

## City Improves Reliability for Chlorine Residual Compliance, and Cuts Chemical Costs, through Replacement of Pump System with Special Vacuum Feeder System for Bleach, LAS, and Polyphosphate

*Also Gains Greater Feed Accuracy, Less Operator Attention, Enhanced Safety Margin, Reduced Apparel Costs*



Replacement of problematic peristaltic pump system with special liquid vacuum feeder system for bleach, liquid ammonium sulfate (LAS), and polyphosphate feeds provided improved reliability for maintaining required minimum chlorine residual throughout booster-pumped distribution network.

The public works director responsible for a southwestern U.S. city's drinking water supply reports multiple benefits from replacement of a problematic peristaltic pump system with a special liquid vacuum feeder system for bleach, liquid ammonium sulfate (LAS), and polyphosphate feeds at one of its well sites. In particular, he notes improved reliability for maintaining required minimum chlorine residual of 0.5 mg/L, as far as about 12 miles from well sources in the city's 480 mi. drinking water distribution network.

He also notes the replacement unit has cut chemical costs by 34%, saving about \$9000 annually; provided for greater chemical feed accuracy; allowed for enhanced safety margins against hazardous leaks; and reduced the excessive cost of worker apparel replacement.



New feed units are connected to the facility's SCADA system, unlike the previous setup, so that automatic alarm functions are now in effect. Replacement system has also cut chemical costs by 34%; provided for greater feed accuracy; allowed for enhanced safety margins; and reduced cost of worker apparel replacement.

“When pumping bleach with the diaphragm unit, we had a tendency to get air-bound, and we also had dry rot of hoses that caused leaks,” he explained. “Either or both failures could lower the residual we’re working to get from the bleach and LAS feeds, as well as the sequestration of iron and manganese we need to get

from the polyphosphate feed. The leaks also exposed operators' clothing to bleach to the extent that we had significant extra cost for apparel replacements."

"Meanwhile, we now also have much tighter feed accuracy, deriving from the technology of the new system, so we can use less chemicals, while keeping the ratio we need between bleach and LAS. And we have a much better margin of safety against hazardous major leaks, in keeping with our pro-active operations and maintenance philosophy, while keeping up with our customers' high aesthetic expectations."

At the well site, the Class 2 Operator added that the new unit requires much less attention.

"There's a lot less time messing with the vacuum unit," he said. "For example, with the diaphragm, we had to monitor the bleach and LAS ratio with a draw down tube. Now that's all done electronically, so we can get more monochloramines, and minimize disinfection byproducts like trichloramines."

The new feed units are now connected to the facility's SCADA system, unlike the previous setup, so that automatic alarm functions are now in effect. Operators' daily rounds include taking readings on monochloramines, free chlorine, and free ammonia. A percentage of end-of-line readings are taken daily throughout the distribution system.

The new system feeds bleach @4.3 gph; LAS @0.86 gph; and polyphosphate @0.325 gph. Production from the well, driven by a vertical turbine pump, ranges from 1-1.5 MGD. Regulations for chloramines and free residual are from the state environmental commission.

The public works director said his selection of the new feeder setup derived from his previous experience with a vacuum feeder representative.

"Before I had this position, in previous water plant experience, I had good results working with Brian Whitmore and the vacuum feeders he was representing at the time, including bleach feed, and his strong commitment to making them work," he recalled. "I knew he had gone on to develop the technology further, so I sought him out. We started up the new system from Brian's company last January, and have had very good results."

Whitmore is now president of JCS Industries, Inc. of Spring, TX, which he founded in 2002 as a product development company charged with developing an alternative to the current vacuum feed liquid doser technology. Its original product was the patented liquid feeder now in use at this city, among about 1000 other installations. The company has diversified to offer related products, including for gaseous chemical feeds.

JCS chemical feeders utilize real-time feed information, via electronic flow sensors that allow for continuous monitoring and control of the chemical feed rates. Each feeder automatically regulates in both fixed and variable control modes, including fixed feed rate, flow paced, residual control, and compound loop. The feeder system can dose a variety of aqueous chemicals commonly used in municipal and industrial water treatment systems.

The feeder system is comprised of a vacuum injector to safely introduce the liquid into the feed-water stream; a reversing servo motor coupled with a V-notch valve to regulate the chemical feed rate; an electronic flow sensor to monitor and regulate the feed rate; and a control module for complete electronic control and communications.

A facility's water flow rate, and/or a chemical residual signal, are used to adjust the chemical liquid flow rate by electronically positioning the servomotor driving the feed control valve. The ratio of input signal to liquid flow is adjustable over a range of 5% to 400% to enable increased liquid feed in response to additional chemical demand. US Patents have been received for the all-vacuum liquid feeder, which can dose up to 60,000 gal/day.

For further information, contact JCS Industries, 5055 FM 2920, Spring, TX 77388, Tel. 281-353-2100, Fax 281-353-0657, sales@jcsindustries.us.com, www.jcsindustries.u.s.com.

*\*Catalytic Objective Synthesis™ newsletters, reported independently by Cliff Lebowitz, are sponsored by technology vendors who allow for objective reporting based on interviews of their customers and their engineering firms, who in turn provide review and approval for accuracy and completeness. Titles and headlines are created to help readers recognize solutions for problems and needs, typically related to issues such as quality, reliability, efficiency, and compliance. Circulation and distribution are customized for each newsletter.*