

ChemScan®

PROCESS ANALYZERS

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ChemScan® Application Summary #83 Dechlorination Control in Chloraminated Wastewater

The Problem

Chlorine is the most widely used disinfectant today, however, the release of chlorinated water into sensitive waterways can be detrimental to aquatic life. Regulations have mandated that the chlorine be removed prior to discharge into a receiving waterway. Most dechlorination processes use a reducing agent such as sodium bisulfite or sulfur dioxide to neutralize the chlorine in the water. A simple treatment process would add excess reducing agent to the stream to insure a complete removal of the chlorine. However, these reducing agents are themselves undesirable because they contribute to BOD₅ in the final effluent. The excess reducing agent will consume dissolved oxygen, potentially affecting the aquatic life. The ideal process would add only enough reducing agent to remove the chlorine.

Some plants have attempted to control Dechlorination using an ORP sensor, but such sensors have proven to be inaccurate due to the many chemicals that can contribute to an ORP value and the need for constant maintenance. Other attempts at control use chemical analyzers, but the reagents used in this earlier technology are readily oxidized and subject to rapid deterioration.

The Process Control Strategy

A typical control strategy is the feed forward strategy which requires a measurement of the chlorine residual prior to agent feed. If flow is a variable, a flow rate measurement may also be needed.

The feedback control strategy is for feed of a dechlorinating agent based on the target effluent chlorine residual. This is difficult to do without some estimate of the feed rate required to achieve steady state operation and also requires analysis of the effluent chlorine residual at very low concentration to control the dechlorinating agent feed pump. A variation of this strategy is to maintain a small but measurable residual of the reducing agent in the final effluent, which requires accurate analysis of this chemical.

The Solution

ChemScan has a special product, the **UV-2150/DC** for this application. The analyzer can detect chlorine residual at a post disinfection sample point at high concentration and detect chlorine and dechlorination chemical residuals at concentrations down to 0.005 ppm at the post chlorine removal sample point.

Chlorine is detected using a modified idiometric approach with multiple wavelength detection of the iodide to iodine conversion, while dechlorination agent is detected by measuring an applied disinfectant residual compared to a baseline. Unlike other analyzers, the ChemScan system compensates for reagent deterioration by measuring a baseline during every analysis cycle, resulting in low maintenance and stable operation.