



AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

SUCCESS STORIES

PLANT NAME AND LOCATION

KEY LARGO WASTEWATER TREATMENT DISTRICT - KEY LARGO, FL

DESIGN DAILY FLOW / PEAK FLOW

2.88 MGD (10,886 M³/DAY) / 5.75 MGD (21,735 M³/DAY)

AQUA-AEROBIC SOLUTION

DUAL-BASIN AquaSBR[®] SYSTEM, (2) AquaDisk[®] FILTERS (12-DISK), IntelliPro[®] SYSTEM

KEY LARGO INCORPORATES IntelliPro[®] SYSTEM WITH NEW AquaSBR[®] SYSTEM FOR ENHANCED PROCESS CONTROL

Originally installed in 2005, Key Largo Wastewater Treatment District (WWTD) in Key Largo, Florida utilized a small alternative sequencing batch reactor (SBR) for treating the plant's wastewater. After five years the plant was in need of an upgrade in order to address increasing flow rates from the population of 15,000 it now serves, and future stringent effluent limits.

The district began exploring options including five-stage oxidation ditch and SBR technologies. In addition, the planning staff visited nearby installations to see the potential technologies in operation.

Following the selection research, Key Largo chose a three-basin AquaSBR[®] sequencing batch reactor followed by two AquaDisk[®] cloth media filters (12-disk units) for its upgrade. The plant currently utilizes only two of the SBR basins for its biological process and the other as an aerobic digester, until it is needed for future treatment capacity as a third SBR basin. To enhance the plant's process control capabilities, Key Largo also incorporated an IntelliPro[®] process monitoring and control system. These Aqua-Aerobic System technologies were chosen because of their reputation for meeting performance objectives, dependability, and process control flexibility.

The new treatment scheme went into operation in August 2010 and is designed to meet Florida's advanced water treatment (AWT) requirements.



Aerial of Key Largo WWTD after its upgrade with the AquaSBR[®] system, AquaDisk[®] filters and IntelliPro[®] system.

Based on his experience with the plant over the past year Key Largo's Lead Operator, Jered Primicierio stated, "This system is very dependable. Tech support is second to none and preventative maintenance is minimal, yet necessary." He also noticed a drastic improvement in the monitoring and control of the biological process, which he attributes in part to the IntelliPro system. The most beneficial aspect for Key Largo is the ability to fully monitor the process, such as real-time ORP, pH, TSS and D.O. concentrations in each SBR basin. The plant also makes use of a majority of the system's additional features including active mass control, and trending capabilities.

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.

IntelliPro® PROCESS MONITORING & CONTROL SYSTEM

The IntelliPro system is designed to offer an essential link between operations, equipment and treatment objectives. It actively influences the treatment process by proactively responding to changes as they happen and efficiently managing overall system performance. Through the use of process instrumentation, the system can actively control process parameters within the biological system such as dissolved oxygen (D.O.), system mass, and even modify the cycle structure. The addition of the nutrient module and instrumentation adds the capability of automatically monitoring and controlling biological and chemical nutrient removal.



IntelliPro® monitor (shown left) is displaying AquaSBR® basin status at Key Largo WWTD

AVERAGE OPERATING DATA (2010)

LOADING	DESIGN INFLUENT	AVG INFLUENT	CURRENT PERMIT EFFLUENT	2015 PERMIT EFFLUENT	AVG EFFLUENT
AVG Flow mgd	2.88	0.41	---	---	---
Peak Flow mgd	5.75	0.87	---	---	---
BOD ₅ mg/l	250	204	20	5	2.21
TSS mg/l	250	230	20	5	1.19
NH ₃ -N mg/l	50	40	---	---	0.05
TN mg/l	---	68	---	3	1.92
Total P mg/l	8	8.5	1	1	0.96

In order to achieve the average effluent limits shown, the operators are dosing aluminum sulfate for phosphorus precipitation, sodium hydroxide for pH adjustment, and glycerin as a carbon source during denitrification.

AquaSBR® SYSTEM ADVANTAGES

- All components retrievable and accessible
- Tolerates variable hydraulic and organic loads
- Controls filamentous growth
- Provides quiescent settling
- Saves energy via separation of aeration and mixing
- Lower installation costs
- Eliminates return activated sludge pumping and secondary clarifiers
- Small footprint
- Simple to expand or upgrade
- One company accountability

IntelliPro® SYSTEM ADVANTAGES

- Plant process optimization
- Process monitoring power of a Supervisory Control and Data Acquisition (SCADA) system
- Integrated comparative analysis
- “Active Control Mode” offers automatic adjustment of process variables including biological nutrient removal, chemical addition, and energy
- BioAlert™ process notification program provides recommended corrective action for process “alarms”
- Optional electronic O&M Manual