



Relevant Experience Aqua-Aerobic® MBR

Providing Innovative Solutions to Membrane Technology

The Proven MBR Formula

The success of any membrane biological reactor (MBR) relies on three major components:

1. Biological Treatment
2. Membrane Technology
3. Process Control

Aqua-Aerobic Systems, Inc. (AASI) has supplied aeration, mixing and filtration equipment to municipal and industrial sectors for over 40 years. For over two decades, AASI has provided and commissioned over 1,000 biological treatment systems, including the AquaSBR®/AquaExcel®, Aqua MSBR® and AquaPASS® processes. This experience in the design, operation and maintenance of biological treatment systems translates directly to those factors which impact the design, operation and maintenance of the biological treatment system in an MBR application. From the detailed kinetic design to sound equipment sizing

criteria and selection, AASI offers the greatest breadth of knowledge and experience of any MBR system supplier.

Also, Aqua's extensive experience in solids/liquid separation dates back 30 years, with technologies including the AquaABF® filters and Cloth Media filters. With respect to membranes, Aqua has focused on Research & Development efforts in this area since 1999. The research has included extensive pilot work with flow-through and batch reactor MBR process systems. AASI is not a membrane manufacturer. Over the course of Aqua's development of the Aqua-Aerobic® MBR, it has developed relationships with companies that focus on this area of expertise.

To support our MBR efforts, Koch Membrane Systems (KMS) PURON™ submerged membrane technology has been selected for integration into the Aqua-Aerobic® MBR System. The

PURON™ product is a membrane technology that has enjoyed success in Europe over the last 7+ years. The simple, yet robust design of the PURON™ product complements the Aqua-Aerobic® MBR system design.

Featured Installations

- *Quechan Paradise Casino, CA*
- *Colorado School of Mines, CO*
- *Souder Road, PA*
- *Middle Point Leachate, TN*



Featured Aqua-Aerobic® MBR Installations

Quechan Paradise Casino, CA

QAvg : 250,000gal/day, QMax : 250,000gal/day
Operational : January 2009

The Aqua-Aerobic® MBR Membrane Biological Reactor (MBR) is the wastewater treatment system of choice for the Quechan Paradise Casino. This newly constructed gaming facility, located on Native American owned land in Winterhaven, California began its treatment operations in January 2009. Early into the project development, it was decided that the Aqua-Aerobic® MBR system was the optimum solution due to its small footprint, high-quality effluent and low energy consumption. The plant is designed to meet California's strict Title 22 reuse requirements in which effluent is reclaimed to supply drip irrigation for the casino's landscaping and a future onsite golf course.



The Aqua-Aerobic® MBR system was actually started up a month before the casino opened in order to get the biomass to the level needed for treatment of the Grand Opening flows. This unique startup plan saved Quechan from a large expense of hauling seed-sludge. It was expected that the Grand Opening flow would go from < 2% to nearly 100% capacity in one day.



On opening day, the plant processed nearly 100,000 gallons, and the effluent quality was superb. Despite significant fluctuations in daily flows and loads, the plant continues to record exceptional operating data with minimal operator input. The plant's typical operating data is shown below.

	Influent (mg/l)	Effluent (mg/l)
BOD	400	2
TKN	50	3
TN		5
TSS	400	2
TP	12	-

Souder Road, PA

QAvg : 250,000gal/day, QMax : 500,000gal/day
Operational : December 2010

Aqua Aerobic is providing a dual basin bioreactor system and two membrane basins for a small system that will be used to treat the waste from a school and nearby community that is currently being built. The system is sized for average flows at initial conditions as low as 0.025 MGD and is sized to be expanded to 0.25 MGD by simply adding in additional membrane area to the membrane basins at full build-out the system is sized for a peak flow of 1 MGD. The structure will be a two floor building, with pumps and blowers installed in the first floor, with the controls, process and operations room above. The system will operate in a batch mode and adjust the concentration in the bioreactors based on the flow that is coming into the plant. Design data for the project is shown to the left.

	Influent (mg/l)	Effluent (mg/l)
BOD	350	10
TKN	55	3
TN		6
TSS	350	10
TP	10	0.1

Featured Aqua-Aerobic® MBR Installations

Colorado School of Mines, CO

QAvg : 7,600gal/day, QMax : 15,000gal/day
Operational : February 2009

The Advanced Water Technology Center (AQWATEC) at Colorado School of Mines (CSM) partnered with Aqua-Aerobic Systems and CSM's Small Flows Program to explore the viability of new hybrid treatment systems using sequencing batch reactors (SBR) with submerged ultrafiltration membranes. The Aqua-Aerobic® MBR demonstration system is designed for small communities or cluster homes, providing an effluent quality that is suitable for onsite reuse. The main objective of the current study is to assess the performance of the on-site, full-scale, demonstration system, treating domestic wastewater generated by the Mines Park student housing complex (~400 apartments). Primary work focuses on the optimization of the process for biological nutrient removal (BNR), optimization of membrane operation, and recycle rates for constant and diurnal flow patterns. The system is challenged under a variety of weather and operating conditions while considering the potential for beneficial reuse. Typical operating data for the project is shown below.

	Influent (mg/l)	Effluent (mg/l)
BOD	350	2
TKN	70	3
TN		5
TSS	350	<2
TP	12	0.5



Middle Point Leachate, TN

QAvg : 100,000gal/day, QMax : 150,000gal/day
Operational : May 2010

The Middle Point Leachate Facility had a break-point chlorination system. In order to reduce O&M costs, the decision was made to upgrade the system to an activated sludge treatment process. Due to the high strength waste and difficulties with solids separation a treatability study was commissioned. Based on the results of this study, MBR technology was chosen. The Aqua-Aerobic® MBR was eventually utilized based on its operational flexibility and lowest lifecycle costs. The Aqua-Aerobic® MBR system consists of a dual basin flow-through reactors system with two membrane tanks. Each membrane tank will have two 500 m² modules and have space for a future third module. The system is sized for 0.1 MGD average and 0.15 MGD peak flow, and is designed mainly for nitrification. The design influent ammonia value is 2,765 mg/l. Design data for the project is shown to the right.

	Influent (mg/l)	Effluent (mg/l)
BOD	1800	250
TKN	2765	50
TN		
TSS	500	2
TP		0.1

Aqua-Aerobic® MBR

Membrane Biological Reactor

Providing Innovative Solutions to Membrane Technology

Learn more about the Aqua-Aerobic® MBR System

Aqua-Aerobic Systems, Inc. is proud to offer the water and wastewater treatment industry an innovative solution to membrane technology. If you are currently working on a specific project that requires municipal or industrial wastewater reclamation, or impaired water body TMDL limits, please contact our office and we will be happy to provide you with the information you need to make the Aqua-Aerobic® MBR system an integral part of your next project.

Technical Seminars

Join the thousands of individuals who have attended an Aqua-Aerobic Systems technical seminar in which the Aqua-Aerobic® MBR Membrane Biological Reactor is a featured presentation. If you are interested in attending an upcoming seminar, please contact [Sara Miller at 815-639-4417](tel:815-639-4417) or smiller@aquaaerobic.com for a seminar schedule and synopsis.



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