Atlantium

APPLICATION BRIEF

Hydro-Optic™ Technology
RO Membrane Protection

Seawater RO Facility Optimizes Membrane Performance with Novel Hydro-Optic™ UV Technology

A seawater reverse osmosis (SWRO) facility in Asia with a 100,000 m³ per day drinking water capacity undertook a comparative study to evaluate the disinfection efficacy of a novel Hydro-Optic™ (HOD) ultraviolet (UV) technology to provide enhanced protection of the RO elements and positively affect overall RO system and facility performance. Following the installation of the HOD UV technology, the facility experienced significant operational improvements. The HOD UV technology offers the facility a proven and economical non-chemical disinfection treatment approach to protect RO membranes.

The SWRO facility employs a multi-stage treatment process including a clarifier, disc filter, ultrafiltration (UF) membrane, micron filters, RO and post treatment. The RO system consists of 12 skids, each treating 750 m³ per hour feed water upstream of the micron filters. Membrane system operation and maintenance from a six-month period prior to and following the installation of the HOD UV technology on RO Train 12 were evaluated. The HOD UV technology was installed in December 2018 on the RO skid line for RO Train 12, after the UF membranes and before the micron filters. CIP frequency, DP post CIP, micron replacement, normalized permeate flow, and RO membrane replacement were evaluated. Data was also compared to the performance from an unprotected RO train (RO Train 11) that did not receive treatment from the HOD UV technology.

Results and Discussion

The facility experienced a 50% decrease in clean-in-place (CIP) frequency and a 65% decrease in the number of micron filter replacement events, leading to a 4.8% and 7.7% cost savings, respectively (Figures 1-3). Membrane performance also improved: there was a 21% decrease in post CIP differential pressure (DP) and an 8.2% increase in membrane permeate with the use of the HOD UV technology (Figure 4).

Conclusion

SWRO facilities experiencing frequent CIPs, micron filter replacement and RO membrane element replacement can benefit from exploring the HOD UV technology as a non-chemical disinfection treatment approach to enhance protection of the RO elements, extend membrane life, and positively affect overall RO system and facility performance.

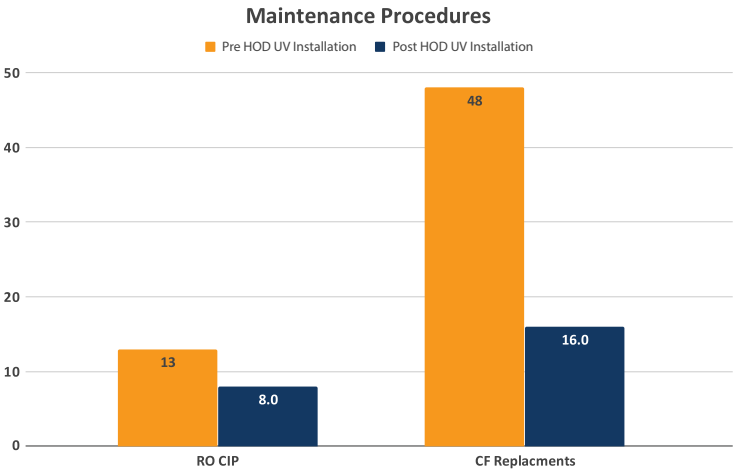

Figure 1: RO CIP frequency and CF replacement frequency, six months before and after HOD UV installation

