

Automated Cl₂ & SO₂ Feed Allows Treatment Plant To Maintain Compliance, Reduce Chemical Costs

Challenge

Longtime problems with disinfection and dechlorination operations at the Stuttgart Wastewater Treatment Plant in Stuttgart, Ark. had resulted in chronic violations for exceeding both fecal coliform and chlorine residual limits in the facility's final effluent. The 4.5 million gallons per day (MGD) Stuttgart facility is a trickling filter plant that serves a population of 10,000 as well as two major industries that contribute combined loadings equivalent to another population of 10,000. The plant flow receives primary treatment then enters two trickling filters, two intermediate clarifiers, a biotower, final clarifiers and sand filtration prior to chlorination and dechlorination.

Chlorine (Cl₂) and sulfur dioxide (SO₂) dosage control at the plant was performed through flowpacing, with operators manually adjusting dosage rates based on periodic chlorine residual testing. But this approach was not effective because the chlorine profile and chlorine demand constantly change in a continuous flow system. As a result, SO₂ feed was sometimes too low to achieve proper dechlorination. This created undertreatment situations where chlorinated water exceeding 0.1 mg/L was discharged, bringing excess chlorine violations. Chlorination was also erratic under the flowpace system, resulting in undependable bacteria kill rates (exceeding total fecal coliform mpn/100 mL) and expensive fines. "We could not keep the plant in compliance," says Plant Operator Tommy Lawson. "We would finally get our fecal levels under permitted levels, and then we'd go out of compliance on residual chlorine."

Solution

A Strantrol® 900 Controller from USFilter Stranco Products was installed at the Stuttgart facility in August 2001.

- Utilizing High Resolution Redox® (HRR) technology, the Strantrol Controller provides automatic, demand-based control of chlorination and dechlorination, matching feed to demand and treating the system with only the chemical dosages required to maintain consistent compliance.

Results

Each channel on Stuttgart's three-channel controller is programmed with a predetermined HRR setpoint that corresponds to the disinfection or dechlorination value required to meet the plant's discharge limits. The Strantrol system monitors both the oxidant and reductant demand in the water and automatically modulates the required amount of Cl₂ and SO₂ required to meet chlorine residual and fecal coliform limits in the plant effluent.

- If flow rates increase or decrease, the controller continues to respond accurately, accounting for changes in flow rate while maintaining accurate control. The unit automatically goes into alarm mode if HRR readings fall out of the setpoint range.
- Because the controller continuously modulates dosage according to actual oxidant and reductant demand, underfeed and overfeed situations were eliminated, allowing the Stuttgart plant to finally maintain compliance.
- The adoption of demand-based chlor/dechlor operations also reduced Cl₂ expenditures by half and SO₂ usage by more than 25 percent. "Since becoming fully on-line, the Strantrol controller has provided us continuous, accurate chlorination and dechlorination control," says Lawson. "We are now consistently in compliance for both disinfection and chlorine residual. And our savings on Cl₂ and SO₂ should pay for the unit in two to three years."