



AQUA-AEROBIC SYSTEMS, INC.

SUCCESS STORIES

PLANT NAME AND LOCATION

BUXAHATCHEE WWTP - CALERA, AL

DESIGN DAILY FLOW / PEAK FLOW

1.5 MGD (5678 m³/day) / 1.5 MGD (5678 m³/day)

AQUA-AEROBIC SOLUTION

Dual-basin AquaSBR® System, 2 AquaDisk® Filters (6-disk)

AQUA-AEROBIC TECHNOLOGIES MEET SMALL FOOTPRINT AND STRINGENT NITROGEN AND PHOSPHORUS REQUIREMENTS

The Buxahatchee Wastewater Treatment Plant in Calera, Alabama was built in 1960. It upgraded in 1985 to a 0.75 MGD capacity extended aeration system with integrated clarifier and traveling aeration bridge for nitrification. By 2004, the system could no longer handle the flow capacity brought on by community growth, nor the increased stringent nutrient limits set by the Alabama Department of Environmental Management (ADEM). To resolve the plant's issues an upgrade was in order.

The City of Calera decided to investigate several other treatment technologies, and required a written process performance guarantee. The only company that met the criteria was Aqua-Aerobic Systems with the AquaSBR® sequencing batch reactor (SBR) and AquaDisk® cloth media filter. Not only was Aqua-Aerobic the most cost-effective choice due to the technologies' small footprint, but the new treatment train could also provide advanced nitrogen and phosphorus removal without the use of alum or other chemicals.

In March 2005, Buxahatchee upgraded its facilities with the installation of a 2-basin AquaSBR sequencing batch reactor and (2) 6-disk AquaDisk cloth media filters following the SBR system to further reduce TSS and phosphorus levels.



Aerial of the 2-basin AquaSBR® system with adjacent (2) 6-disk AquaDisk® filters

The Buxahatchee plant serves a portion of the City of Calera's population and a few local industrial businesses. Both the AquaSBR system and AquaDisk cloth media filter systems were designed to accommodate expected future community growth so another upgrade will not be necessary for numerous years. Many Engineers and Water Works Managers now travel to the Buxahatchee plant to view the AquaSBR system and AquaDisk filters in operation for consideration in their retrofit and new construction projects.

AquaSBR® SYSTEM PROCESS

The AquaSBR system operates on a simple concept of introducing a quantity of waste to a reactor, treating the waste in an adequate time period, and subsequently discharging a volume of effluent plus waste sludge that is equal to the original volume of waste introduced to the reactor. This “Fill and Draw” principle of operation involves the basic steps of Fill, React, Settle, Decant, and Sludge Waste. The system may be designed to include seven individual phases of operation but the inclusion or duration of any individual phase is based upon specific waste characteristics and effluent objectives.

Where nutrient removal is required, a simple adjustment to the SBR’s operating strategies permits nitrification, denitrification, and biological phosphorus removal. Optimum performance is attained when two or more reactors are utilized in a predetermined sequence of operation.

AquaDisk® FILTER PROCESS

Clarified effluent from the AquaSBR system enters the filter and flows by gravity through the cloth media of the stationary hollow disks. The filtrate exits through the hollow shaft which



Close up of AquaDisk® filters

supports the individual disks and flows to the effluent channel. As solids accumulate on the surface of the media, the water level surrounding the disks rises.

Once a predetermined level is reached, the disks rotate and the media surface is automatically vacuum backwashed clean. Heavier solids settle to the bottom of the tank and are then pumped to a digester or to the plant headworks.

DESIGN CHARACTERISTICS

Buxahatchee’s AquaSBR system and AquaDisk cloth media filters were designed to accommodate future community growth for numerous years in order to conserve precious land space. The treatment scheme currently accomplishes low effluent TSS, NH₃-N and Total P without the addition of alum

or other chemicals. It is also designed for future Total Nitrogen limits, which are not yet required.

Doug Smedley, Wastewater Superintendent for the City of Calera says, “Our continued outstanding pollution prevention scores can be attributed to the efficient operation of the AquaSBR system and AquaDisk filters.”

AVERAGE OPERATING DATA (2007)

LOADING	DESIGN INFLUENT	AVG INFLUENT	PERMIT EFFLUENT	AVG EFFLUENT
AVG Flow mgd	1.5	0.81	----	----
Peak Flow mgd	1.5	1.58	----	----
BOD mg/l	200	130.6	8.0	3.2
TSS mg/l	200	93.4	30	2.4
TKN mg/l	30	29.7	1.5	0.31
NH ₃ -N mg/l	----	22.5	1.0	0.3
Total P mg/l	10	4.2	0.75	0.07

AquaSBR® SYSTEM ADVANTAGES:

- Tolerates variable hydraulic loads
- Tolerates variable organic loads
- Controls filamentous growth
- Provides quiescent settling
- Separation of aeration and mixing
- Lower installation costs
- Return activated sludge pumping eliminated
- Small footprint
- Simple to expand or upgrade
- One company accountability

AquaDisk® CLOTH MEDIA FILTER ADVANTAGES:

- Consistent, high quality effluent
- Lower backwash rates
- Tolerates extreme variations in loads
- Reuse quality effluent
- Continuous filtration during backwash
- Minimal operator attention
- Minimal maintenance
- Small footprint
- Eliminates sand media and underdrains