Bocabarranco Desalination Plant – Gran Canaria
Increasing hydraulic resources
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The purpose of this job was to obtain the maximum production of drinking water in order to cover the great demand in the area today and in the future. The design takes into account a series of limitations such as optimizing the space necessary for the installations, increasing the quality of the intake water and overcoming the problems of scarcity and quality with the power supply.

Location	**Galdar (Gran Canaria)**
Customer	**Consejo Insular de Aguas de Gran Canaria**
Date	**November of 2000**
Construction period	**10 months**
Capacity	**7.000 m^3/day**
Technology	**Reverse osmosis**
Membrane	**Spiral Wound**
Modulation	**One line, one stage**
Treated Water	**TDS < 400 mg/l**
Quality	**USE: Drinking Water**

As part of the plan to increase water resources for the towns on Gran Canaria Island, the Consejo Insular de Aguas requested the design and construction of a plant of maximum water production due to the large demand today and that expected in the future.

It had to meet a series of limiting factors such as the reduced space available in the facilities where it was to be installed, the lack of an appropriate site for collecting seawater of adequate quality and the problem of obtaining electric power for the plant's equipment , all in an existing facility with installations of the same type whereby it was necessary to integrate a control system to coordinate this aspect.

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Description of the installations

The technology chosen for this project was reverse osmosis using spiral wound membranes. The reasons were directly related to the solutions that were offered for conditioning factors mentioned above, especially the good ratio between the space occupied and the high water production, given the large specific surface area offered, the great penetration of this product and process on the market and the good specific consumption ratio (kW/m^3).

The solution for the conditioning factor of the quantity and quality of the seawater collected was to dig wells along the coast using rotary percussion machines. Multi-stage, high corrosion resistant, submergible pumps built of stainless steel alloys were installed in these wells.

Nine new wells were dug: 3 for this facility and the rest at the customer's disposal to slowly change the current or future installations over to this system and location. Each one assured a minimum pumping capacity of 60 liters per second. The required intake flow was 180 l/s (648 m^3/h, 15,552 m^3/day).

The advantage of this system is the high quality of the water collected because of the filtering process that takes place naturally. As a result, the preliminary treatment before the water enters the reverse osmosis process is more effective and less costly and the membranes do not get as soiled or deteriorated. Both of these factors affect the plant's economics and production positively when in operation.

A new, ductile cast iron, 350 mm diameter pipeline was built to convey this flow directly to the process building. It was necessary to completely remodel the building in order to install the new equipment. The low pressure pipes in the area were built of GFRP.

The physical preliminary treatment consists of two pressurized sand filters working at 16 m/h, each with 20 m^2 filtering surface. This leads to a 5 micra microfiltration unit formed of three cartridge filters installed in parallel, one on stand-by for maintenance purposes.

Considering the characteristics of the input water according to the analyses carried out, the physical preliminary treatment consists of adding sulphuric acid to adjust the pH, a dispersant – sodium hexametaphosphate – to prevent the salts from precipitating, sodium hypochlorite to disinfect, and sodium bisulphate to eliminate residual chlorine and a coagulant. As a post-treatment calcium hydroxide is added for remineralization.

A motor-pump system with Pelton turbine is used in the reverse osmosis process making it possible to take advantage of the energy from the brine to reduce the specific power consumed by the process. The split chamber pump is fed by a 1075 kW engine at 6 kV and the working pressure to reach 7,000 m^3/day of treated water at a conversion rate of 45% is 67 kg/cm^2. This process is carried out in a rack housing 86 pressure boxes that contain the 602 membranes required. The treated or permeated water goes to the existing regulating tank from where it is distributed.

The high pressure pipeline was made of a special stainless steel alloy that resists the pressures and corrosion typical of this type of technology.

Noteworthy of the electrical installations was the construction of a new building to house the transformers to supply the pump turbine. The control and automatization were redundant, given the critical nature and importance of the process.