

Submersible Pumps and Motors

CASE STUDY

City of Santa Barbara Charles E. Meyer Desalination plant - Intake Pumping Station



City of Santa Barbara Charles E. Meyer Desalination Plant

On July 21, 2015, in response to exceptional drought conditions, the Santa Barbara City Council voted unanimously to reactivate the Charles E. Meyer Desalination Plant. The plant uses state-of-the-art technology and design practices to reduce electrical demand and environmental impacts, while providing a critical water supply for the City.

City Council awarded IDE Americas, Inc. a design/build/operate contract to re-commission the desalination plant.



Figure 1: Project Pipeline 2015-2017

The plant began supplying water in May 2017 with a production of nearly three million gallons per day. This is equivalent to 4.63 million of m^3 annually or about 30 percent of the City's demand; that means about 100,000 inhabitants (including the Montecito community with whom Santa Bárbara has a supply agreement). The desalination plant is an important part of the City's water supply portfolio which also includes surface water from Cachuma and Gibraltar reservoirs, groundwater, State water, purchased water, recycled water, and conservation.

The capital costs to reactivate the plant are \$72 million financed over 20 years with a low 1.6 percent interest rate loan, which equates to \$4.2 million per year in debt service. Annual operating costs are estimated to be about \$4.1 million at full production and about \$1.5 million in non- operation or standby mode. The plant could be put in standby mode during rainy periods to reduce operating costs.



Aerial image of Charles E. Meyer Desalination Plant March 2017

(Figure 2)

City Of Santa Barbara Charles E. Meyer Desalination Plant: How the #DESAL works?

Seawater enters the City's desalination plant from 763 m offshore passing through the wedge wire screens at velocities of less than 1.524 m/s which is less than typical ocean currents (Open Ocean Intake).

Once on shore, the seawater passes through a series of filters that remove sediment, bacteria, viruses, and minerals (including salt), to produce an ultra-pure water. The City's desalination plant uses **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.



Figure 3: Desalination process in The Charles E. Meyer Desalination Plant
Source: City Of Santa Barbara
(1) Location of the SeaWater Intake (Open Ocean)

07/2021

Reliable Pumping Solution: The Retrofit

By 2020, IDE technologies, according to the actual operating points along the last three years, updated the technical requirements for the intake pumps.

A more adjusted hydraulic selection, tailored for the projects needs, was chosen for the retrofit of one (1) of the two (2) intake pumps, as the pump was not operating at its best with the current desalination intake needs in terms of flows, heads and material selection



Figure 4: Project Pipeline 2015-2021

By the end of 2021 intake chamber will be retrofitted, replacing one (1) of the original two (2) pumps with a highly efficient Indar submersible volute pump **BF-30-29-B2 + MF-355-4/130**.

The pump manufactured in Duplex Material will drive a flow of 299 l/s.

Pump	Motor	Flow (l/s)	Head (m)	Motor Output (kW)	Voltage (V)	Discharge Diameter (mm)
BF-30-29-B2	MF-355-4/130	299	31	149	4160	300

The totally customized submersible pump with mixed flow, single stage and single inlet have an enclosed multi-channel impeller with big free ball passage. Being projected with volute diffuser the equipment has been adapted to fit the original layout (intake and discharge) of the intake sump. The material selection with Duplex SS increases corrosion resistance for the equipment taking into account the marine environment for the installation; this fact is crucial to guarantee equipment optimal operation and minimize maintenance stops.

Indar's Value Proposal for Desalination

Desalination is a water treatment process that turns salt water into fresh water. It takes away mineral components from saline water. Seawater desalination facilities require an intake system capable of providing a reliable quantity of clean seawater with a minimum ecological impact.

Indar submersible pump sets for desalination water intake projects, open ocean and Subsurface (slant or not), are a technically and environmentally friendly alternative due to the efficient use of water. Backed by our proven in-house technology, we offer stiff, high performance and almost maintenance free solutions.

With this new project, Indar consolidates the presence of its Water Engineering strategy in the US, where it hopes to achieve new benchmarks in the near future.