

CASE STUDY

Industry:
Power Plant

High Salinity Water Reuse in Power Plant Operations

Application Overview

Power plants face increasing pressure to reduce wastewater discharge while maintaining efficient operation. In high-salinity environments, conventional treatment methods often fall short due to scaling, membrane fouling, or high chemical demand.

In 2020, a thermal power plant implemented a 760 m³/h ultrafiltration (UF) system using PolyCera® Hydro100 membranes to treat a challenging mix of circulating wastewater and RO concentrate. The objective was to achieve nearly zero liquid discharge (ZLD) while ensuring consistent pre-treatment for downstream reverse osmosis (RO) processes.



POLYCERA®



Process Design

The system was engineered to handle high salt concentrations and variable water quality with minimal chemical use. The treatment process includes:

1. Wastewater Source:

Combination of circulating cooling water and reverse osmosis concentrate, both containing elevated levels of TDS and suspended solids.

2. PolyCera® Hydro100 UF Membrane Filtration:

- Removes suspended solids and reduces turbidity to protect RO membranes.
- Maintains stable operation at high flux under challenging feedwater conditions.

3. Downstream Reverse Osmosis (RO):

Receives consistently pretreated water with reduced fouling potential, ensuring reliable performance and extended membrane life.

4. Concentrate Management:

Final brine is managed through a concentration and reuse loop, minimizing liquid discharge from the plant.

Results

The PolyCera® Hydro UF system achieved the following operational outcomes:

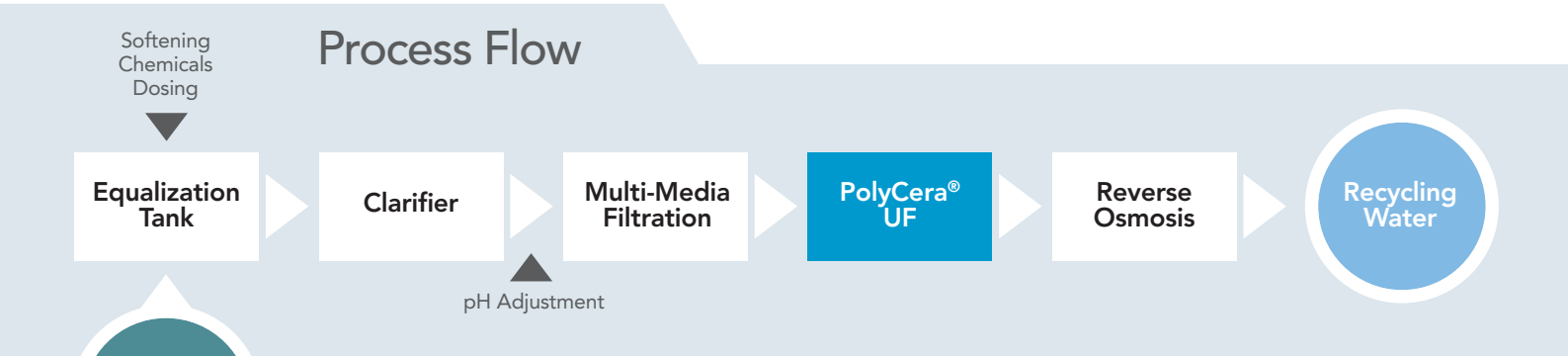
- High Recovery Rate: Overall system recovery exceeded 90%, significantly reducing liquid discharge volumes.

- Stable Water Production: Continuous 760 m³/h operation at design flux confirmed the membrane's performance reliability.
- Enhanced RO Protection: Pretreated water enabled stable RO operation with reduced cleaning frequency.
- ZLD Compliance: The membrane system played a critical role in enabling the plant to meet its nearly zero discharge target.

Conclusion

The deployment of PolyCera® Hydro 100 UF membranes in this power plant project underscores their suitability for high-salinity wastewater applications. The system enabled efficient water reuse, high recovery, and operational stability, helping the plant achieve its environmental and regulatory goals with reduced resource demand.

PolyCera®'s membrane performance in this project positions it as a reliable pretreatment solution for power plants pursuing zero liquid discharge in water-stressed regions.



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