Efficient **Chemical Delivery**

By Gary Rose

North Carolina water plant adopts peristaltic pumps to reach WaterSense goals

Over the years, the U.S. Environmental Protection Agency (EPA) has offered voluntary partnership programs to address a wide variety of environmental issues by working collaboratively with companies, organizations and communities. There are now more than 13,000 groups participating in EPA Partnership Programs, according to the EPA website. One of the most highly recognized EPA programs is WaterSense.

Launched in 2006, this is a partnership to save water and protect the future of our nation's water supply by implementing water-efficient products, services and practices as specified by the EPA guidelines. Many local water utilities have joined the WaterSense partnership as a way to promote high water standards throughout their communities. There are only a select few water plants that are able to achieve the partnership program's highest level of standard: Level 4.

The Orange Water and Sewer Authority (OWASA), which operates the Jones Ferry Water Plant (JFWP) in Carrboro, N.C., is one utility company that is on the cusp of obtaining such a distinction. The Level 4 standard is based on several factors associated with providing the cleanest water in the most efficient manner. One of these factors is the measurement of turbidity in the treated water.

The new pumps at JFWP maintain precise amounts of potassium permanganate.

Potassium Permanganate Precision

The JFWP, like many other facilities in this part of the country, faces a unique well water problem. The natural occurrence of high levels of oxide iron and magnesium creates a yellowing effect within the water, and this effect is reflected on turbidity readings as dirty water. OWASA's objective is to eliminate the yellowish color by adding and maintaining the precise amount of potassium permanganate.

The JFWP had been using a diaphragm pump for potassium permanganate dosing for the past several years. The recent technical advancements of peristaltic pumps, however, have proven to provide a more consistent flow rate than a diaphragm pump with less maintenance for chemical feed applications. Within the last two years, the plant has converted most of its chemical feed applications to the Blue-White Industries Flex-Pro A3V peristaltic pump, replacing the existing diaphragm pumps.

The new pumps have been installed in three critical injection stages: low-pressure sodium hypochlorite, high-pressure sodium hypochlorite and low-pressure fluoride. The technology has delivered accurate and constant flow rates with virtually no downtime. The Flex-Pro A3 tube life on the fluoride injection is lasting 9,500 hours, running 24/7 at less than 15 psi. The tube life on the sodium hypochlorite flash mixer consisting of 10 pumps is lasting 7,000 to 7,500 hours, running 24/7 at less than 15 psi. The tube life on the sodium hypochlorite post mixer is lasting 1,500 to 1,700 hours, running 24/7 at a pressure of 80 psi.

JFWP's plant manager decided to switch out the existing diaphragm pump on the potassium permanganate feed for a peristaltic pump. The feed rate of

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84 gal per hour (gph), however, greatly exceeded the feed rates of the Flex-Pro A3. As a result, two other competing peristaltic pump companies offered to test their higher-output pumps in the application. After just eight days of testing, the tubes failed on both the competing peristaltic pumps, running 24/7 at less than 15 psi and pumping 84 gph. Meanwhile, Blue-White prepared to introduce its Flex-Pro A4 higher-output peristaltic pump.

Testing of this new product began on June 1, 2010, in the aforementioned application pumping potassium permanganate. The A4 peristaltic pump continues to pump with the same tube more than three months after the initial start. It appears that the new peristaltic pump is emulating the success of its predecessor pump.

Technology Comparison

The key differences between the Flex-Pro model and other competing models are the roller assembly and the tube specifications. The former models offer a four-roller assembly, two guide rollers and two squeeze rollers. Other manufacturers offer a three-roller assembly. Each tube used with the Flex-Pro is made in accordance with Blue-White's rigid specifications. These are advantageous features that affect tube wear, as demonstrated in the JFWP application.

The A4 model offers the same benefits as the A3 model, with the exception of the output capability. While the A3 pump is limited to 33 gph, the A4 pump has a range of up to 158 gph. Both pumps are rated at 125 psi and have a motor speed adjustment range of 2,500:1. Other significant similar features of the two models are: NEMA 4X enclosure (IP66), 30 ft of maximum suction lift, continuous duty cycle, SCADA inputs, non-maintenance brushless motor, tube failure detection system and the ability to inject at maximum pressure in either direction (clockwise or counterclockwise).

Coordinating for Efficiency

JFWP's use of these peristaltic pumps has contributed greatly to its water quality enhancement by reliably and consistently delivering vital water treatment chemicals. This increased efficiency is a key attribute to the EPA's WaterSense program. The future of U.S. water supplies will be better managed with coordinated efforts of companies and organizations such as Blue-White Industries and the OWASA. PS

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