



Customer Success Story

Reverse Osmosis Membranes Help Turn Wastewater into Reliable, High-Quality Drinking Water for Californians

Photo Credit: National Water Research Institute

ADVANCED WATER TREATMENT TECHNOLOGY FROM DOW HELPS RELIEVE LOCAL WATER STRESS IN ORANGE COUNTY

As population grows and urbanization rises, treating municipal wastewater for reuse presents a reliable and safe option to help mitigate drought and provide clean, potable water to residents.

Reclaimed municipal wastewater minimizes the need for local regions to import water, which is an expensive and energy intensive endeavor. The Orange County Water District (OCWD) has long been an innovative leader in recovering municipal secondary-treated effluent to create reusable, potable water. An integral component of its process is the Groundwater Replenishment System (GWRS) – a 100 million gallon per day (mgd) advanced water purification facility that uses reverse osmosis (RO) membrane technology as the workhorse of the treatment system.

Due to the stringent regulations on the quality of reclaimed water, the state-of-the-art facility uses a multiple barrier water treatment process. To create potable water, the facility first implements a microfiltration pretreatment to remove microorganisms and large,

suspended particles. The water then goes through an advanced RO treatment system removing dissolved chemicals, viruses and pharmaceuticals in the water. Finally, advanced oxidation (UV & Hydrogen peroxide) disinfects the water and destroys remaining low molecular weight compounds including those that must be removed to parts per trillion levels. Most of the purified water then goes to spreading basins to replenish groundwater aquifers, injected underground near the coast to protect the aquifer from seawater intrusion, and provide the county with an ongoing supply of highly purified drinking water that meets or exceeds all state and federal standards.

The OCWD sought a long-term strategy to further increase efficiency and productivity in the treatment of wastewater for reuse with the new RO membrane technologies that have higher permeability and fouling resistance. This is one reason why they chose to work with Dow Water & Process Solutions, filling their recent 30 mgd RO system expansion with DOW FILMTEC™ Reverse Osmosis Elements.



In facilities like the GWRS, the RO system is the most energy intensive process. In 2012, nearly 50 percent of all energy usage was tied to the RO process. Adoption of Dow's membranes in RO operation, as seen with the 30 mgd expansion in early 2015, lowered the energy required to treat the same amount of water by 13 percent when compared to the status quo performance of the existing membranes used in the original 70 mgd facility. Not only does reducing the energy it takes to purify wastewater translate into reduced operating costs for the plant, but it also lowers the carbon footprint of the facility.

Since then, Dow has provided a series of prototype membranes for evaluation by the OCWD – targeting higher permeability and fouling resistance without compromising rejection. Five prototype membranes have been developed and evaluated to date. Performance data indicates that progress is being made toward achieving the facility's goal of further minimizing energy requirements, which significantly contributes to the cost-effectiveness of such a large scale water reuse project.

OCWD and Dow are currently testing multiple membrane technologies to see which would provide the best option to bring drought-proof water to Orange County and create a long-term partnership. Through the trial tests, OCWD and Dow have implemented RO membranes with higher sustained permeabilities without sacrificing permeate water quality, thus offering first-rate, drinkable water at lower energy costs.

At full operation, the OCWD facility purifies more than 100 million gallons of treated wastewater a day to provide clean, high-quality drinking water to homes and businesses in north and central Orange County¹. By working together, Dow and OCWD research and development teams hope to create technologies that can be implemented across the globe, making wastewater reuse an even more attainable reality for water-stressed communities.

¹Source: [The Orange County Register](#)



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“We are proud to operate the world’s largest water reuse project of its kind, the Groundwater Replenishment System (GWRS). The GWRS uses FILMTEC™ membranes and their superior performance help us produce up to 100 million gallons of high-quality water every day.”

- **Mehul Patel**

Director of
Water Production
Orange County
Water District

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