

CASE HISTORY:

MUNICIPAL WWTP - INSTALL OF BIOS AND PAL CONTROL SOLUTION

CITY OF LEBANON, PA

INSTALL DATE JUNE, 2012

SYNOPSIS

Advanced treatment including BNR (Biological Nutrient Removal) facilities requires precise operational control to produce desired results. Next-generation, intelligent control solutions provide the know-how and precision automation necessary to operate these facilities. With almost 30 online instruments, intuitive user interfaces, predictive and adaptive logic, and multiple fail-safes and overrides 'very few changes are required by the system is in auto and we are exceeding our original goals [...] in large part to the robust system designed by BioChem.

BACKGROUND

In June of 2012, the City of Lebanon Authority began a BNR upgrade project to reduce their footprint on the Chesapeake Bay. The plant's goals were to reduce Total Phosphorous to 0.8mg/L and Total Nitrogen to 6mg/L. Total Nitrogen objectives are required to support a TMDL (total maximum daily load) of 146,000 pounds per annum or approximately 8mg/L at the plant design flow.

The existing plant has a two-stage biological system with trickling filters and activated sludge.

Due to physical site constraints, treatment intensity needed to be increased without increasing the size of the biological reaction tanks. For this reason, an integrated fixed film activated sludge (IFAS) process with anoxic/aerobic swing zones with polishing denitrification filters were constructed. Coarse bubble diffusers are used in the IFAS zones for air scouring whereas fine bubble diffusers are provided in the swings zones for energy efficient supplemental aeration.

CHALLENGE

Complex, advanced treatment facilities including BNR plants require a level operational precision that is beyond the capabilities of traditional plant staffing. While advances in instrumentation provide a wealth of data, automation controls particularly for biological and aeration processes haven't proven to be reliable. The Lebanon facility is particularly challenging with multiple biological processes and aeration devices.

EXECUTION

BioChem's BIOS (bioprocess intelligent optimization system) and BACS (bioprocess aeration control system) provides integrated process and operational control of the entire biological process. Control of key high frequency operating functions includes:



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EXECUTION CONTD.

- Determine optimum DO setpoints for all biological treatment zones including the operating function of swing zones
- Control for coarse and fine bubble systems
- Reprogram single-stage blower MCP for flow based operation
- Control internal mixed liquor recycle flows
- Control trickling filter bypass for denitrification carbon balance
- Control supplemental chemical feeds

RESULTS

With AWR's improvements to the plant's current blowers and EDI's advanced technology fine-bubble aeration system in place, electric consumption **dropped by over 40 percent per month** on average. Before the upgrade, monthly energy consumption for the plant averaged 117,480kWh. After the project was complete, the plant's monthly energy consumption on average measured only 68,394kWh. The city expects a payback on the investment well before their three-year projection.

TESTIMONIAL

Biochem has given the City of Lebanon Authority the ability to look at historical trends by providing an additional computer and monitor inside the control panel. This has been very beneficial in troubleshooting. Recently, we had an air valve that was torque tripping every couple of hours and with Biochem's backup control, the valve would go to 50% to provide sufficient air to that zone even though the valve had malfunctioned. We were able to use the historical trends to see what was happening and fix the problem.

Biochem was very easy to work with from the beginning. I recall changes that were made during our first trip to their facility for Factory Testing. During startup, they would work to make sure we understood how to operate the system and make changes to suit our needs. When they weren't at our facility, they were quick to respond to phone calls, emails and text messages.

Our Operators find the Bioreactor Process Control System very easy to navigate and make changes. However, very few changes need to be made when everything is in Auto. Today, we are exceeding our original goals and can reduce Total Phosphorous to as low as .4 mg/L and Total Nitrogen to 3 mg/L in large part to the robust system that was designed by Biochem.

Satisfied Customer,

Frank DiScuillo Jr., Wastewater Systems Director
City of Lebanon Authority, Lebanon, Pennsylvania