AcuFlow Case History: Pumps' Chemical Resistance, Simple Design Help Reduce Downtime at Trinity River Water Plant

The Trinity River Authority's Huntsville, Texas, Regional Water Supply System (HRWSS) provide six million gallons per day of portable water to 28,000 area residents. Each day, 330 gallons of alum are added to incoming river water to remove mud and suspended solids, along with 200 gallons of 50% caustic soda to raise the water's pH level.

In the past, the corrosive nature of the chemicals caused significant problems in the plant's metering pumps. Chemical incompatibility caused pump heads to crack, increasing downtime and driving up costs for maintenance and replacement parts.

In September, 1981, Trinity River took steps to solve this problem by switching to Cheminjector-D diaphragm metering pumps made by AcuFlow (formerly Hydroflo) of Irvine, CA. Today, the pumps are still providing good performance, while requiring only minimal maintenance. According to Keith Coogler, maintenance supervisor at HRWSS, "The Hydroflo pumps' chemical resistance has had a definite effect on plant downtime. For example, the check valves in our old pumps had a significant chemical incompatibility problem.

The chemicals we use have a tendency to crystallize in cold weather. If the pump isn't stroking fast enough, crystals can form and prevent proper check valve seating. And since our old pumps could only run at 25 to 30 strokes per minute, crystallization was a always a problem.

The Cheminjector-D pumps, on the other hand, run at around 96 strokes per minute. This keeps the chemicals from crystallizing, so the ball valves can seat the way they're supposed to."Modifications to the pumps have allowed HRWSS to adapt the pumps to its particular specifications. In the pumps used for caustic soda, TRA replaced the electric motor with an air motor for greater turndown. This lets them overdrive the pumps, for capacity that's greater than the pumps original specifications. "We're getting nearly 200:1 turndown, reducing standard rpm from 1800 to less than 180 rpm. It gives us greater control over capacity without really changing the stroke length."

The Huntsville Regional Water Supply System currently has four Cheminjector-D pumps at its facility: a simplex and a duplex unit for alum injection, one simplex unit for caustic soda, and one simplex unit that's kept on standby for general service.

"We need greater capacity for alum injection to accommodate rapid increases in turbidity that can occur in heavy run off. After a storm, turbidity can go from the

tens to several hundred in only a couple hours. The duplex unit lets us handle that." The Hydroflo pumps inject 13.7 gallons per hour of alum, and 8.3 gallons per hour of caustic soda. Pump capacities can be adjusted from 0-100 percent at anytime, even during operation. A built-in automatic reset relief valve also protects each pump against system blockage. It also eliminates the need for external relief valves, and prevents damage caused by system over pressurization. Large free-volume, straight through flow ball check valves assure non-clogging operation. The drive of the pump is also fully enclosed to prevent dust, chemicals, and the elements from reaching critical operation components.

All drive parts are also oil-immersed, eliminating the need for regular lubrication and providing long-term, low maintenance operation. Although the pumps have required some maintenance during their many years of service, the biggest advantages have been their long life and low mechanical maintenance. "The simply, durable design of the Cheminjector-D pumps has had an impact on operations here. Our old pumps had three times as many parts, so there was a lot more to go wrong.

The Cheminjector-D pumps have a more simplistic design, so repairs go quickly, when they're needed. As a result, we can keep downtime to a minimum. All in all, we're getting better performance than we did before, under the same type of conditions."