

### PolyCera® Hydro

## UF membranes prove to be an essential part of power plant blowdown water recycling process

### Overview

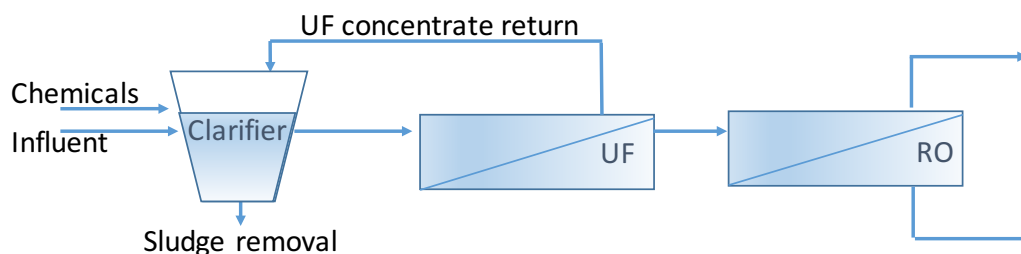
- Power plants consume significant amounts of raw water and generate wastewater. This wastewater, a wasted resource, is often disposed of by injecting into disposal wells or into retention ponds.
- Cooling tower blowdown water has a very challenging chemistry with high levels of sparingly soluble minerals, especially silica, which can limit water recovery during treatment.
- The PolyCera Hydro UF membranes, in conjunction with other process and control improvements, were able to treat this challenging wastewater and prove significantly lower capital (CapEx) and operating (OpEx) expenses, therefore making reuse a compelling economic solution.

### Demonstration

- PolyCera Hydro membranes were selected as part of a novel and low-cost treatment train to perform removal of silica, solids, and other contaminants from the challenging cooling tower blowdown.
- PolyCera® Hydro (100 kDa) Spiral Monolith membrane elements with an open channel spacer design, accommodating high levels of solids without spacer clogging, was selected. The membrane is back-washable and can operate in crossflow mode. The PolyCera Hydro elements treated the effluent from the chemical desilication clarifier as a pretreatment to the reverse osmosis (RO).



Process Flow Diagram



PolyCera®  
Hydro

>90%

Water  
Recovery

<0.1 NTU

Filtrate  
Turbidity

<3.0

Filtrate SDI

~25 gfd

Average  
Flux

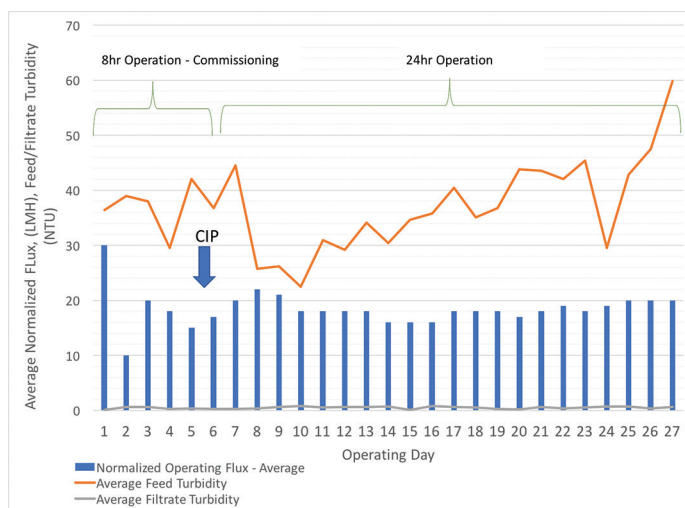
<0.5 ppm

Filtrate TSS

## Results

- The PolyCera Hydro membrane consistently produced a high quality of filtrate with average turbidity, aluminum, and silica removal efficiencies of 96.4%, 73.4% and 82%, respectively.
- PolyCera Hydro produced a silt density index (SDI) of below 3, which is the threshold level prescribed by RO membrane manufactures for good quality feed water.
- System specific energy consumption (SEC) was stable reflecting the operational consistency observed throughout the pilot. The average SEC was calculated at 0.080 kWh/m<sup>3</sup>
- Clean in place (CIP) events, 2 within the 6 weeks of demonstration, showed significant improvements in flux recovery.

Figure 1: UF performance over the entirety of the demonstration study.



## Value Proposition

- PolyCera Hydro membranes are made from a polymer material that has superior threshold for withstanding highly fouling prone waters, exhibiting high cleanability and flux recovery after fouling.
- PolyCera Hydro provided an absolute total suspended solids (TSS) barrier ahead of the RO system, as the membrane pore size provided complete removal of any solid particles greater than 0.01 microns.
- The PolyCera Hydro element construction with open channel spacer allowed for very high levels of solids in the feed water.

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