

## IOWA, USA INDUSTRIAL ULTRAFILTRATION SOLUTION



#### Industrial Plant Retrofit

APPLICATION: Process Water CAPACITY: 1,900 m<sup>3</sup>/day (350 gpm) LOCATION: Iowa, USA TECHNOLOGY: Ultrafiltration COMMISSIONED: 2021



System with original membranes



Newly installed UF membranes modules

## CHALLENGE

An industrial ethanol client located in lowa, United States, was using a microfiltration (MF) system, which was composed of 48 hollow fiber modules. The plant processed tertiary effluent from the city's wastewater treatment plant first through the MF modules, then through reverse osmosis (RO), so that it could be reused as process water.

The membranes, originally designed to produce 350 GPM (1,900 m<sup>3</sup>/day), were approaching end of life and thus required increased feed pressure and more frequent chemical cleans to maintain capacity. The client also sought a solution that could expand the capacity of the facility without making a significant capital investment. The solution needed to consider the varying levels of quality in the water to ensure that the modules could handle the different loads on the system and consequently provide the necessary flow.

### SOLUTION

Its membrane expertise, field service capabilities, and open-source strategy positioned H<sub>2</sub>O Innovation as the best suited to perform this upgrade project. After examining several replacement and expansion possibilities, H<sub>2</sub>O Innovation engineered a solution that incorporated Toray's HFU-B2315AN modules as a direct replacement.

#### UPGRADE

The module upgrade process was completed, from start to finish, in less than a day. Four  $H_2O$  Innovation team members joined forces with three plant staff members to replace the existing membrane modules with the new modules in an efficient and timely manner.

The original MF modules were replaced with the UF modules. The new UF modules offer a membrane surface area of 646 ft<sup>2</sup>, as opposed to 538 ft<sup>2</sup> for the original modules, which translated directly into a 20% increase in capacity. The new modules were installed and connected with the existing feed, permeate and backwash connections of the original modules, thus eliminating unnecessary expenses and making the upgrade process fast and efficient. All the programming was left unchanged, the new modules operating with the same sequence and parameters (air scour, backpulse flow, cleaning recipe, etc.) as the original one. The only other change was to increase the permeate flow setpoint by 20% on the HMI.



# IOWA, USA INDUSTRIAL ULTRAFILTRATION SOLUTION



Installation of the UF membrane modules

## MODULE COMPARISON

SPECIFICATIONS	TORAY	PALL
Model #	HFU-B2315AN	UNA-620A
Surface Area	646 ft²	538 ft²
Туре	Ultrafiltration	Microfiltration
Pore Size	0.01 µm	0.1 µm
Module OD	178 mm	165 mm
Form Factor for Connections	Identical	

## RESULTS

As a result of this retrofit, the client gained a system with a 20% higher rated capacity that is less susceptible to fouling thanks to the new membranes. H<sub>2</sub>O Innovation's successful solution not only increased the capacity of the system while drastically reducing the need for capital expenditure, but it also improved the quality of the recycled water produced and provided a better pretreatment for the downstream reverse osmosis, leading to additional operational improvements.



New and old modules, side by side

