Exceeding Phosphorus Limits Required for Environmental Wastewater Reuse



The challenge

In 2002, Georgia's City of Flowery Branch faced strict new requirements about discharging water back into the nearby Lake Lanier—a drinking water source for the community—compelling the city to find an alternative wastewater system. At the time, the wastewater plant was using conventional sand filters that were unable to achieve the reduction of phosphorus to meet the new limit of 0.13 milligrams per liter (mg/L). Not only were the sand filters working improperly, but they were also creating barriers to the plant's ability to reach a higher level of treatment and recovery for discharging into the environment. If unable to meet the new phosphorus limit, the city would have been banned from discharging any additional water into Lake Lanier, resulting in an immediate negative impact on the city.

The solution

After a thorough evaluation of various wastewater treatment solutions, the Aria FLEX™ membrane system from Aria Filtra® was selected due to its critical ability to meet the phosphorus limits. The quality and performance of Aria Filtra membranes for tertiary treatment were particularly important, as this allowed the plant to meet the new permit requirements for phosphorus limits. Another important factor given the plant's deadline for meeting the limit was that the Aria FLEX system needed minimal infrastructure and took the least amount of time to get up and running, whereas other systems would have required the construction of a new plant.

> *The Aria FLEX system helped us exceed phosphorus limits required for environmental discharge, and more than 10 years later, the system is still performing at a level where we will not need to make any adjustments when our phosphorus limits drop even lower. The design of the wastewater treatment system also made it so that no infrastructure or construction was needed, allowing us to meet a tight deadline for producing water within the phosphorus limit."*
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> **Jimmy Dean,** director of water and wastewater quality, City of Flowery Branch

The results

Most notably, the implementation of the Aria FLEX system allowed Flowery Branch to meet the proposed limits of 0.13 mg/L phosphorus reduction for the treated wastewater to continue to be directly discharged into Lake Lanier. This also brought the water quality to reuse standards and resulted in a reduced concentration of solids and other contaminants.

After 15 years, the plant continues to run successfully. The plant has two permits to discharge: one for 400,000 gallons per day (gpd) to Lake Lanier and one for 510,000 gpd to a LAS site. Currently the plant, which has 1.3 million gallons per day (mgd) peak flow capacity, runs an average of 500,000 gpd, which is split between the two permits.

Due to increased water use resulting from future population growth, the City of Flowery Branch plans to expand their discharge capacity in Lake Lanier up to 1.45 mgd, thus requiring their phosphorus limit to drop into the 0.06 to 0.08 mg/L range. As the Aria FLEX system is currently producing water in the 0.05 to 0.07 mg/L range, the wastewater plant will not need to make any modifications when the new limit goes into effect.

Aside from exceeding phosphorus limits, the Aria FLEX system helped the plant increase their maximum capacity and successfully meet Flowery Branch's discharge limit. The plant was also able to limit their use of chemicals and now conducts a full clean-in-place every four months.

The benefits

The quality and performance of Aria Filtra membranes were instrumental in helping Flowery Branch exceed new phosphorus limits of 0.13 mg/L for the treated wastewater to continue to be directly discharged into Lake Lanier. Overall, the benefits of the Aria FLEX system to the Flowery Branch wastewater plant included:

- **Safe discharge into the environment**
- **Quality that exceeded requirements for phosphorus limits**
- **Reduced concentration of solids and contaminants**
- **Increased maximum capacity**

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