



Six high-efficiency bandscreens with washers and compactors are at the heart of the new headworks facilities. They are completely housed and the flow channels are covered to contain and collect odors for treatment. Flow channel concrete surfaces are coated to prevent corrosion.

Missouri River Treatment Plant Gets Greener in a \$40 Million Makeover

People who live in northwestern St. Louis County in Missouri are finding that the air smells a little fresher these days. For that, they can thank the \$40 million upgrade and expansion recently completed at the nearby Missouri River Treatment Plant, one of seven wastewater treatment plants operated by the St. Louis Metropolitan Sewer District (MSD).

Odor control, however, was just one of several challenges in recent years to test the 28 million-gallon-per-day (MGD) plant, which serves four watersheds in an expansive stretch of west and northwest St. Louis County since the 1980s. The MSD retained Burns & McDonnell to plan and design the plant replacements and upgrades, which were implemented in a three-year construction process that ended in early 2010.

Challenges

Operating for more than 20 years in a corrosive environment can take its toll on the concrete structures and equipment in a treatment plant's headworks, where wastewater is diverted into the plant. Screens intended to block inorganic material were allowing significant amounts of trash and debris to enter the plant and its downstream treatment units.

"A few years ago, maintenance costs were growing throughout the plant," says Steve Yonker, Burns & McDonnell project manager. Everything from grit dewatering equipment to pre-aeration basins to on-site generators were experiencing age- and corrosion-related operational problems and substandard performance. And then there was the odor-causing hydrogen sulfide gas that formed as sewage turned septic on its often-long journey to the plant.

"The preliminary treatment operations at the plant had clearly reached the end of their useful life," summarizes Ken Gambaro, the plant manager for MSD.

Solutions

"Before the new construction, the treatment plant could accommodate peak flows of 80 MGD. Upstream expansions of the collection system increased anticipated peak flow rates to as much as 190 MGD," says Curt Gentile, Burns & McDonnell project engineer.

To address that issue, Burns & McDonnell designed higher capacity headworks facilities and new peak flow storage basins at the plant site that can hold up to 30 million additional gallons of wastewater during high flows. When normal flow conditions return, the stored flows are returned to the plant for treatment.

Once arriving at the plant, the chances of debris damaging the processing equipment have been greatly reduced. That's because the plant's new 190 MGD headworks replaces older screening technology with fully automatic high-efficiency bandscreens that remove, clean and compact inorganic materials before the flow is sent to primary and secondary treatment.

Clarifier mechanisms were replaced, and aluminum covers were installed above the clarifier launders as part of the odor control system.

The region's fresher smell, meanwhile, can be attributed to new green odor control technology that uses biological organisms — rather than chemicals — to consume hydrogen sulfide in the system, neutralizing its odors. "It's a much more environmentally friendly and effective approach to odor control than treatment plants have used historically," Gentile says.

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The Burns & McDonnell design also included green solutions in the plant's upgrade and expansion. For example, biogases produced during the waste treatment process have traditionally been used to fuel the plant's on-site engine-generators. These generators provide more than half of the power needed to run the treatment plant.

"The problem was," Yonker says, "those biogases contained siloxanes, which are chemicals that cause maintenance issues by forming deposits in the engines, resulting in frequent engine overhauls." The plant upgrades included an advanced cleaning system that safely removes the siloxanes from the biogases before being consumed by the generators.

Results

"These and other improvements — both large and small — have given the plant a new lease on life, modernizing operations and simplifying future maintenance needs," Gentile says.

Placed into operation in late 2009 and early 2010, all are performing according to plan so far.

"We're still early in our analysis," said MSD's Gambaro. "In the long term, we're anticipating that these upgrades will not only benefit our customers and the environment, they will reduce our operating and maintenance costs while improving reliability. That's the goal."

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