

RTC-ST Adjusts Coagulant Dosage, Lowers Operating Costs While Controlling TSS and pH Levels

Problem

A wastewater treatment plant in a large dairy facility was looking for ways to reduce chemical coagulant costs and labor to monitor and operate the dissolved air flotation (DAF) unit.

Solution

The Hach® Real-Time Control for Sludge Thickening (RTC-ST) solution offers real-time coagulant analysis and optimises dosage. This allows the facility to monitor and remove solids without over-dosing coagulant in the DAF.

Benefits

RTC-ST helped this facility control its chemical costs and help them reassign some of their utilities mechanics' and operators' time to more productive tasks.

Background

Like many dairy processing facilities, this one uses a DAF to remove protein, fats, oils, grease and suspended solids from the wastewater stream. DAF operations use chemical coagulant and flocculant to increase solid particle size. Micro-bubbles attach to the particles, causing the suspended solids to float to the surface where they are skimmed off. This process clarifies the process water before it is discharged to the city utility.

This dairy facility processes nearly 2.3 million litres per day at their on-site wastewater pre-treatment plant (WWTP). Before installing RTC-ST*, the WWTP operator working the overnight shift made manual adjustments – based on visual observations and readings from a Hach Solitax probe – to manage effluent total suspended solids (TSS).

WWTP Challenges

One challenge is that the pH levels have to be within their wastewater discharge permit. This presents a challenge because the chemicals that help control TSS also reduce pH levels. Their sewer bill is tied to the flow, BOD and TSS levels of the effluent they discharge, so treating and balancing these parameters more efficiently could have a real impact on the bottom line.



Figure 1: Hach Real-time Control for Sludge Thickening (RTC-ST) installed to help monitor and adjust chemical treatment, pH level and flow in a dairy facility's wastewater treatment plant.

*Hach has also developed an **RTC-DAF** solution, built on the same proven technology as the RTC-ST described here. The RTC-DAF module features expanded functionality beneficial for managing a DAF for greater efficiency, process visibility, and cost savings.

Learn more at [Hach.com](https://www.hach.com)

Operational Challenges

Besides the overnight operator for the WWTP, the maintenance manager often had to ask other personnel to spend time away from their core responsibilities to check the DAF operation during the day. Even though they wanted to keep a lean staff, the facility was considering adding operators to the WWTP as a last resort if RTC-ST didn't meet its needs. "We were looking at continuing the status quo of running a manual system. We were talking about hiring another DAF attendant," says the Maintenance Manager.

Solutions & Improvements

To help ensure proper TSS and pH levels while reducing operator workloads, the facility looked for a solution that decreased grab sample testing and manual analysis. In conjunction with their chemical supplier, a Hach RTC solution was recommended. After an onsite trial, during which Hach engineers made adjustment to meet performance requirements, the facility was able to validate a reduction in coagulant dosing and decided to install the RTC-ST permanently.

Integrating seamlessly with the facility's HydroCal DAF, RTC-ST measures TSS, pH, and flow of equalisation tank effluent along with TSS in DAF effluent in real time. This improves on the prior methods of visually measuring TSS. Real-time control delivers significantly faster analysis than using weekly or monthly samples from the independent lab, eliminating the need to overestimate coagulant dose to keep TSS and pH levels in check. "It has helped keep us in compliance," says the Maintenance Manager. "We haven't had any issues since it has been running consistently."

RTC-ST includes an algorithm to reduce coagulant dose as pH drops. RTC-ST works in concert with the Solitax and pH probes to ensure both TSS and pH levels stay within limits. For example, since this facility must keep pH compliance levels to meet the parameter within their wastewater discharge permit, RTC-ST automatically doses coagulant to maintain TSS levels unless the pH probe measures a dip in pH below a set amount. If this occurs, RTC-ST is programmed to subtract 20% coagulant dose for every tenth of a percent the pH drops, allowing pH levels to equalise. These measurements occur continuously, offering a real-time measurement solution.

Real-time control allows the facility to operate the WWTP with minimal oversight from dayshift utilities mechanics. Even the overnight operator can spend more time on preventive maintenance. With the help of Hach support staff and Prognosys, a predictive diagnostic system included in the RTC-ST, the facility is alerted if instrumentation requires maintenance.

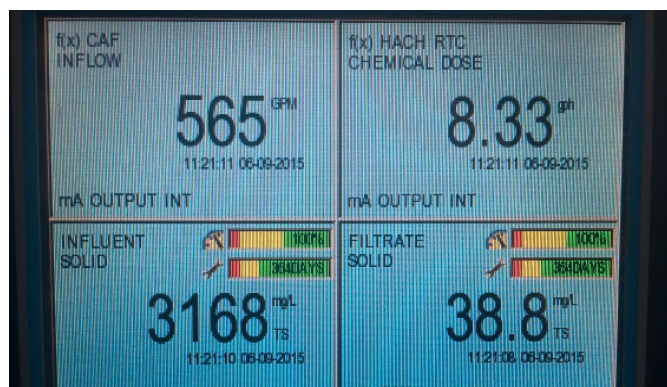


Figure 2: Real-time control automatically balances TSS requirements with pH level limits, eliminating the need for manual measurement and dosing.

Conclusion

This plant is so committed to efficient operation it earned the National Food Recovery Challenge Award for Innovation from the EPA in 2015. RTC-ST allows the plant to meet the local utility's requirements stated in their wastewater discharge permit while lowering coagulant dosage and operating costs. After just a few months of operation, the WWTP is seeing reduced chemical costs, improved utility billing, and optimised operations. The Maintenance Manager comments, "I would think anybody running a DAF type system would benefit from it."