



AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

SUCCESS STORIES

PLANT NAME AND LOCATION
RUTTER'S DAIRY - YORK, PA

DESIGN DAILY FLOW / PEAK FLOW
0.05 MGD (189 M³/DAY) / 0.1 MGD (379 M³/DAY)

AQUA-AEROBIC SOLUTION
SINGLE-BASIN AquaSBR[®] SYSTEM

AquaSBR[®] SYSTEM AT RUTTER'S DAIRY ACHIEVES 96% BOD REMOVAL

Rutter's Dairy, located in York, Pennsylvania is operated as a pretreatment system prior to discharge to the municipal sewers. Before the installation of an AquaSBR system, Rutter's Dairy was discharging its wastewater directly to the municipality. Like many other food processors throughout the United States, Rutter's Dairy was assessed high municipal surcharges when wastewater BOD₅ and TSS exceeded 300 mg/l.

The dairy plant processes over 22,000 gallons of milk, 12,000 gallons of processed drinks such as punch and lemonade, and 1300 gallons of ice cream EACH DAY. Not to mention the other products produced on a daily basis: butter, yogurt, creamers, and cottage cheese. Rutter's Dairy serves the dairy market from York, Pennsylvania to Maryland, Delaware and Washington, DC and is still growing. Bottling of the plant's products is also done at the facility to assure maximum quality and freshness.

According to Maintenance Supervisor, Don Loucks, "We were in the same situation as many other food processing plants. Surcharges were so high that we were forced to install a pretreatment system, but we couldn't afford the

expense of installing a conventional system. We certainly didn't have anyone at the dairy who could operate a complicated system either." The solution to the problem of high surcharges and complicated treatment plant operation came with the installation of the AquaSBR system in the fall of 1987. Since its installation, the AquaSBR system has achieved 96% BOD removal.



Single basin AquaSBR[®] system measures 47' in diameter x 16' SWD.

AquaSBR® SYSTEM PROCESS

The AquaSBR system differs from conventional treatment systems in a number of ways. Complete treatment is accomplished within a single reactor, eliminating the need for separate basins for aeration, mixing, and clarification. Because the flexibility is a key feature of the AquaSBR system, it can be operated to achieve the desired treatment results. The separation of mixing from aeration, through the use of diffused air and the AquaDDM® direct-drive mixer, allows the operator to create a variety of reactor environments ranging from anoxic to aerobic. This allows the AquaSBR system to be operated for BOD and TSS removal, nitrification and denitrification, nutrient removal, and the control of filamentous growth.

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.

DESIGN CHARACTERISTICS

The single-basin AquaSBR system at Rutter's Dairy has an average design daily flow of 0.05 MGD (189 m³/day) and peak design daily flow of 0.1 MGD (379 m³/day). Since the start-up of the AquaSBR system, the plant has experienced exceptional phosphorus removal of 7.2 mg/l, and effluent BOD₅ and TSS levels are well below permit (as shown in the following table).

AVERAGE ANNUAL OPERATING DATA

LOADING	DESIGN INFLUENT	AVG INFLUENT	DESIGN EFFLUENT	AVG EFFLUENT
AVG Flow mgd	0.05	0.37	----	----
Peak Flow mgd	0.1	----	----	----
BOD ₅ mg/l	4000	3000	300	130
TSS mg/l	1000	800	300	130

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



Aerial view of the Rutter's Dairy treatment plant.