



Nov 2011 SEWER LEAKS

A Publication of Los Angeles Basin Section of the CWEA

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2011 Academy of Environmental Engineers West Coast Event

On September 22, 2011 the American Academy of Environmental Engineers (AAEE) hosted their annual West Coast Event titled *GM's Pioneer Recycled Water Use in SoCal* at the Orange County Water District (OCWD) headquarters in Fountain Valley. OCWD General Manager, Mike Markus initiated the program with a tour of the Groundwater Replenishment System (GWRS), which is the largest water purification project of its kind in the world. The system currently produces 70 million gallons per day (MGD) of finished water or enough to meet the needs of 144,000 families.

For decades imported water from the Colorado River and the State Water Project has been relied upon. In recent years there has been a reduction in imported water supplies due to recurring droughts. Reduced supply has been coupled with population expansion, which leads to the need to secure new water sources.

The OCWD and the Orange County Sanitation District (OCSD) worked together to meet this challenge through the construction of the GWRS. The GWRS takes highly treated sewer water and purifies it using a state-of-the-art three-step process. The advanced treatment system includes: microfiltration, reverse osmosis, and ultraviolet light with hydrogen peroxide disinfection. Microfiltration is a low-pressure membrane process that removes suspended particles, protozoa, bacteria and some viruses. Reverse osmosis is a high-pressure membrane process that forces water through the molecular structure of a thin membrane that filters out minerals and contaminants, including salts, viruses, pesticides and other materials. During disinfection, water is exposed to ultraviolet light and hydrogen peroxide. Due to the advanced treatment level, some alkalinity must be replaced in order to stabilize the pH. Lime is added to the finished water for this purpose.

Roughly half of the water from the GWRS will be injected into Orange County's seawater barrier. The seawater barrier is an underground pressure ridge of water formed by injection wells along the coast of Orange County. The remaining water is piped to recharge lakes in Anaheim, where the water will filter through clay, sand and rock to the groundwater basin. A combination of federal, state and local funding is being applied to this project, estimated at \$481 million. The percentage breakdown is as follows: Federal Title XVI Grants 4%, State Grants 16%, OCWD Contributions 40%, and OCSD Contributions 40%.



Photo credit: Leo Raab

GWRS Funding Source	Amount
EPA Grant	\$500,000
State Water Resources Control Board Grant	\$5,000,000
US Bureau of Reclamation Grant	\$20,000,000
Department of Water Resources Grant (Prop. 13)	\$30,000,000
Santa Ana Watershed Project Authority Grant (Prop. 13)	\$37,000,000
OCWD Contribution	\$198,560,000
OCSD Contribution	\$198,560,000

OCWD General Manager Mike Markus toasts guests with GWRS advanced treated water.

After evaluating many alternatives the OCWD and the OCSD chose to form a joint authorities agreement partnership for the GWRS project. This project benefits both agencies and the constituency in general, in that it helps to meet the long-term plan developed by the Metropolitan Water District of Southern California (MWD) to maintain and improve the reliability of Southern California's water supply. It also protects against future droughts, produces high-quality water to replenish the groundwater basin, protects the environment by reusing a vital resource and provides a source "water diversity" in an arid region. In addition, the facility will use approximately half the amount of energy that is required to transport water from Northern California to Southern California.



Photo credit: Deb Bogdanoff

Attendees enjoy networking (lt), Attendees dine al fresco (ctr), Attendees enjoy patio dining (rt).

The first Featured Speaker of the AAEE West Coast Event was Jim Herberg. Mr. Herberg is the Assistant General Manager and Director of Engineering for the Orange County Sanitation District. Under general administrative direction he, plans, manages, and oversees the District's major facilities which include: two wastewater treatment plants, cogeneration power plants, and the collection system; he also coordinates activities within District departments and with outside agencies; and provides technical support to the General Manager, Jim Ruth.

Early in the GWRS planning process a joint governance council was established to oversee the program. Key decisions that led to the success of the GWRS include: the decision to have the National Water Research Institute (NWRI) appoint an advisory panel of expert scientists and engineers, the selection of the highest technically feasible level of treatment (100% reverse osmosis), the commitment to a 10-year proactive public outreach program, and ultimately the close coordination at all levels. Mr. Herberg summarized the projects' success by showing the reduction in ocean discharge and corresponding increase in water reclamation. For example in 2006 effluent was discharged to the ocean at an average rate of 240 million gallons per day (MGD) and currently in 2011 effluent is discharged to the ocean at an average rate of 150 MGD, a reduction of 90 MGD.

