in order to prevent scaling and the associated costs. But while that objective was partially achieved, a problem was identified and additional unforeseen costs were introduced as a result of the decision. Without the visibility afforded by Ackumen Boiler Management and the Remote Services Innovation team, the source of these issues and resulting costs would have remained unidentified, and the additional costs of operating in this manner would have continued to multiply.

Implementation of a digital monitoring and control platform with remote visibility is an essential best practice in today's industrial environment. This is true for all of the core industrial water systems, including open cooling systems, closed loops, steam boilers, and reverse osmosis systems. Many decision makers are facing intense pressure to control or reduce operational expenses, which may cause them to make

decisions to forgo investment in such digital monitoring technologies, based on the belief that there will not be a sufficient return in savings to justify the expenditure. However, as the examples in this case study clearly show, the probability of seen and unseen issues occurring in any given water system is high, and these issues invariably lead to an increase in operational expenses. Perhaps most importantly for the light industrial sector, it is also imperative that the remote visibility provided by these platforms be paired with a team of remote water treatment experts who can

identify and respond to the issues observed. In many cases, as in the present case, it does not involve a system alarm. In contrast, the real value comes from a knowledgeable expert proactively identifying operational patterns or data correlations and an ability to understand the consequences. Without these best practices, business owners and operators will forever fall short of their business goals related to water usage, and they will continue to needlessly spend due to operational issues that can be avoided.

### ABOUT THE AUTHOR

**Michael Willer** is the Director of Water R&D at Buckman. He holds a BA in Chemistry from Kalamazoo College, and a PhD in Inorganic Chemistry from Harvard University. He has 22 years of experience in chemical and digital product development in water treatment and cleaning/sanitizing in the industrial sector, including a commercially successful digital IoT platform in the water treatment market.

He was a founding board member of the Alliance for Advanced Sanitation, and has also served as a member of the Household and Commercial Products Association.

To share your feedback or enquire about the author, write to us at [deepak.chaudhary@eawater.com](mailto:deepak.chaudhary@eawater.com)



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