The city of Clarksville, Tenn., was recently rated the ninth-fastest growing city in the U.S., with a population of just over 120,000 people located approximately 40 miles north of Nashville, Tenn.

The Clarksville Gas and Water Department (CGWD) is a municipal entity that provides Clarksville’s gas, water and wastewater services. CGWD services approximately 50,000 customers and maintains more than 200 wastewater pumping stations.

The city has utilized calcium nitrate to control hydrogen sulfide odor in its wastewater collection system since the early 1990s. Staff has always used the conventional dosing method of one constant-rate pump feeding the same rate 24 hours a day. At some sites, a second timer-controlled pump increases the dose rate during peak demand periods. Like most other wastewater systems, CGWD has generally been able to achieve adequate levels of odor control using this method.

However, as with many other wastewater systems, increases in the size of its collection system and increases in chemical prices have inflated chemical budgets to the point where the group is now looking for alternative technologies to provide effective odor control in a more cost-effective manner. One of the new systems that has been evaluated is the American Control Technologies (ACT) automated dosing system, a proprietary, patent-pending system that applies odor control chemicals in response to the system demand rather than at a continuous, set dose rate.

Sugar Tree No. 1 Pumping Station

In 2007, AWS installed an automated dosing system at the Sugar Tree No. 1 wastewater pumping station in Clarksville. For several days prior to the startup of the system, the city’s existing system was monitored, sampled and optimized. The optimal dose rate for odor control utilizing the city’s conventional system was determined to be 30 gal per day of calcium nitrate.

The new system was then started up. After four days of hydrogen sulfide monitoring and dose rate optimization, the optimal dose rate was determined to...
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Combined savings for both the Sugar Tree No. 1 site and the Sherwood Forest pump station have been approximately $38,000 per year.

be approximately 15 gal per day (gpd) of calcium nitrate. The criteria used at the odor monitoring point was less than 0.1 ppm sulfide with nitrate residual of 5 ppm.

All monitoring and sampling was done simultaneously by AWS and the city. The results of this study show that optimizing odor control chemical dose rates utilizing the ACT automated dosing system can reduce chemical consumption by as much as 50%. The 15-gpd savings seen at the Sugar Tree No. 1 site equates to an annual savings of nearly $11,000 per year.

Sherwood Forest Pumping Station

Following the success of the system at Sugar Tree, the city requested that a second ACT unit be installed at the Sherwood Forest pumping station. Using the same criteria and methodology used for the Sugar Tree No. 1 site, it has been determined that Clarksville has saved an average of 35%, equating to approximately 40 gpd. The 40 gpd at this site equates to an annual savings of approximately $27,000 per year.

Looking Ahead

The city has been very pleased with the new automated dosing systems and is planning to trial the system at several other sites. Clarksville is also planning to use the ACT system in tests with alternative chemicals to calcium nitrate.

“I have been in the odor control business for almost 10 years, and I never expected to treat these levels of hydrogen sulfide with this low of a dose rate of chemicals,” said Mike Crawford, wastewater collection system analyst for the city of Clarksville. “With odor control chemicals, you have a theoretical dose rate and you have the real world dose rate. With the ACT system, I am seeing dose rates down near the theoretical rates.”

It is estimated that the city will save several hundred thousand dollars per year with the system when it is installed in all 20 locations.

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