The second Featured Speaker of the AAEE West Coast Event was Mike Markus. Mr. Markus is the General Manager of the OCWD. With more than 30 years of experience, he is well known for expertise in delivery of large projects, planning and water resource management. Mr. Markus was responsible for implementing the \$481 million GWRS. This project creates 70 MGD of high quality water supplies from secondary treated wastewater using microfiltration, reverse osmosis and ultraviolet light treatment processes. The GWRS is a model for water agencies worldwide. Mr. Markus is responsible for the management of all operations in the District including a staff of 215. The District's primary role is to manage the local groundwater

basin, which provides approximately 350,000 acre feet per year (AFY) of water supply to the area. OCWD's annual operating budget is \$120 million.

Mr. Markus continued the program with a discussion of the water supply sources and the District's operational recharge facilities. OCWD recharges approximately 308,000 AFY to groundwater supplies. The breakdown is as follows: 102,000 AFY from Santa Ana River base flows, 50,000 AFY from Santa Ana River storm flows, 60,000 AFY from natural incidental recharge, 20,000 AFY from MWD untreated full service water, 4,000 AFY from other sources, and 72,000 AFY from the GWRS. The GWRS currently accounts for 23% of the overall supply. OCWD manages 1,100 acres of recharge facilities. Mr. Markus emphasized the need for the GWRS from OCWD's perspective. These drivers include: extended drought conditions, imported water shortages caused by increasing environmental restrictions and potential levee failures, and the knowledge that local projects lessen dependency on outside sources. The GWRS, operational since 2008, reclaims 70 MGD of advanced treated water from resources that otherwise would have been wasted to the ocean for beneficial reuse. This results in enough "new" water to provide adequate supply for over 500,000 people.



Photo credit: Leo Raab

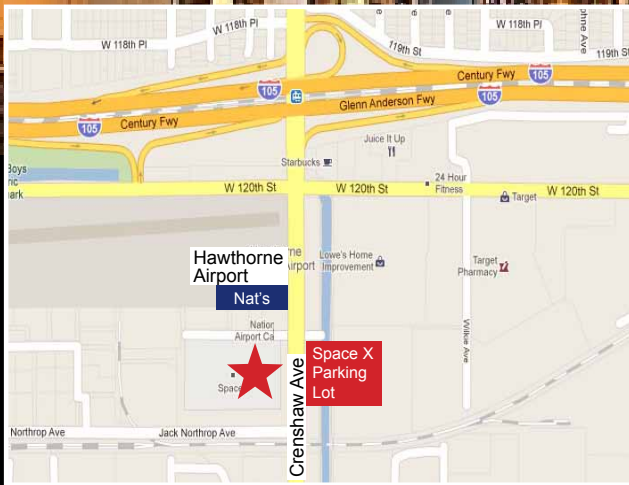
OCWD shares property line with OCSD (lt), Secondary effluent feed (ctr), Attendees enjoy tour of GWRS (rt).

Mr. Markus continued with a summary of the project funding sources. The \$481 million capital cost of the project was shared equally between the OCWD and the OCSD. The system is expandable to 130 MGD. Costs are comparable to imported water. The project received \$92 million in state and federal grants, and an operational and maintenance subsidy from MWD of \$4 million per year for 21 years. The resulting cost is \$480 per acre foot (AF) or \$850 per AF without subsidies. Mr. Markus concluded with an overview of OCWD's future plans for the project. The GWRS will be expanded to a capacity of 100 MGD. Bids for construction of the expansion were received on July 18, 2011 and a contract for \$115.1 million was awarded to the low bidder (McCarthy) on September 7, 2011. The 31,000 AFY expansion is projected to be complete in October of 2014. The estimated unit cost for the expansion is \$579 per AF, which results in an overall "melded rate" of \$512 per AF.

Through pioneering partnerships such as the one between OCWD and OCSD, the profession continues its journey toward making comprehensive water resources management practices a reality.



Blastoff on a Tour of



5:00pm...Thur...Nov 10, 2011

Established in 2002 by Elon Musk, the founder of PayPal and the Zip2 Corporation, **SpaceX** has already developed two brand new launch vehicles, established an impressive launch manifest, and been awarded COTS funding by NASA to demonstrate delivery and return of cargo to the Space Station.

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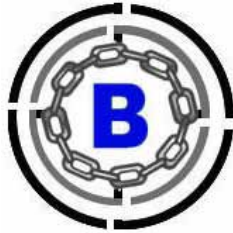
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SPECIAL EVENTS CALENDAR

Nov 3rd LA's Collection System Training Day; Hyperion, www.labsofcwea.com
Nov 8th Southern Regional Safety Day; Anaheim, www.labsofcwea.com
Nov 10th LABS Annual Industrial Waste Tour SpaceX; Hawthorne, www.labsofcwea.com
Nov 16th 2011 LABS Awards Nominations Deadline; www.labsofcwea.com

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