

Oneonta, Alabama Water Treatment Plant

Client

Oneonta Utilities Board, AL

Project

DOC Removal/Membrane Pretreatment

Location

Oneonta, AL

Commission Date

May 2012

Engineer

Insite Engineering, Hoover, AL



Figure 1: The MIEX® System at Oneonta, Alabama

“Our mission is to safely and reliably supply our customers with the highest quality solution at the lowest possible cost. Following a successful pilot trial in late 2008, we selected the MIEX® Process as the most cost-effective and sustainable option to meet the EPA Stage 2 DBP Rule.”

Mr. Rodney McCain,
Manager of the Oneonta
Utilities Board

Challenge

The Oneonta Water Treatment Plant treats water from the Calvert Prong of the Little Warrior River in Alabama. The plant experienced dissolved organic carbon (DOC) concentrations of merely 2.0 mg/L in its surface water source and conventional treatment was challenged by disinfection by-product (DBP) formation when free chlorine was used as a residual disinfectant. The utility's preference to continue to use free chlorine meant that additional treatment would be required to achieve DBP compliance.

When the Oneonta Utilities Board realized that their water treatment plant would require modification in order to comply with future EPA regulations for DBPs, they knew from the start that they would work to provide their customers with an innovative and sustainable treatment solution that would enable the plant to achieve and maintain DBP compliance in the most cost effective manner. An

innovator in Alabama, the Oneonta Utilities Board previously demonstrated its long-term commitment to sustainability through a program that provided residents with free gas hot water heaters to reduce energy usage. The Utility Board would display a similar commitment to sustainability when evaluating water treatment plant processes for DBP compliance.

Solution

In addition to replacing a raw water intake, the project included evaluation of several water treatment processes to reduce DBP formation and improve finished water quality. The utility selected to pilot membrane filtration with various processes applied as pretreatment to remove DOC from the raw water source prior to filtration. The pretreatment processes evaluated included MIEX® Treatment, a combination of MIEX® Treatment and alum coagulation, alum coagulation alone, and plate settled water that had been coagulated with alum. These were compared with a baseline testing period of

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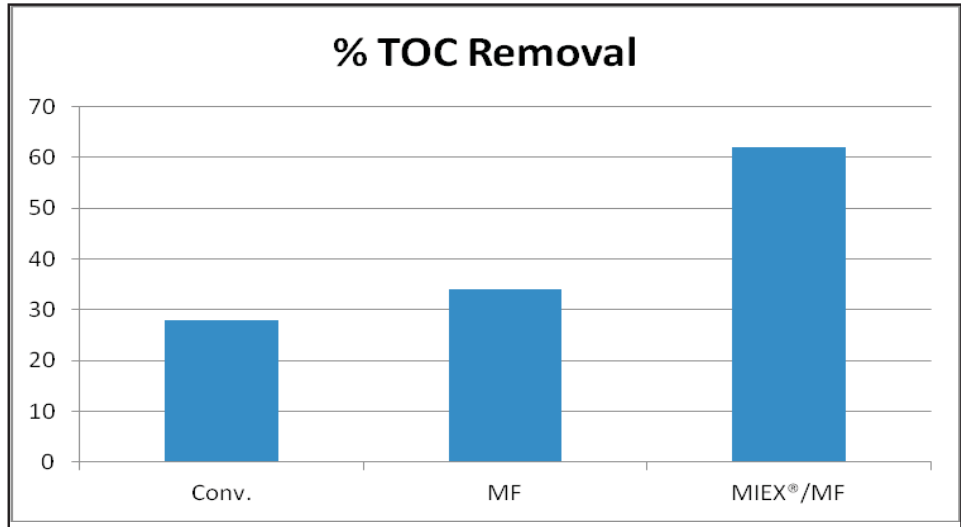


Figure 2: MIEX® Results Demonstrating TOC Removal for Conventional Treatment, Membrane Filtration, and MIEX®/Membrane Treatment

membrane treatment alone. Membranes manufactured by Pall were used for the pilot scale study, which was completed in 2008.

The pilot scale results indicated that MIEX® Treatment was able to achieve an average of 61% reduction in UV254 absorbance. MIEX® Treatment followed by coagulation with 20 mg/L of alum was also able to achieve an average 62% removal in total organic carbon (TOC), reducing the finished water TOC concentration to 0.71 mg/L. This was significantly better than the 34% TOC reduction achieved using plate settled water coagulated with alum at 20 mg/L.

The reductions in TOC and UV254 absorbance achieved by MIEX® Treatment and coagulation were sufficient to reduce simulated distribution system (SDS) DBP formation to concentrations well below EPA DBP requirements: 27.3 mg/L for TTHM and 11.1 mg/L for HAA5, allowing the utility to comfortably meet current and future D/DBP Rule requirements.

In addition to DBP compliance, MIEX® Treatment will improve the operational performance of the microfiltration membranes and reduce the CIP frequency. Both of these

factors are expected to lead to lower operating costs as well as system sustainability.

Project Outcome

Oneonta Public Utilities' 3 MGD MIEX® System was contracted in 2009 and commissioned in May 2012. At the time of startup, the Oneonta Water Treatment Plant will be one of the largest installations to apply MIEX® Treatment for DOC removal as membrane pretreatment. The MIEX® System is installed prior to Pall pressurized microfiltration membranes.

The system is expected to achieve the following results:

- Over 60% reduction in raw water DOC and UV254 absorbance
- DBP concentrations lower than 50% of the MCLs
- Greater than 50% reduction in chlorine demand
- Improved operations of downstream microfiltration membranes

Additionally, the Oneonta Public Utilities Board succeeded in selecting a sustainable process that will enable them to provide compliance and cost-effective drinking water to their citizens for years to come.