



Automated Phosphorus Monitoring and Treatment Control

North Las Vegas Puts Advanced Wastewater Treatment to Work

Summary

The North Las Vegas Water Reclamation Facility treats an average of 17 million gallons a day (MGD) of wastewater through an advanced nutrient removal process with subsequent membrane filtration. The utility's process control enables treatment effluent exceeding typical environmental standards and allows discharge to Lake Mead, where it subsequently is withdrawn and fully treated by other facilities for drinking water distribution.

The utility chose a sophisticated automatic monitoring and control solution, the Real-Time Control System for Phosphorus Removal (RTCP) from Hach®, to help optimize treatment and enable efficient water recovery. The solution routinely helps the utility save treatment costs, and it has proved its worth by detecting and correcting a treatment system upset and allowing uninterrupted compliance with the facility's daily total phosphorus discharge limit. Since installation, the system has saved significant treatment costs, including more than a 50% reduction in ferric chloride use.

The Challenge

The North Las Vegas Water Reclamation Facility, which went online in June, 2011, applies a state-of-the-art A²/O™ process for biological nitrogen and phosphorus removal that complements conventional wastewater treatment processes and yields extremely clean, reclaimable water. Ferric chloride, added to polish phosphorus removal after the biological removal process, was based on manual phosphorus measurements made just once daily, during the facility's single manned shift.

"With hot days, the biological process can vary," explained Dave Commons, the utility's Water Reclamation Facility Administrator. "A single daily measurement often didn't identify the correct ferric chloride dosage needed later in the day. A subsequent upset in the biological process would mean too little chemical would be added. But more often than not, we were applying too much chemical."

The Solution

The utility chose to install a Real Time Controller System from Hach, configured to work with the facility's biological treatment process. The RTC-Phosphorus System integrates with the plant's effluent flow measurement and includes a sensor that measures orthophosphate in real time; this sensor is integrated with the platform's sc1000 controller and the RTC-P module that automatically calculates and doses ferric chloride as phosphorus load varies ahead of the membranes. Commons explained that the Hach system provided the monitoring and control configuration that the utility expected it would have to design itself.

The on-site RTC-P system is complemented by Hach's remote monitoring service, which routinely provides reports on system performance. These reports assure the utility of proper platform operation and identify need for adjustment as needed.

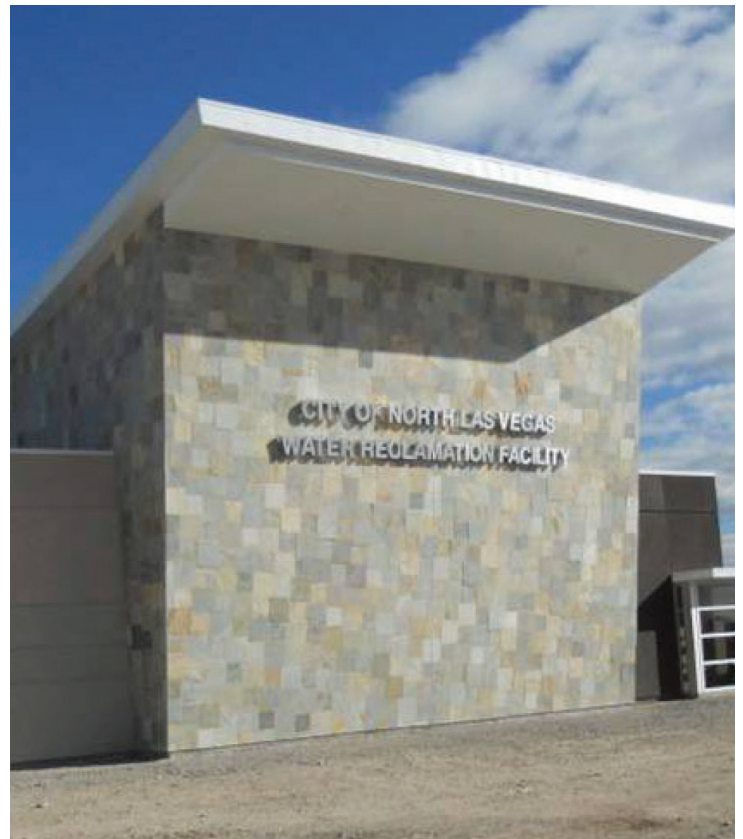


Figure 1: North Las Vegas Water Reclamation Facility tracked ferric chloride dosing prior to and following RTC-P system activation in April, 2013, and the system's response to a biological treatment process upset in June, 2013.

