

# Memcor® Submerged Membrane System Starts Up At Orange County Water District

## Background

Southern California is a semi-arid desert with a burgeoning population, and current water supplies are inadequate to supply future water needs. Orange County Water District supplies approximately 2 million people with potable water. The population is expected to increase to almost 3 million by 2020. In response, several agencies, such as Orange County Water District have pioneered the use of advanced water treatment systems that combine a dual membrane process that incorporates a microporous membrane process, such as microfiltration followed by reverse osmosis (RO) for the reclamation of municipal wastewater for agricultural, industrial and indirect potable reuse applications.

## Challenge

The Orange County Water District (OCWD) of Fountain Valley, California needed to increase its potable water supplies to meet the future water demands of this fast-growing area. In 1997, the OCWD and the Orange County Sanitation District released a joint report proposing a groundwater replenishment project (GWRS) to serve the residents of Orange County. The project would reclaim secondary treated wastewater, reducing the amount of wastewater discharged to the ocean, and providing a new local water source. It would also improve the overall water quality in the groundwater basin by reducing the mineral content as well as preventing ocean water contamination.

The GWRS is designed to be built in three phases during the next 20 years, expected to cost between \$400 and \$450 Million, and upon completion will provide as much as 130 MGD of treated reclaimed water. The GWR System serves three key functions.

- a seawater barrier;
- a drought-proof source of high quality drinking water, and
- an alternative to wastewater discharge to the ocean.

Snapshot - Orange County, CA	
Location	USA
Source	Municipal Wastewater
Application	Reuse
Technology	Memcor® CS
Capacity	80 MGD (302.8 MLD)
Commissioned	2007



Memcor® Membrane Systems

Water Technologies

SIEMENS

<b>Operational Data</b>	Orange County, CA
Number of cells	24
Modules per skid	608
Total capacity	70 MGD (302.8 MLD)



### Solution

The OCWD has started up an advanced water treatment facility to provide 70 MGD (265 MLD) of reclaimed water for agricultural, industrial and indirect potable use. Part of the GWRS, the water treatment facility consists of a Memcor® submerged membrane system from Siemens that supplies 87 MGD (329 MLD) of water to a reverse osmosis (RO) unit, followed by advanced oxidation (ultraviolet light plus hydrogen peroxide). Orange County awarded the \$27M microfiltration contract to Siemens in 2002 after extensive pilot and demonstration-scale testing of equipment from three membrane suppliers at OCWD's previous 5-MGD (19 MLD) reclamation plant at the site, known as Water Factory-21. Orange County chose Siemens based on a life cycle cost analysis of the Memcor® submerged membrane system. The system is currently one of the largest in the world.

Secondary treated wastewater that was formerly discharged to the ocean is treated with the submerged membrane system to remove all suspended solids, bacteria and other harmful contaminants. The water is then pumped into recharge basins or barrier wells, where it is blended with other groundwaters, and then travels through the soil, which provides additional natural treatment of the water.

### Membrane Solutions

Memcor® membranes from Siemens Water Technologies represent the broadest range of low-pressure membrane filtration products -- submerged, pressurized, large capacity or small systems. They continue to be successfully employed in applications as diverse as wastewater reuse, potable water, RO pretreatment, high solids and sand filter retrofits.

### Results

The Memcor® membrane system is composed of 26 compact units that provide more than five times the treatment capacity of a conventional clarification system housed in the same footprint. It does not require chemical pretreatment except for pre-chlorination, and requires less maintenance and operator intervention. The high-quality effluent increases the reliability, and reduces the capital and operating costs, of the downstream RO system.

Each of the 26 units, or cells, contains 608 hollow fiber membrane modules. The cells are arranged in four trains, each having a dedicated MemSAP (service access platform) to facilitate system maintenance. Each cell is fitted with its own filtration pump that draws water through the membrane fibers. The modules are arranged in racks, and sit 14 feet (4.3m) below the raw water elevation. This allows the OCWD to make use of the hydraulic gradient, eliminating the need to pump water into the membrane cells.

Memcor® Products								
Product	Pres-surized	Sub-merged	Water Reuse	Potable Water	High Solids	Sand Filter Retrofits	Large Capacity	Small Systems
CP	■		■	■	■		■	
CS		■	■	■	■	■	■	
XP	■		■	■	■			■
XS		■	■	■	■			■

### Siemens Water Technologies

North and South America  
+1 508.849.4600 Shrewsbury, MA, USA

Europe, Middle East and Northern Africa  
+44(0) 1332.387300 Derbyshire, UK

Asia Pacific and Southern Africa  
+61(2) 4577.6800 Windsor, NSW, Australia

© 2009 Siemens Water Technologies Corp.  
MC-ORANGEdr-CS-0709  
Subject to change without prior notice.

Memcor is a trademark of Siemens, its subsidiaries or affiliates.

The information provided in this literature contains merely general descriptions or characteristics of performance which in actual case of use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of the contract.