CASE STUDY

NYS P2I | New York State Pollution Prevention Institute

# Optimax Systems Improves Membrane System Operation

### Challenge

Optimax Systems wanted to optimize a previously-installed ultrafiltration system, looking for opportunities to:

- Reduce hazardous waste generation.
- Reduce operating costs by extending membrane lifetime.
- Evaluate new anti-fouling coating technology developed in partnership with the State University of New York at Buffalo (UB).

### Solution

- Various anti-fouling coatings were applied to commercial filtration membranes.
- Coated membranes were integrated into Optimax operations to monitor and compare performance.
- Source reduction measures developed concurrently led to less waste and extended membrane lifetime, and reduced energy usage.

### Results

- Sulfobetaine methacrylate (SBMA) and dopamine with 16 hour preparation was identified as the membrane coating with the largest impact on flux performance (+13.6%).
- Membrane lifetime was extended from 1.5 to 5+ months via source reduction, saving ~$11,000/year.
- NYSP2I will conduct further evaluation of membrane anti-fouling coatings.

## Optimax Systems

Optimax Systems Inc. (Optimax) is located in Ontario, NY, producing prototype, high-quality optical lenses for a variety of industries. Employing nearly 300 people, Optimax serves customers including the National Aeronautics and Space Administration (NASA), making lenses of all kinds including those with complex geometries such as aspheres, cylinders, domes, freeforms, prisms, and spheres.

*"Partnering with NYSP2I helped Optimax reduce its environmental impact through waste minimization and pollution prevention, which has resulted in cost savings and continuous improvement opportunities."*
***Junel Chan, Optimax Systems Inc.***

## Challenge

As part of a prior project with the New York State Pollution Prevention Institute (NYSP2I), Optimax installed a production scale ultrafiltration system to reduce hazardous waste generated from the cutting and grinding of precision optics (spent machining coolants). While the system worked well, the company was replacing ultrafiltration membranes once every 1-2

months instead of every 6-12 months, which is the expected replacement cycle for membrane applications. Irreversible fouling of the membranes was occurring, shortening the lifetime of the membranes and costing the company an extra ~$10,000/year.

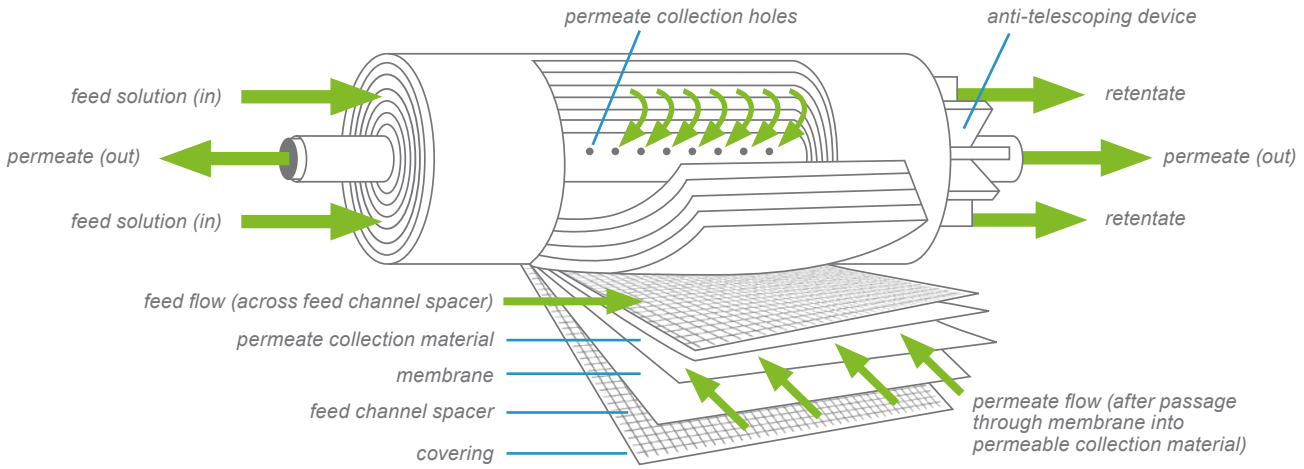
New technology to reduce fouling in membranes was developed as part of a NYSP2I grant awarded to the State University of New York at Buffalo (UB). To evaluate the technology in an actual field system, a project was scoped with Optimax to determine if this anti-fouling technology could help the company reduce costs and the number of waste modules, which themselves were considered hazardous waste. This project would potentially not only validate the new technology but also help Optimax reduce costs and hazardous waste.

## Solutions

In conjunction with UB, NYSP2I designed a test program to evaluate long-term performance of the anti-fouling membrane coating technology on the ultrafiltration system at Optimax. After a baseline without anti-fouling coatings was established, four (4) different coating formulations were evaluated where each test lasted 2-3 months. Direct comparison with uncoated membranes occurred in each test.

## Results

- Sulfobetaine methacrylate (SBMA) and dopamine was identified as the membrane coating with the largest impact on flux performance (+13.6%), expected to reduce system usage and save ~4kWh/week.
- Membrane lifetime was extended from 1.5 to 5+ months via source reduction, potentially saving ~$11,000/year.
- As part of NYSP2I's Emerging Technology Research program, further evaluation of membrane anti-fouling coatings will take place.




***Spiral membrane configuration***

## Partners

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