CITY OF SANTA BARBARA DESALINATION FAQs

How much does desalination cost?
The capital costs to reactivate the plant capacity of 3,125 acre-feet per year[1] (AFY) are estimated at $70 million. Annual operating costs are estimated to be about $4.1 million at full production (for 3,125 AFY of water supply), and about $1.4 million in non-operation or standby mode. The facility could be put in standby mode during rainy periods to reduce operating costs.

How will the desalination costs be financed?
The City has taken out a State Revolving Fund Loan to finance the $70 million capital cost to reactivate the desalination plant. The terms of this loan are a 20 year payback period with a 1.6% interest rate, which results in annual payments of approximately $4.2 million. Due to better loan terms, and a design concept that will save in operating costs, the annual cost of desalination is less than originally estimated.

What percentage of the City's water supply will the desalination plant immediately provide?
Based on the City's 2011 Long-Term Water Supply Plan, the City would use the facility as a drought relief measure at a capacity of 3,125 AFY, which is approximately 30 percent of annual demands, which vary depending on season and weather conditions. When the desalination plant is reactivated, extraordinary water conservation from residents and businesses will remain critical to meeting water demands.

How does desalination work?
Seawater will enter the City's desalination facility from 2,500 feet offshore passing through the wedge wire screens (see photo on next page) at velocities of less than an half a foot per second (which is less than typical ocean currents). Once on shore, the seawater will go through a series of filters that remove sediment, bacteria, viruses, and minerals (including salt), to produce an ultra-pure water. The City's desalination facility will use reverse osmosis treatment for removal of salt from seawater. Before the finished water is ready to be pumped into the water system and distributed to customers, natural minerals are reintroduced into the water to make it compatible with the City's other water supplies. The waste product from the desalination process is referred to as brine and is about twice as salty as normal seawater. The brine is blended with the City's treated wastewater and is discharged into the ocean over a mile and a half offshore. Discharge flow rates of brine and treated wastewater leaving the City's outfall pipe are controlled to protect sea life and comply with current regulations.

Will the desalination plant be operated after the drought?
The City's current adopted policy considers desalinated water as a drought supply. However, the City's existing permits allow for a range of operating scenarios which could include non-drought operations. When the drought emergency ends and our groundwater supplies have recovered from drought-related pumping, the role of desalinated water in the City's Long Term Water Supply Plan will be considered by the City Council. The City Council is expected to engage in this policy discussion as part of a Long-Term Water Supply Plan update, which will begin after the current drought emergency has abated.

Has desalination technology improved since the original plant was constructed?
The reactivated facility will use 40% less energy than the original design, greatly reducing its electricity demand and carbon footprint by using high-efficiency pumps, motors and improved filter technology. Additionally, the existing ocean intake pipes will be re-equipped with wedge wire screens recognized by the State Water Resources Control Board as a best available technology for screened open ocean intakes. The screens will be made of durable copper-nickel alloy and will

[1] An acre-foot is equivalent to approximately one football field covered with one foot of water. There are 435.6 hundred cubic feet (HCF) in one acre-foot. An acre-foot per year provides approximately 3 households with water for a year.

have 1 millimeter openings to minimize marine life entrainment and impingement. For comparison, the original ocean intake screens were approximately 3.5" by ¾" rectangular screens- a reduction of approximately 95% in screen size.

What does the intake look like?

The City's existing intake is an open ocean intake that uses screens to reduce environmental impacts of marine life becoming entrained (taken into) the treatment plant. As part of the reactivation project, the City has volunteered to update the screen technology to meet the standards that the State recognizes as "Best Technology Available" (BTA). The updated screen technology uses 1 millimeter openings, and water entering the intake will be flowing at 0.5 feet per second, which is slower than the natural surrounding current of 1 feet per second.

What is the maximum permitted capacity of the desalination plant?

The City's permits allow for up to 10,000 AFY of water supply. The original plant constructed in 1991 had 7,500 AFY of treatment capacity. Current water rates assume reactivation at a plant capacity of 3,125 AFY. An increased plant capacity, up to 7,500 AFY, is currently estimated to cost an additional $30 million and would require additional water rate increases.

Is the desalination plant a regional facility?

When the temporary desalination plant was constructed in 1991, Montecito Water District (Montecito WD) and Goleta Water District (Goleta WD) were partners in the project. In order to make the facility a permanent water supply, an extensive environmental review and permitting process was required. When the review and permitting efforts were completed in 1996, Montecito WD and Goleta WD declined to participate in the project further and did not pay for the process of making the facility permanent. Therefore, the City is the sole owner of the plant and has continued to renew its permits over the years. The desal plant could potentially be expanded to serve as a regional water supply facility to benefit the South Coast communities. Regionalizing the desal plant could be accomplished through approval of water supply agreements and exchanges with South Coast water agencies, communities receiving State Water, and communities receiving water from the Santa Ynez River.

Why did the City put the original plant into long-term storage?

When the original facility was constructed in 1991, the desalination process technology only allowed relatively short periods of inactivity before the reverse osmosis membranes (used for treatment) began to deteriorate. Due to sufficient surface supplies and significantly reduced demand following the drought, the City put the plant into long-term storage, since it was the most cost-effective option for ratepayers.

What happened to the money when the City sold off the original membranes?

When the desalination plant was put into long-term storage, a portion of the reverse osmosis membrane treatment equipment was sold, reducing the capacity of the original regional facility to the capacity required for the City's needs only. The sale helped to recuperate the City's costs associated with permitting of the permanent facility, and also reduced the long-term costs to rate payers for maintaining the facility.

What are the environmental impacts of desalination?

The environmental effects of the desalination plant were analyzed in two separate Environmental Impact Reports. The first of those reports, prepared in 1991, analyzed the construction and operation of the desalination plant as a temporary emergency facility (1991 EIR). Subsequently, the City decided to incorporate the desalination plant into a permanent facility that would produce water supplies that were included in the City's Long-Term Water Supply Plan (LTWSP). The second EIR, prepared in 1994, analyzed the operation of the desalination plant as a permanent facility (1994 EIR). These EIRs identified potentially significant impacts related to noise, cultural resources, air quality, water quality, and aesthetics. However, all potentially significant impacts were mitigated to less-than-significant levels through project modifications and/or mitigation measures. Therefore, both EIRs concluded that the desalination plant would not have a significant impact on the environment.

Are sub-surface seawater intakes being explored as an option?

Sub-surface seawater intakes are pipes installed under the sandy seafloor, rather than in open water. An ongoing City-sponsored study recently found that sub-surface intakes were infeasible at this time due to several factors including impacts to sensitive habitat (Mission Lagoon), insufficient water production, and geologic factors. When the drought ends and the water supply emergency has subsided, the City will revisit the role of desalination as part of an update to the Long-Term Water Supply Plan.

How salty is the brine waste that is discharged back to the ocean?

As a result of the desalination process that removes salt from water, a portion of the seawater drawn in from the City's intake will be concentrated into a salty brine waste stream that is nearly twice the salinity of seawater. The desalination plant's brine stream will be discharged to an ocean outfall that is shared with the El Estero Wastewater Treatment Plant. Blending the brine stream with the City's wastewater stream reduces the salinity dramatically - under typical flow conditions the combined wastewater would be equal to or less salty than the ocean. The City hired a consultant associated with the SCRIPPS Institution of Oceanography to model brine discharge under a range of conditions. This brine study concludes that the wastewater effluent would comply with the discharge requirements of the existing permit.