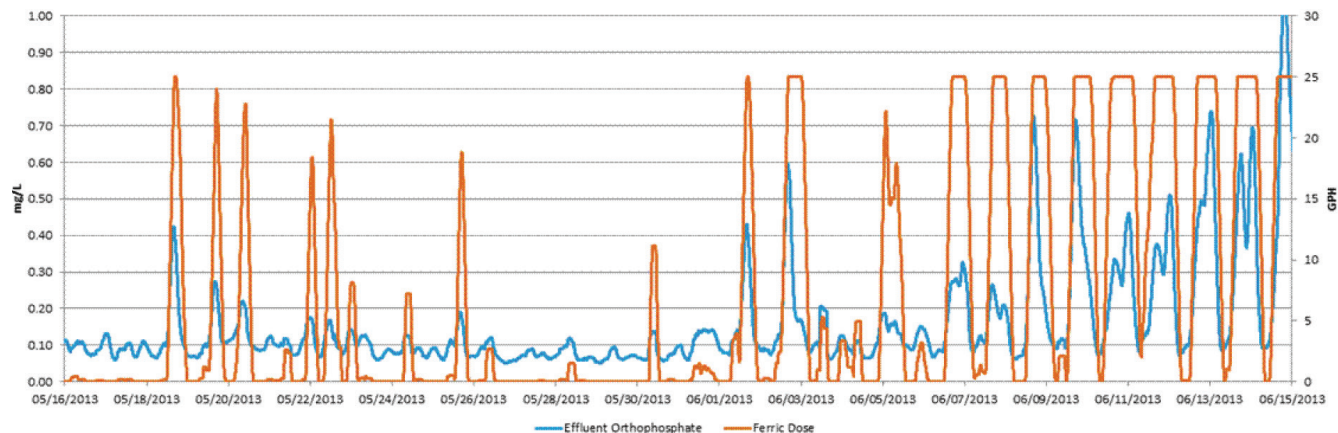
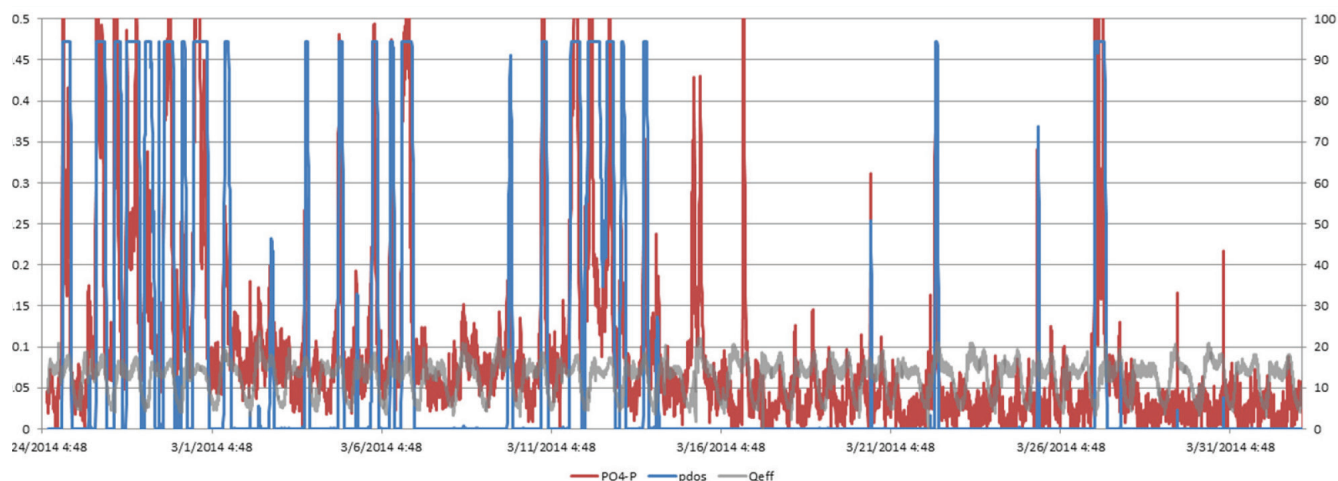


Figure 2: The North Las Vegas Water Reclamation Facility realizes significant ferric chloride cost savings with automatic, real-time dosing adjustments as phosphorus load changes.



The Results

The North Las Vegas Water Reclamation Facility team worked with Hach specialists for a few months to fine-tune the system. However, Commons emphasized that after the system was fully adjusted, this effort certainly paid off. Figure 1 shows the utility's markedly-reduced dosing of ferric chloride after system tuning. When a failure of biological treatment occurred in June of 2013, the system automatically boosted ferric chloride dosing to accommodate the higher phosphorus loading and avoid discharge violation.

"We were dosing at 800 gallons or more per day," stated Commons. "Now, we're often using less than 200 gallons a day—even as our permitted average daily phosphorus load is being lowered. It's not a stretch to conclude that, as of April, 2014, this real-time solution has paid for itself."

He added, "We are extremely proud of this treatment facility. The RTC-P System provides state-of-the-art monitoring and control that reflects our high goals of water protection."



World Headquarters: Loveland, Colorado USA | hach.com

United States 800-227-4224 fax: 970-669-2932 email: orders@hach.com
Outside United States 970-669-3050 fax: 970-461-3939 email: int@hach.com

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DOC043.53.30733.Dec21