

No Longer Singing the Blues - Composite valves incorporated into Blue Plains Advanced Wastewater Treatment Plant outperform expectations while helping improve operations

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The Blue Plains Advanced Wastewater Treatment Plant, operated by the District of Columbia Water and Sewer Authority (WASA), is the world's largest advanced wastewater treatment facility.

The Blue Plains facility treats wastewater from two million people and a large number of businesses located in a service area that includes the District of Columbia and major portions of Maryland's Montgomery and Prince George Counties, and Virginia's Fairfax and Loudoun Counties.

The Blue Plains Advanced Wastewater Treatment Plant's total plant capacity exceeds a billion gallons of water a day. Its National Pollutant Discharge Elimination System (NPDES) permit requires peak full-treatment flow rates of 740 mgd for up to four hours and continuous peak full-treatment flow of 511 mgd. In addition, up to 336 mgd stormwater flow must receive partial treatment. According to the plant's officials, these levels of required treatment are some of the most stringent in the U.S.

Ultimately, treated wastewater is discharged into the Potomac River. Organic biosolids generated from treated solid waste are applied to agricultural land in Maryland and Virginia.

Currently, the Blue Plains Advanced Wastewater Treatment Plant is undergoing a 10-year, billion-dollar capital-improvement program to ensure compliance with its NPDES-permit requirements.

Valve Malfunctions

Even before the massive plant upgrade began, existing control valves were not properly functioning.

"We were using PVC valves for chemical applications at WASA," said Reggie Kornegay, a mechanical engineer with WASA's mechanical maintenance department for two years. "The PVC valves did not meet specified criteria and were unreliable. They were not very sound and certain components lacked chemical resistance."

"One problem was that when we tried to turn the old valves, the operators would break off," Kornegay said.

Unfortunately, this was often the case as operators frequently would break the first time they were used. When an operator breaks while workers are attempting to divert chemicals to a different line or tank, it can create a leak and cause a problem. When the backup valve also fails, problems are compounded. After a valve failure that involved chemicals, WASA began to search for a valve that would meet the needs of the Blue Plains applications.

"One of our contractors located a Nil-Cor representative," Kornegay said.

A meeting took place with the contractor—an environmental services provider—and E. J. Monahan, president of Coastal Technical Sales, the area distributor of Nil-Cor advanced composite valves. The Nil-Cor ball valve was described by Monahan as "substantial, beefier" than the existing PVC valves.

“We tried the valves on chemical lines in a variety of areas, including sodium hypochlorite lines,” said Kornegay. WASA tested both lever- and actuator-operated the recommended ball valves for six to 12 months.

New Valve Passes Test

WASA proceeded to install Nil-Cor 310-Series and 410-Series glass-fiber-reinforced flanged ball valves in a number of applications and areas throughout the plant, including its disinfection facilities and chemical building.

In the course of upgrading the plant, WASA wanted to alleviate vital chemical-handling and safety concerns. Liquid/gaseous chlorine and sulfur dioxide were shipped to Blue Plains Advanced Wastewater Treatment Plant in 90-ton rail cars for use in disinfection and dechlorination operations. The plan was to use less volatile chemicals, liquid sodium hypochlorite (bleach) and liquid sodium bisulfite. “We are installing the new valves in any area where corrosive chemicals are in use,” Kornegay said. “We feel comfortable that the valve will work, and help alleviate serious hazards” in the plant.

The new 410-Series polysulfone valve, designed and manufactured specifically for sodium hypochlorite and troublesome caustic applications, was specified for WASA chemical installations.

The environmental service provider described the manufacturer’s advanced composite ball valves as “durable, heavy duty, chemical resistant, high quality and well built.”

Kornegay is also satisfied with service provided by Nil-Cor.

“Manufacturer representatives call or stop in about once a month to see if we need anything,” Kornegay said. “They promptly return our calls, too, and address any issues that arise.”

After the new valves were installed, it was determined that some valves required titanium bolts rather than the standard stainless steel bolts. When WASA needed service, a manufacturer official visited the plant.

Thousands of bolts were promptly delivered to rectify the situation.

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