

H2Oaks Center

Background

Location:	Elmendorf, Texas
Water Authority:	San Antonio Water System
Year Operational:	2016
Design Capacity:	12 million gallons per day (MGD)
Production Wells:	12 wells installed in the Wilcox Aquifer
Total Project Cost:	\$192.7 million



Reverse osmosis system

Treatment Process

The raw water (average total dissolved solids concentration of 1,300 milligrams per liter) is conveyed in a closed pipe system to prevent air from entering the pipelines. Pretreatment includes filtration using cartridge filters and addition of anti-scalant and acid to prevent membrane fouling.

There are six reverse osmosis (RO) trains. Four of these trains are called primary RO trains and contain two stages, and the remaining two are called concentrator RO trains and contain a third stage. Total recovery from the three-stage system is 90 percent.

Each primary RO train can be operated independently of each other and is designed to produce 2.22 MGD at 80 percent recovery. The first stage contains 40 pressure vessels and the second stage constitutes 20 pressure vessels. Each concentrator RO train receives the combined concentrate from two primary RO trains and produces 0.56 MGD of permeate at 50 percent recovery. Each concentrator RO train contains 16 pressure vessels and can be operated independently.

Each pressure vessel of primary and concentrator RO trains contains seven RO elements, which are manufactured by Dow

Filmtec (model number BW30-400). An inter-stage booster pump between the second and third stages is used to boost the feed pressure to the third stage. The concentrate from the system is injected 5,000 feet deep into the Georgetown, Edwards, and Upper Glen Rose limestones.

A portion of the permeate goes through calcite contactors to add calcium, alkalinity, and hardness to the water. The 10 MGD of permeate can be blended with 2 MGD of raw water. The water then goes through degasifiers to strip out remaining gases and chlorine contact basins for disinfection.

Future Expansion

From the planning to construction phase, it took approximately 10 years to build the desalination facility. The Center is unique because it operates and produces from one location three water supplies: aquifer storage and recovery, desalination, and local groundwater. The utility was also the first to permit a Class I injection well under the new regulatory process and obtain a general permit.

In the future, the desalination facility will be expanded in two phases, which include a 12 MGD expansion in the second phase and a 6 MGD expansion in the third phase.

The Texas Water Development Board (TWDB) is the state agency charged with collecting and disseminating water-related data, assisting with regional planning, and preparing the state water plan for the development of the state's water resources. TWDB administers cost-effective financial assistance programs for the construction of water supply, wastewater treatment, flood control, and agricultural water conservation projects.