



CASE BULLETIN - APPLETON, WISCONSIN

Consistently Meeting the Needs of Today and Tomorrow



*Water Treatment Plant
Appleton, WI*

THE CHALLENGE

In 1999 the city of Appleton, Wisconsin decided to replace its existing lime softening plant, which could not meet upcoming water quality regulations or be expanded to meet higher capacity requirements. The new facility needed to have the flexibility to vary flow while maintaining finished water quality. Seasonal changes in water quality, including algae as well as taste and odor, needed to be addressed.



*Cross Section of Hollow Fiber
Water Cartridge*

A CUSTOM SOLUTION

Koch Membrane Systems (KMS) had successfully piloted a similar lime softening process on the Missouri River in Kansas City, MO as part of an American Water Works Association Research Foundation (AWWARF) study, and was particularly well equipped to meet Appleton's requirements.

In a paper presented at "Microfiltration III" in Costa Mesa, CA, Duane Leaf, Utilities Director for the City of Appleton, Wisconsin states "Koch Membrane Systems was identified as having the membrane system that would best meet our needs."



Ultrafiltration Stage on Train #2

The system Appleton chose is a modular membrane system from KMS, which has the flexibility to adjust system output to match the flow of the upstream pretreatment processes. The system also has the ability to modify the ultrafiltration (UF) system operating parameters, including recovery rate, backflush frequency and backflush duration. Plant operators can then adapt the membrane plant performance to changes in the raw water quality.

MEETING AND EXCEEDING REGULATIONS

Each stage of the membrane system is continuously monitored by an on-line integrity test protocol that ensures compliance with the Wisconsin Department of Natural Resources guidelines.



SYSTEM SPECIFICATIONS

SYSTEM

<i>Water source:</i>	Lake Winnebago
<i>Capacity:</i>	Demand range 6-24 MGD. Capacity of the plant is adjusted based on finished water demand.
<i>Stages:</i>	Eleven HF-50 stages, with 50 cartridges per stage
<i>Trains:</i>	Two independent trains of 6 and 5 stages, each with its own control and CIP system
<i>Cartridges:</i>	8" by 72", PMPW™ ultrafiltration membrane
<i>Hollow fibers:</i>	100,000 molecular weight cutoff (MWCO), 35 mil interior diameter
<i>Installation date:</i>	May 2001
<i>Length of piloting:</i>	3 months
<i>Backflush frequency:</i>	45 - 60 minutes
<i>Cleaning frequency:</i>	Monthly
<i>Engineering:</i>	McMahon Associates, Inc., Carollo Engineers

RESULTS

<i>Recovery:</i>	Overall plant recovery is 95%
<i>Turbidity:</i>	0.03 NTU

PRETREATMENT

Lime softening, granular activated carbon and potassium permanganate with option for powdered activated carbon.



View of Five Ultrafiltration Stages, Train #2

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