

Case Study

Reagent-less Chlorine Analyzers

An Effective Solution for Water Treatment Plants and for Distribution

Background

The City of King Water Treatment Facility is a conventional water treatment plant located in Tobaccoville, NC. The plant treats up to 3 million gallons per day of Yadkin River water, and has inground storage tanks, onsite and at the booster station, totaling 6 million gallons. The distribution system extends some 40 miles, and includes additional storage in four remote water towers, serving approximately 25,000 customers. Sodium hypochlorite is fed as the disinfectant. Residual Free Chlorine levels of 2.0-2.5 mg/L are targeted as the water leaves the plant. Free Chlorine out in the distribution system typically ranges from 1.0 – 1.8 mg/L. Maintaining these levels ensures the delivery of safe drinking water to area residences and businesses.

In 2016, based on a successful trial of the technology, the King plant made the decision to replace their online colorimetric DPD (diethyl-p-phenylene diamine) chlorine analyzers. They opted to purchase a Chemtrac reagent-less chlorine analyzer. The new analyzer eliminated the need for monthly chemical reagent changes, and periodic tubing replacements, both of which proved to be quite costly over the long term. The reliability, accuracy, and ease of maintenance of the Chemtrac analyzer convinced the King plant to eventually purchase a total of five units: four for the WTP, and one for the booster pump station. All five of the units were connected to the SCADA system, and the sodium hypochlorite feed system was optimized with automatic feed control based on the chlorine analyzer results. So now, at any given time, the operators in the control room can monitor the current chlorine levels in the plant, as well as the sodium hypochlorite feed system settings.



Chemtrac chlorine analyzer remote installation next to distribution system water storage tank.

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Distribution System Chlorine Residual Monitoring Challenges

While the situation with online chlorine monitoring at the WTP was greatly improved, the plant operators were still needing to drive to each of the towers and conduct daily manual chlorine tests on water samples. This significant investment in operators' time only produced one daily data entry for these remote sample points. So, in 2020, there was an initiative to install chlorine analyzers in the distribution system at each of four remote water storage tanks for continuous real-time monitoring. However, one obstacle was that there was not an available power source at each of the distribution storage locations.

Solution

The water plant approached Chemtrac about a remote chlorine analyzer solution. Because they had several years of experience with the Chemtrac analyzers' reliability, and realized the minimal maintenance requirements and proven accuracy, they decided on these as a dependable choice for remote monitoring. And to make things even simpler, Chemtrac was able to provide a 24 VDC option that allowed the analyzer to work off a solar panel and battery power source.

Dorsett Controls, the SCADA system provider for the King WTP, came up with the solar panel with battery backup solution, as well as a telemetry solution to transmit the data via a GSM cellular modem connection. The Chemtrac unit was incorporated into that power and data transmission system.

Now two of the storage towers have remote chlorine analyzers that report to the SCADA system. At any given time, operators can access current telemetry data (pressures, tank levels, etc.) and current free chlorine results (0-5 mg/L) for those locations. Likewise, the plan is to have similar systems installed at the two remaining remote towers in 2021.

Conclusion

The City of King WTP operations team continues to pursue excellence, and provide the best water for their customers. As they look for ways to better optimize their water treatment processes, they include Chemtrac as a trusted provider of quality instrumentation solutions.



The chlorine analyzer (lower left) is powered by a solar panel located on the top of the tank.