

Kyrene Water Reclamation Plant

Application: Wastewater treatment meeting Arizona Class A+ reclaimed water standards for reuse

Capacity: 9 MGD (34,070 m³/d)

Location: Tempe, Arizona, United States

Commissioned: May 2006



Challenge

Demand for reuse quality water is gaining momentum in water-short Arizona. The thriving community of Tempe, near Phoenix, is experiencing increasing commercial/industrial growth. In order to meet the growing wastewater treatment needs of the area, and to divert some of the city's allotment of Salt River Project (SRP) water used for irrigation to potable uses, the City decided to expand the existing conventional Kyrene Reclamation Facility.

GE's Water & Process Technologies was selected to provide a ZeeWeed* membrane filtration system to convert the existing facility into a membrane bioreactor (MBR) system. Since ZeeWeed MBR requires a fraction of the space of a conventional wastewater treatment plant, a considerable portion of the exist-

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ing infrastructure was utilized while doubling the capacity. The existing water reclamation facility also required upgrading to allow the effluent to meet Arizona Class A+ reclaimed water standards, which requires a total nitrogen concentration of less than 10 mg/L.

Solution

The existing conventional plant consisted of coarse screens and grit removal, followed by a bioreactor, two secondary clarifiers and a sand filter. In the plant expansion, the existing bioreactor was split into four parallel biological trains with two additional trains constructed next to it. The two clarifiers were each converted into four identical membrane trains and retrofit with ZeeWeed UF membranes.

For aesthetic reasons, all biological and membrane tanks are located underground and covered by concrete. Odor control and foam removal systems are also incorporated into the plant design.

Raw wastewater is pumped to the headworks, which includes a new coarse screening system, traveling band screens, grit removal and equalization, prior to biological treatment.

Each train consists of one anoxic tank and one aerobic tank for denitrification and nitrification processes respectively. Mixed liquor flows from the aerobic tank to the eight membrane trains. The system is capable of treating a maximum day flow of 11.7 MGD (44,290 m³/d). Peak flows above this will be equalized and treated throughout the day.

The membranes are immersed directly into the mixed liquor and draw treated effluent into the fiber using a slight suction. With a pore size of 0.04 microns, ZeeWeed membrane fibers act as a physical barrier, preventing suspended solids and pathogens from entering into the final effluent.

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The effluent is then sent to a UV system for further disinfection and discharged directly into the water reuse system for application such as golf course irrigation and industrial processes.

Effluent Discharge Requirements	
TSS (mg/L)	< 5.0
BOD5 (mg/L)	< 5.0
TN (mg/L)	< 10
Turbidity (NTU)	< 2.0