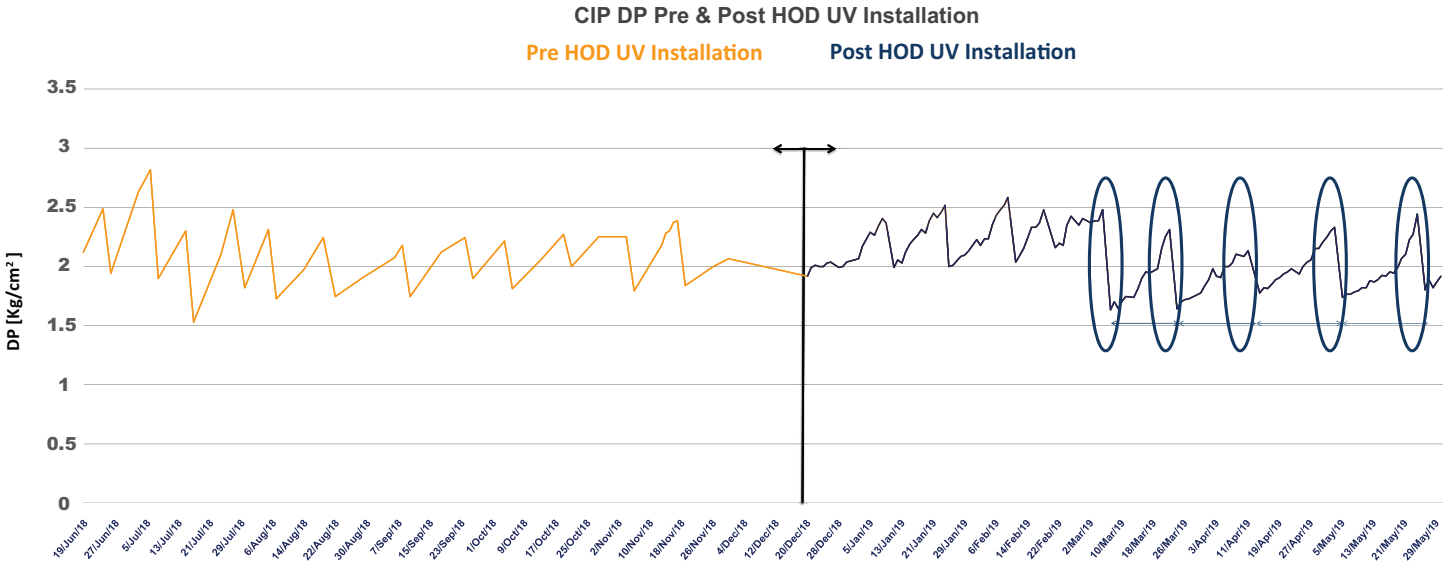

Figure 2: CIP is more efficient – 0.75 kg/cm² vs. 0.59 kg/cm² before HOD UV installation.

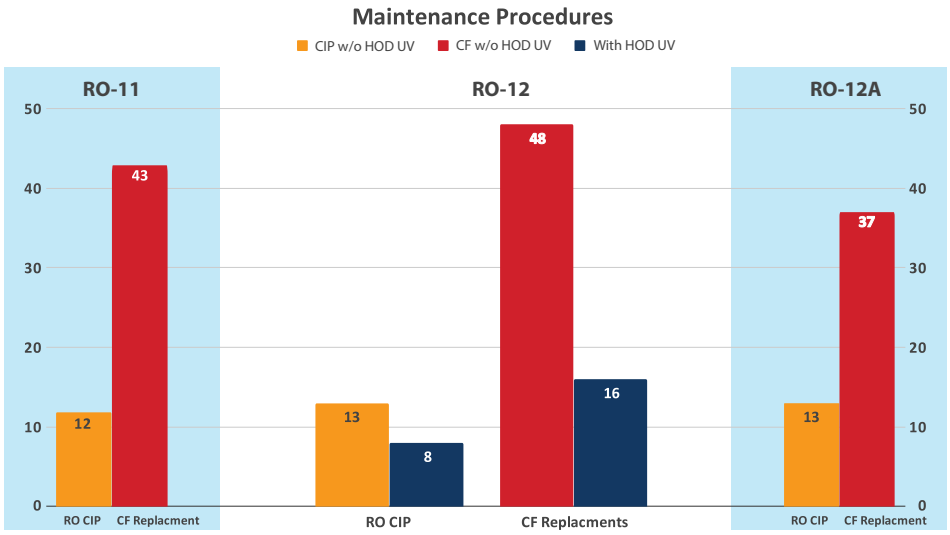

Figure 3: Performance data comparison for RO train with HOD UV protection (RO Train 12) and the same RO train six months before HOD UV installation (RO Train 12A), and for an RO train without HOD UV protection (RO Train 11).

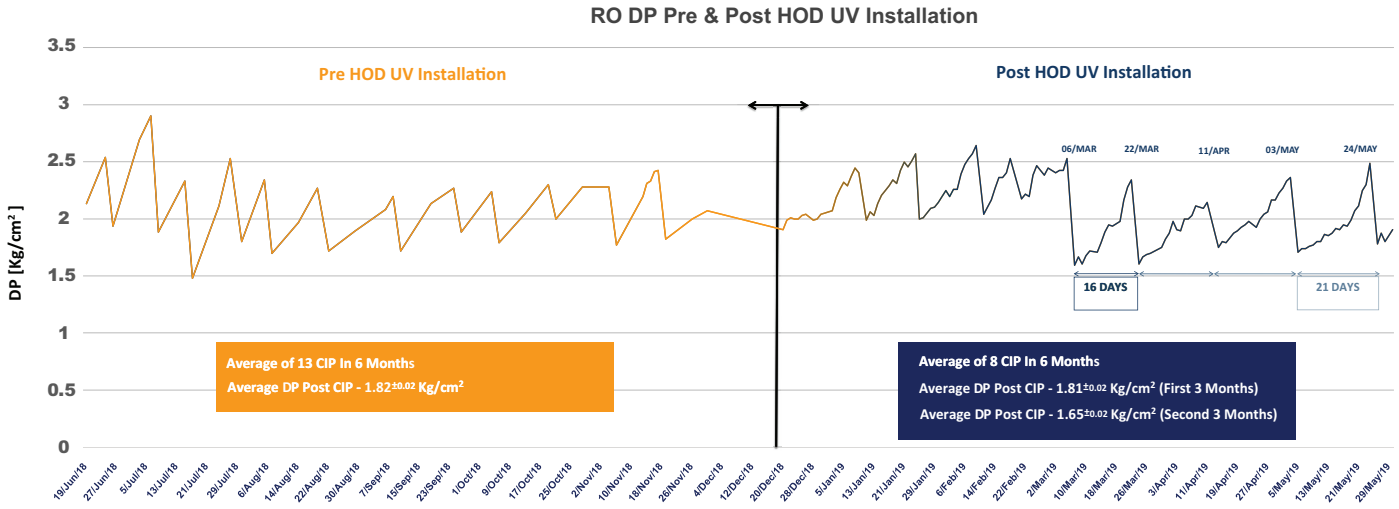

Figure 4: RO differential pressure prior to and post HOD UV technology installation

Atlantium
Illuminating Water Technologies

Atlantium Technologies

www.atlantium.com
info@atlantium.com

For more information, contact your Atlantium representative