BIOS

BIOPROCESS INTELLIGENT OPTIMIZATION SYSTEM

BioChem® TECHNOLOGY, INC.

The Bioprocess Intelligent Optimization System (**BIOS**) is a 4.0 software solution that helps operators and management get the most from the secondary, biologic process unit. The solution features a customized model of the physical plant which is continuously calibrated in real time to mirror plant specific behavior. The resultant “digital twin” supports a range of outcomes from operations, to management, and design.

Critical process conditions are optimized in real-time based on incoming load, environmental conditions, and insitu biologic (microbial) activity. **BIOS** serves the dual purpose of maximizing nutrient removal (nitrogen) and minimizing aeration demand.

Aerobic process performance is optimized by adjusting oxic tank volume and available biomass for nitrification. Residual DO conditions are subsequently adjusted to best meet process objectives and minimize aeration demand.

Nitrogen removal is optimized by adjusting internal recycle rates to maximize nitrate uptake and residual DO in the anoxic reactor.

Aeration demand is typically reduced by 10% to 20% and nitrogen reduction improvements of over 30% have been achieved. Some installations have seen aeration demand reductions in excess of 25%.

BIOS is an active tool to monitor and adjust the biomass inventory in the process unit. The system provides prompts when changes in bioactivity are occurring and recommends adjustments based on current load and operating conditions.

The operating digital twin provides a direct guide for capacity planning, and process and equipment right-sizing. This helps ensure that operators of BNR plants can deliver intended performance at current as well as design loads.

Maximized Capacity • Energy Savings • Nutrient Removal

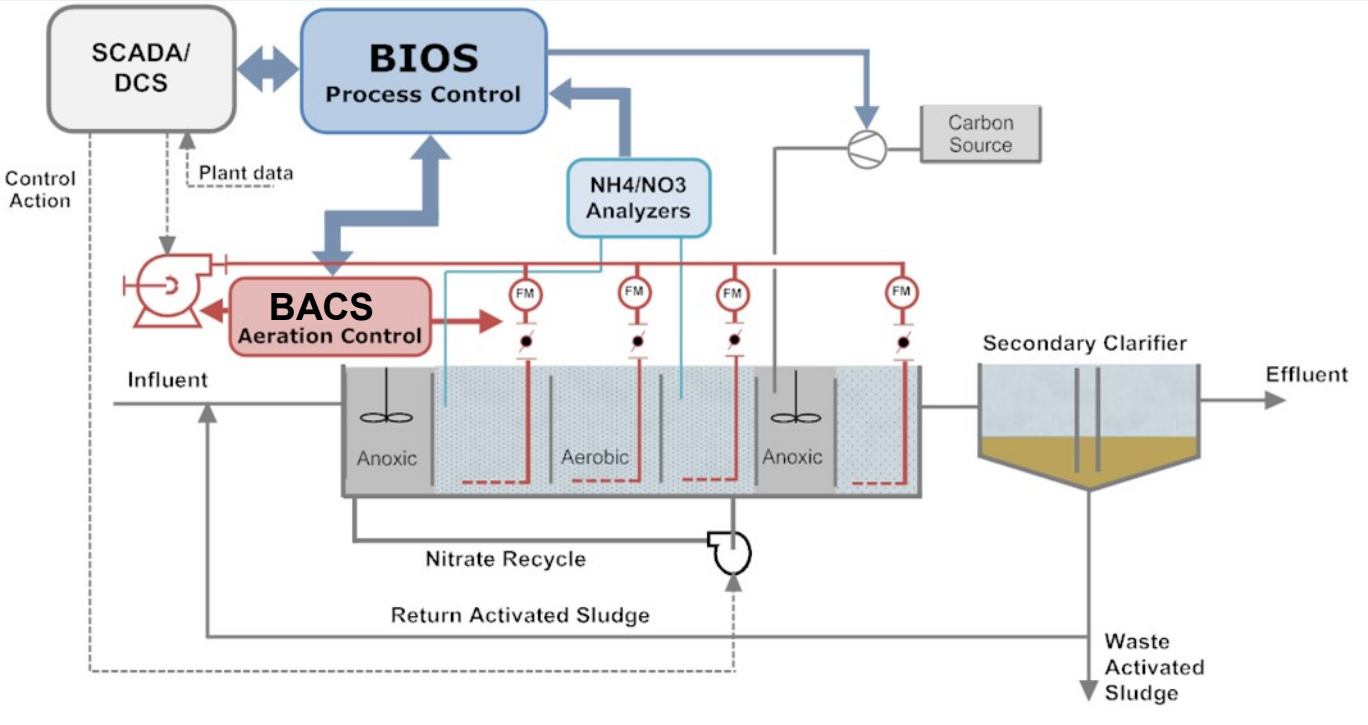
Key Benefits*

- Real-time, 24 x 7 process optimization based on incoming load, environmental conditions, and insitu biologic (microbial) activity
- Process conditions are optimized to operational objectives, and process aeration demand is minimized for all operating strategies
- Biomass inventory advisor prompts when activity rate or changes are required
- Maximizes recovery of nitrate oxygen and alkalinity
- Optimization of conjoined process units for best overall plant operations
- Robust uptime performance

Key Features

- 1st principle, feedforward, ammonia based process model
- Continuously recalibrated to mirror insitu process performance
- Adjusts biomass inventory and residual DO concentration(s) to meet treatment objectives. Includes swing zones, number of operating tanks, and DO target for all controlled aerated zones.
- DO setpoints gamed for lowest process aeration demand or daily energy cost
- Direct control of swing zones, mixers, and IMLR flow
- Management of aeration with target DO setpoints
- Advanced fault detection analytics

*guaranteed performance with supporting data and instrumentation



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