

CASE STUDY:  
 Mosinee, WI  
 Mullins Cheese Dairy Plant

<b>Applications:</b>	Diffused Aeration Supplemental Mixing / Anaerobic Selector
<b>Design Flow (ADF):</b>	1.2 MGD
<b>Compressors:</b>	One (1) 50 HP Rotary Screw
<b>Design Engineer:</b>	Mullins Cheese

## BioMix® System Minimizes Maintenance for Growing Wisconsin Cheese Maker

Family owned and operated since 1970, Mullins Cheese is the largest family-owned cheese maker in the state of Wisconsin. In 2013, the company more than doubled their production, going from processing about 300,000 gallons of milk per day to over 700,000. To achieve their treatment needs in a smaller footprint, the company implemented a membrane bioreactor (MBR) that included a high-density, low-flux, strip style aeration system.

While the aeration system offered very high efficiency, it had limited turn-down capacity. If air rates were decreased to match off-production oxygen demands, biomass would settle in the MBR basins leading to significant odors. Additionally, a large portion of the aerobic zones in the MBR lies beneath the membrane cassettes. As the plant was considering alternative mixing solutions, it was of utmost importance that the equipment beneath those MBR cassettes be maintenance free.

EnviroMix worked directly with Mullins Cheese in 2019 to design and implement a BioMix Compressed Gas Mixing System to provide supplemental mixing in the MBR basins, allowing turn-down of the aeration diffusers and preventing solids deposition in those tanks. The system was also installed in the plant's anaerobic selector tank to improve efficiency versus the older jet mixing system.



*Decoupling aeration from mixing in the MBR basins prevents over-aeration and eliminates solids deposition in the basins.*



**ENERGY EFFICIENCY**

BioMix optimizes efficiency by minimizing mixing energy and facilitating turn-down of the aeration system



**STRAIGHTFORWARD OPERATION**

Zero in-tank maintenance ensures sustained operation with minimal downtime



**PROCESS OPTIMIZATION**

Preventing over-aeration not only saves energy but leads to process improvements



**UNPARALLELED FLEXIBILITY**

A centralized compressor and EnviroMix control system run mixing for both applications



*The cheese curds at the Mullins Cheese gift shop are delicious!*



*BioMix replaced inefficient jet mixing in the anaerobic selector reducing power use by more than 50%.*

BioMix eliminated the need for Mullins Cheese to conduct in-basin maintenance — a primary driver in their decision to select the technology.

Mullins Cheese considered conventional mechanical technologies to provide mixing in the MBR basins and the anaerobic selector tank, but they ultimately selected a BioMix Compressed Gas Mixing System. The decision was based on numerous benefits offered by the system, but the primary driver was that BioMix eliminated the need to perform in-basin maintenance.

In the MBR basins, BioMix enabled the plant to decouple aeration from mixing, thus giving the operators independent control over oxygen transfer and mixing. This flexibility eliminated the need to over-aerate the MBR basins to prevent biomass deposition, not only saving energy but providing process improvements.

In summary, Mullins Cheese selected BioMix for the following reasons:

- BioMix has no moving parts in the basin that require maintenance.
- Zero in-tank maintenance ensures sustained operation with minimal downtime.
- Decoupling aeration from mixing optimizes efficiency by both minimizing mixing energy as well as facilitating turn-down of the aeration system.
- A centralized compressor and control system enable mixing in both applications.

EnviroMix worked directly with Mullins Cheese to design and implement the mixing system. This included working closely with the mechanical contractor that they keep on retainer to do periodic work, thus ensuring a seamless installation and start-up.



Contact [sales@enviro-mix.com](mailto:sales@enviro-mix.com) today to discuss the ways EnviroMix can optimize your mixing solutions.