CASE STUDY

An Affordable Wastewater Treatment Solution for Institutions and Small Municipalities

Whitewater Processing

Problem Whitewater Processing Company, an organic turkey processing plant located in southwest Ohio, was in OEPA non-compliance for exceeding ammonia limits in the winter during periods of cold weather.

Solution An EarthTek AMBR MBBR was installed to reduce cold-weather ammonia levels.

Whitewater Processing worked in conjunction with EarthTek and the Ohio State University to develop and construct a unique sand filter treatment facility to treat the high-strength waste produced in the turkey processing plant. The facility consisted of a fine screen, pump station to transport the wastewater from the facility to the treatment site, an equalization tank, a dissolved air flotation primary treatment process, a single-pass sand filter, an ion exchange process for ammonia reduction, and UV disinfection

The system generally works well except for the ion exchange system for ammonia reduction. During the summer months, ammonia is reduced by nitrification in the aerobic packed bed filter, but during winter months the nitrification process slows down. The ion exchange system was designed to reduce the ammonia during this time, but requires constant backwashing of the tanks and inconsistent ammonia reduction.

The owners of the facility retained EarthTek to investigate options for more consistent ammonia reduction. In reviewing the available options, it was determined that a moving bed biofilm reactor process could be installed in place of the ion exchange system and provide more consistent and cost-effective ammonia reduction down to water temperatures of 34F. EarthTek provided a design based on Metcalf & Eddy, Wastewater Engineering, Treatment and Resource Recovery, 5th Ed. This design was computer-modeled using Biowin wastewater treatment plant modeling software. Modeling results show that the proposed system will reduce ammonia levels below permitted values.

Message from the President

"Our goal is to create the best solution for our client's specific needs, not just provide an off-the-shelf plant."

-Kevin Chaffee, P.E.

Institutional Market

Project Overview

Harrison, Ohio

Design Parameters

- Average flow of 200,000 gallons per day

Primary Treatment

- An existing treatment system

Secondary Treatment

- EarthTek AMBR MBBR for ammonia polishing

Influent Quality

- 5 mg/L BOD5
- 5 mg/L TSS
- 30 mg/L NH3

Effluent Quality

- < 3.3 mg/L BOD5
- <6.6 mg/L TSS
- < 1.3 mg/L NH3

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Institutional Market

The MBBR process consists of a 90,000-gallon, aboveground, insulated, glass-lined steel tank with about 65% fill ratio of polyethylene, free-flowing media. The media has a specific density of about 0.95 so it is neutrally buoyant, and is mixed by the diffused air supply. Diffused air is supplied by a coarse bubble, stainless steel pipe system installed just above the floor of the tank. Air is supplied by two 30 HP positive displacement blowers with one active, and one standby. The blowers were provided with variable frequency drives to vary the air supply as needed. A stainless-steel outlet screen was installed to keep the media in the tank, and was provided with an overflow screen in case of plugging. The influent pipe was installed to discharge the water above the normal operating level, and included a check valve to prevent media from backflowing into the pipe.

Water from an existing plant pump station that feeds the ion exchange and UV disinfection process was redirected through a series of valves to send plant effluent to the MBBR tank. The effluent from the MBBR is then directed back into the existing UV inlet piping for disinfection if needed. A drain line and screen was provided to drain the tank as needed back into the plant pump station that directs the flow into the tank.

The MBBR system is put into service manually by adjusting the valves to direct flow through the tank, and by turning on one of the blowers. Typical maintenance includes periodically checking the influent check valve and effluent screen for plugging, and servicing the blowers.

For more information about EarthTek MBBR systems, contact EarthTek at 800-972-9940.

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