

Improving Orange County Water Reliability: Comparing Alternatives

This paper presents a comparison of the benefits and costs associated with two alternative water reliability programs for Orange County: 1) Poseidon's proposed seawater desalination project at Huntington Beach, and 2) the optimization of the Orange County Basin using available supplies from the Metropolitan Water District of Southern California (MWDSC).

Overview of the Alternative Programs

The proposed desalination project would produce 56,000 acre-feet (AF) per year of water that Orange County Water District (OCWD) is considering to recharge into the Orange County Basin. A "take-or-pay" water purchase agreement is proposed between OCWD and Poseidon, through which OCWD would be required to purchase all of the water produced by the facility for 50 years, subject to water quality standards and other conditions being met by Poseidon. This analysis of the desalination project was performed using information from the May 2015 non-binding term sheet between Poseidon and OCWD.

The Orange County Basin Optimization Program would maximize water purchases by OCWD from MWDSC when water is available. By managing the Orange County Basin with its existing management tools, Basin Production Percentage (BPP) and the Replenishment Assessment (RA), OCWD would maintain groundwater in the basin at higher levels during non-allocation years, and then, during a water shortage event, this stored water could be utilized to the benefit of the Groundwater Producer Agencies. Implementing this approach is within the purview and control of the OCWD Board.

Benefits and Costs of the Proposed Desalination Project

The desired benefit of the proposed desalination project is to improve the local water supply in Orange County. The feasibility of the project requires Local Resources Program (LRP) subsidies from MWDSC and OCWD proposes to apply for a 15 year subsidy of \$475 per acre foot. The underlying purpose of the MWDSC LRP program offset requirement is to improve MWDSC's regional reliability by promoting local projects that must replace an existing demand or prevent a new demand on MWDSC's imported water deliveries. This offset requirement would create regional water supply reliability improvements from the desalination project. The regional reliability improvements from LRP projects are spread across all of the MWDSC service territory. As a result of the offset requirement, water produced by the proposed desalination project would offset Orange County's purchases from MWDSC during non-allocation years when water is readily available and much less expensive. During periods of allocation, the desalination project water would supplement purchases from MWDSC. According to OCWD, the cost to provide this supplemental supply during a water supply allocation using desalination project infrastructure is nearly \$1 billion in capital construction and operational costs resulting in an initial regional cost of water paid to Poseidon and distributed for use of approximately \$1,900 per AF. Since Orange County would be paying substantially more for water from the desalination project than would be paid for water available from MWDSC, Orange County would be subsidizing the increase in regional reliability.

Year 2015 is the fourth consecutive year of the current severe drought and in response MWDSC recently implemented its Water Supply Allocation Plan requiring a 15% reduction of supplies to its member agencies. If the desalination project were online today under current MWDSC allocation rules, it could provide a local direct benefit this year equal to 15% of the 56,000 AF of water produced from the project, or 8,400 AF. The Governor's 25% statewide requirement to reduce potable water demand is limiting how much water will be taken out of the Orange County Basin. This state requirement essentially precludes the benefit of the 8,400 AF in 2015 if the seawater desalination project were online today.

Benefits and Costs of Optimizing Groundwater Storage with MWDSC Supplies

An alternative approach to improving Orange County's water reliability is to optimize the use of storage in the Orange County Basin with water available from MWDSC. This would be accomplished by maximizing purchases of MWDSC water in years when available, with the goal of keeping the basin closer to the top of the current operating range. This approach would provide ample supplies to get through several years of water supply allocations. By directly using Tier-1 treated water during wet years when recharge facilities are full and recharging Tier-1 untreated water when there is recharge capacity, the increased supplies in the Orange County Basin would provide a much more cost effective approach to improving Orange County's reliability.

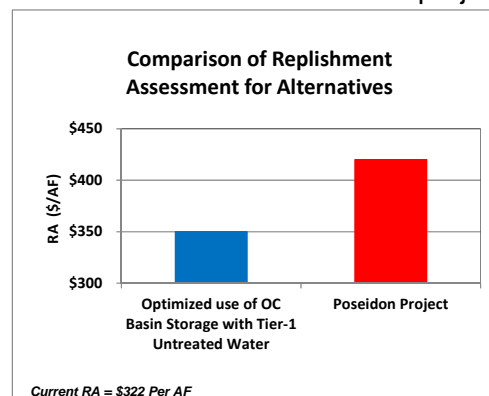
OCWD's 19 groundwater producer agencies and the citizens they serve would save about \$220 million in the first ten years (in 2015 dollars assuming allocations to occur every five years) by optimizing water storage in the Orange County Basin with untreated water from MWDSC versus purchases of desalinated seawater. The purchase of additional MWDSC supplies will require an increase in the OCWD RA that would be modest compared to the increase required by the contractual commitment to purchase desalinated water. For example, the storage of Tier-1 untreated water purchased from MWDSC to provide the same direct reliability benefits as the desalination project assuming water supply allocations that could occur every five years with 30% reductions in deliveries from MWDSC, would result in an increase of \$28 per AF in the RA from the current \$322 per AF to about \$350 per AF.

Comparison of Alternatives:

The net present value of the additional cost to the region of water purchased and distributed from the desalination project over 30 years would be \$1 billion greater than the cost of the water that could be purchased from MWDSC. This would result in a \$70 per AF increase in the RA charged by OCWD above the RA needed for the alternative of optimizing use of storage with water from MWDSC and a \$98 per AF increase over the current RA.

Assuming (hypothetically) that MWDSC calls a Water Supply Allocation every five years with a 30% reduction in deliveries, the proposed desalination project would produce 1.7 million AF of water offsetting Tier-1 water that could have been purchased from MWDSC within the first 30 years of operations. Assuming that half of this water would offset purchases of untreated water and half would offset treated water purchases, the total additional cost to the region of water purchased from the desalination project (after consideration of LRP subsidies and distribution costs) would be 2.3 billion greater than the cost of the water that could have been purchased from MWDSC. The net present value of this additional cost would be \$1 billion. This would result in an RA of about \$420 per AF which is \$98 per AF greater than the current RA and \$70 per AF above the \$350 per AF that would be needed for the alternative of optimizing the use of storage in the Orange County Basin with water from MWDSC.

Other alternatives would also provide water reliability for Orange County at a lower cost on a per acre foot basis than seawater desalination. One such project would be to capture some of the 10,000 AF per year of groundwater currently being lost to Long Beach. Another project would be to expand the use of the good quality water located in the deep aquifer that has a brownish tint imparted from the remains of ancient vegetation. Such a project would be somewhat more expensive, but still considerably less than the cost of seawater desalination. Other less expensive options, such as recycling all feasible sewage discharges currently flowing to the ocean, should be implemented prior to seawater desalination.



ELECTING TO NOT PROCEED WITH A SEAWATER DESALINATION PROJECT AT THIS TIME WOULD NOT PRECLUDE ITS IMPLEMENTATION IN THE FUTURE ONCE OTHER LESS EXPENSIVE OPTIONS HAVE BEEN FULLY EXPLORED AND IMPLEMENTED AND FURTHER IMPROVEMENTS IN WATER SUPPLY RELIABILITY ARE REQUIRED.