Aqua Membranes

PRINTED SPACER TECHNOLOGY®

UNM Case Study

Boiler pre-treatment RO system increases output by 20% and has projected 4X longer life with Aqua Membranes Printed Spacers Technology®

Project overview:

Location: Ford Utility Center Albuquerque, New Mexico

Application type: Boiler Feed/Power Generation

Goals: Improve life and Output

Background: The University of New Mexico uses a Reverse Osmosis (RO) skid with 18 membrane elements for pretreatment at their onsite power generation/heating and cooling facility (commonly referred to as co-gen or co-generation). The plant services the entire UNM campus to generate 219,000 lbs. of steam and 14 megawatts of electricity. The (RO) skid is operated daily and provides pure water to the boilers and occasionally to the nearby hospital. The system is fed groundwater, coming in at anywhere from 350 ppm to 450 ppm, and sees temperature changes throughout the year. When the system was commissioned, there was far less demand on the RO, with only five housings holding three elements each. As time passed, the demand grew, and they added a sixth housing to meet the increasing need. Even with a sixth housing, they needed more output. To get closer to the required output, the membranes were run at high flux and operating pressures, which caused frequent cleaning and replacement of the membranes. These issues made running the RO skid time-consuming and costly for the University. They were looking for a solution to help them get their desired output, reduce the time between cleaning, and extend the time between replacements.

Solution:

UNM came to Aqua Membranes looking for solutions without purchasing new equipment, as they had already spent on equipment improvements that did not solve their problems. That was when Printed Spacer Technology® was introduced into the skid. Aqua Membranes uses this new technology to make RO elements with an innovative spacer that is thinner. It is 19.5 millimeters compared to the industry standard of 28 or 34 millimeters. Aqua Membranes products fit more filtration media inside each RO

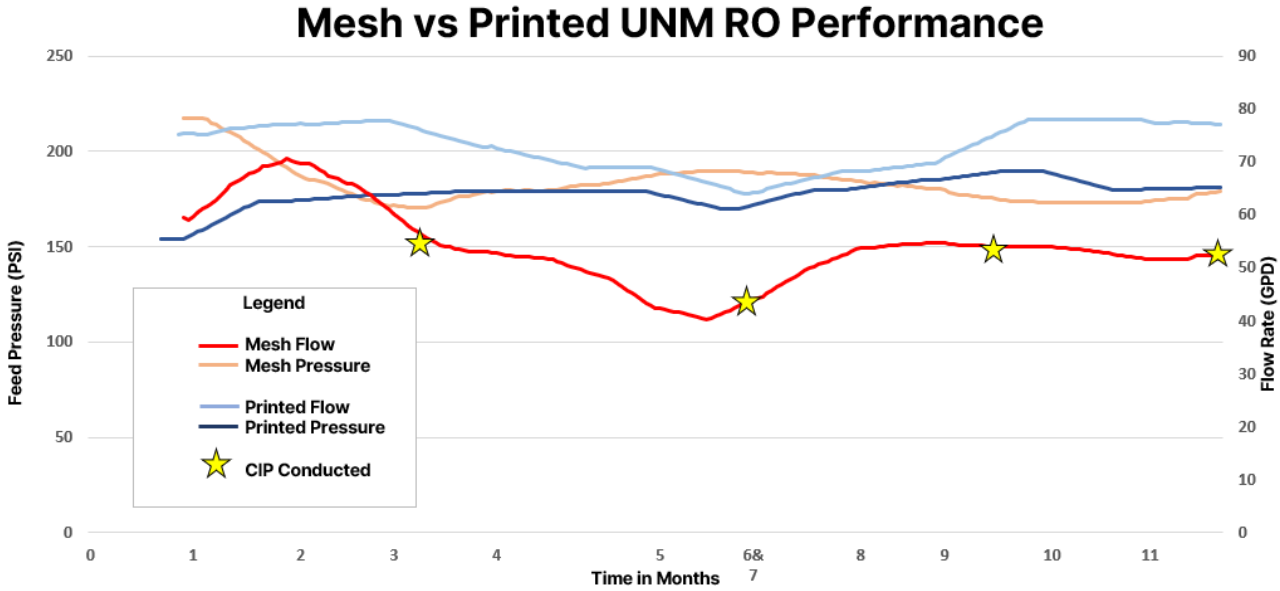
membrane element. Usually, when using thinner spacers, the differential pressure gets too high, losing energy with each membrane; this is not the case with printed spacers. Our products can have significantly thinner spacer because printed spacers are designed to be much more open and discrete, which keeps the differential pressure low, while the mesh is closed off and tumultuous, limiting how thin the spacer can be. This enables two benefits for the customer in this application:

First, because there is more surface area for filtration, we can produce more clean water in the same-sized system without needing additional equipment like pumps, pressure vessels, or piping.

Second, because our spacer is not interwoven like mesh spacers, there are far fewer places for scaling and fouling. This results in more time between cleanings and a longer overall element life. This saves money on chemicals used, labor, and replacement elements.

Results:

After a run time of just over a year using RO membrane elements with printed spacers, the University has seen astounding success. Previously, output was limited to 54 GPM, and cleaning was done every 3 to 4 months. After installing membrane elements with printed spacers, production increased to 72 GPM without cleaning after a year of operation. (Seen in Figure 1) This solved their output issue and is estimated to quadruple the membrane element life and reduce costs associated with chemicals and labor on their RO skid.



**Both data sets were taken at the same time of year and averaged based on data collection from the University of New Mexico and Aqua Membranes.*

Conclusion: Aqua Membranes Printed Spacer Technology solved a long-standing issue for the University of New Mexico Ford Utility Center. Since they started using Reverse Osmosis, it has been a fight to get the desired output and keep the membranes running. Now, the RO skid produces more than enough output, and fewer chemicals are needed for regular cleanings. This looks to save the University of New Mexico tens of thousands of dollars.