

DESALINATION

USA, NATIONWIDE

Seawater desalination provides access to virtually unlimited water supply.

Challenge: While the world's population is expected to increase by 50 percent by 2050, the quantity of freshwater remains constant. This growing demand puts global water supplies—indeed a finite resource—under great pressure. What's more, changing climate conditions alter weather patterns, intensifying drought conditions where they are common and introducing abnormally dry conditions in otherwise normal regions. In the United States, this is particularly serious in the Southeast and in the Western states. One of the most critical questions we face as a nation is how will we ensure that all people continue to have access to clean drinking water.

Solution: With seawater comprising 97 percent of the earth's water, one viable solution is desalination – the removal of salt from brackish (saline) water or seawater. This technology has been successfully implemented around the world, and has been proven to meet the needs of residents that would otherwise have no local access to drinking water. American Water, in cooperation with its joint venture partner Acciona Agua, operates the largest seawater desalination plant in the U.S. in Tampa Bay, Florida.



American Water employee changes a membrane.

As desalination technology improves and its costs decrease, it has clearly become a viable alternative to environmentally-stressed groundwater and surface water supplies used for drinking water. Since the vast majority of the Earth's water is seawater, tapping into this seemingly infinite resource through desalination is becoming an industry trend.

Though various methods exist for desalination, the platform most often used in the United States is called reverse osmosis. During this process, seawater is treated to remove particles and other compounds before it is pumped at high pressure through a special membrane that traps salt while allowing the water to pass through. The resulting clean drinking water undergoes a final disinfection and stabilization process before being delivered to customers. Brine, a leftover concentrate of salty water, is typically mixed with fresh seawater to reduce the salinity before release back to the ocean.



Gauges at the Tampa Bay Seawater Desalination Plant.



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Project Details:

Tampa Bay Seawater Desalination Plant:

During the 1990s, population growth and increasing drought began to outpace the development of new drinking water supplies, driving the need to find additional supplies to offset groundwater pumping, reduce environmental stress, and meet the growing needs of the region. American Water, as part of a joint venture with Acciona Agua, contracted with the local water board to overhaul and manage the Tampa Bay Seawater Desalination Plant. The plant is designed to supply up to 25 million gallons per day of fresh water to the local governments, communities, and residents served by Tampa Bay Water. At full capacity, the reverse osmosis process leaves about 19 million gallons per day of brine behind, which is then diluted with up to 1.4 billion gallons of water before being discharged back into the ocean.



Front entrance of the Tampa Bay Seawater Desalination Plant.



Aerial photo of the Tampa Bay Seawater Desalination Plant.

Technology Applied: In the U.S., the platform for most desalination operations is membrane technology, specifically a process called reverse osmosis (RO). Prior to RO treatment, particles and other compounds must be removed from the sea or brackish water source. This partially treated water is then pumped at high pressure through a semi-permeable RO membrane, which allows water molecules to pass through while excluding the salts. Two things result from this process: clean drinking water and brine, a leftover concentrate of salty water. The clean drinking water will undergo a post-treatment disinfection and stabilization process before being delivered to customers for consumption.

There is a pressing need in this country to find ways to both increase sustainable capacity and conserve water. Desalination technologies can provide a water supply solution that can best serve local and regional needs. Therefore, it is essential that more people understand and focus on the benefits of desalination.