AMS DRIVING INNOVATION WITH REAL-TIME WATER QUALITY DATA AND INTELLIGENT WATER TREATMENT SOLUTIONS

Rick Bacon, CEO, AMS

2019 Overview

Looking back on 2019, it feels like this was the year when the water industry finally began to embrace the value of high frequency, real-time water quality data to guide the design of water treatment systems, validate new treatment technologies, control treatment systems to optimize their use of chemical and energy, and act as a 'canary-in-the-mine' to warn of treatment system failures that put at risk human health and the environment. As a result, online real-time analyzers are being increasingly specified by consulting engineers and end-users into treatment system design, and treatment system vendors understand that the incorporation of this technology affords them the opportunity to offer ongoing value-added service revenues.

In 2019, we also saw the painful consequences of corporate and public utility decisions not to take advantage of the benefits of real-time water quality monitoring when ArcelorMittal, a northwest Indiana steel mill, discharged toxic chemicals violating the legal limits following a failure in its treatment system and contaminating Lake Michigan. Consumers were not spared the consequences of these decisions either when elevated lead levels were found in children's blood in Newark, N.J., as a result of failures in the city's lead corrosion control system. These examples are evidence that there is still a long way for the water industry to go in adopting online real-time water quality monitoring. The regulatory regime could play a part in changing that; however, current regulations, and even proposed regulations (e.g., the proposed revisions to the Lead and Copper Rule in the USA), are still based on traditional laboratory-based analyses that begin with infrequent manual sampling and end with results that are provided many days later by which time the damage has been done.

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Real-Time Monitoring in Action

Despite these pockets of resistance and regulatory inertia, we experienced many successes that served to provide hard evidence of the benefits of wider adoption of real-time, online water quality monitoring.

TRUMPF Photonics, a manufacturer of laser diodes, not only significantly reduced its arsenic (As) treatment costs, but also reduced its net water use in its wafer manufacturing process by 90% through valuable real-time As data provided by AMS' online As monitor.

California American Water, a utility which delivers clean, safe water and wastewater services to 675,000 people, was able to bring back on two well sites with the help of a fully automated, online multi-stream hexavalent chromium Cr(VI) analyzer, which provided the utility with high-frequency real-time data on chromium contaminant levels.

Samsung, the world's second largest semi-conductor manufacturer, adopted AMS' online copper monitoring technology to reduce the lifetime costs of its copper treatment processes.

AECOM and Teck Resources deployed AMS' Cr(VI) monitoring technology in the arduous environment of Northern Canada.

El Paso Water acquired multiple analyzers to control As in its water blending operations that deliver safe drinking water to its customers.

The unique capability of AMS' real-time THM monitoring technology to predict the levels of this carcinogen in both treated water and the potential for its formation from raw water supplies, enabled AMS to maintain its market leadership position in both the USA and Europe, especially in the face of deteriorating water supplies caused by drought and eutrophication.

Micro-Piloting

The water industry traditionally has required new technologies to be extensively tested and demonstrated under field conditions. This is time consuming and highly expensive for an industry where both potential clients and technology vendors are capital constrained. In response to this, AMS developed a micro-pilot approach to demonstrate the performance of its recently developed stannous-based water treatment system. Because this system can be scaled to operate in a laboratory, samples of the water to be treated can be brought to a laboratory and treated under conditions that duplicate those in the field. The same micro-pilot system also can be deployed in the field and be operational within hours. This unique approach has reduced pilot costs dramatically and ensured that public funding earmarked for water quality improvement goes to the end-project and not unnecessary expensive pilot projects.

Lead Monitoring

In 2019, AMS patented a novel approach to lead corrosion risk management in drinking water supplies. This approach combines predictive analytics based on high-frequency water quality analysis to determine when and where there is risk of increased exposure to lead BEFORE contaminated water is consumed (MetalGuard™ LeadAlert™) with rapid high-frequency point of consumption testing of total lead to determine if and when water is safe to consume again.

Finally, although it's never finally or lastly at AMS, much of this report has focused on our products and it would be remiss not to mention the growing recognition of AMS' client support services. The company has remained closely focused on maximizing analyzer uptime given the increasing mission-critical nature of the data its analyzers are expected to deliver 24/7/365. AMS' unique remote "analysis of the analyzers" and their in-built health-diagnostics has continued to receive plaudits from our clients for the value it provides them in terms of continuity of data availability.

2020 Outlook

For the scientists and engineers at AMS, 2020 promises to be an exciting year. We are transforming the way to see water and will bring to market several recent developments and roll out full-scale commercial deployment of them. A number of these innovations are based on the SafeGuard™ H2O, AMS' proprietary on-site stannous generator system. Stannous is a very powerful and versatile reagent with several exciting applications that address a wide range of treatment needs in the industrial, commercial and municipal sectors. Following successful micro-pilots of the SafeGuard™ H2O hexavalent chrome treatment system that have demonstrated the unrivalled effectiveness of the system and its cost competitiveness against traditional systems, we expect to install a full-scale pilot in early 2020 with a number of potential sites already identified.

SafeGuard™ H2O also offers the scope to recover selenium and mercury from industrial waste streams. These toxic contaminants would otherwise have to be disposed of expensively and selenium, in particular, is a valuable non-renewable resource. We are talking to several coal plants and engineers about a micro-pilot as a first step in the validation of this application.

Lead and copper corrosion in drinking water systems that leads to poisoning is a risk to which our society has been made acutely aware by incidents of elevated lead levels in children's blood. Traditional treatment systems and the chemicals they use contribute to algal blooms which prejudice the quality of raw water sources such as lakes and rivers. Stannous, which is far cheaper than these chemicals, does not have the same secondary consequences and can be dosed as and where it is needed, may offer an attractive alternative to them. We also will be seeking to prove applications of a similar stannous system for anti-corrosion treatment of water cooling systems, while this application is well documented in the literature it needs to be realized through practice — something at which AMS excels.

The negative health consequences of exposure to elevated levels of lead in drinking water has received much attention in this review. That should not be a surprise. AMS considers that bio-sensing — monitoring children's blood for lead — has become the default position for detecting lead corrosion. This is not acceptable given the health consequences of elevated lead levels for young people's growth and development. In response to the failure of federal and state lead monitoring programs, AMS expects to begin deployment of its MetalGuard™ LeadAlert™ system in 2020. This system offers a unique approach to reducing the risk of consumers' exposure to lead and we expect to begin demonstrating its effectiveness in early 2020.

The success of AMS is based on the hard work, dedication, inventiveness and determination of my colleagues, the sustained support of our investors, the trust and commitment of our clients and partnerships with leading engineering groups. We look forward to continuing to work with you all in 2020 to achieve sustainable development goals, and in particular, affording wider access to safe drinking water and the mitigation of risks to the environment posed by contaminated industrial effluent.

About AMS

Aqua Metrology Systems Ltd. (AMS) believes real-time water quality analysis and remediation are essential to environmental protection. AMS is a leader in the prediction, control and treatment of disinfection byproducts (i.e., THMs) and trace metals, across municipal and industrial sectors. AMS's online analytical instrumentation provides accurate and reliable data on water quality contaminants through continuous monitoring. AMS's SafeGuard H2O™ is an intelligent water treatment system integrating real-time sensing with an innovative approach for removing trace metals.

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