

## Case Study

# Transitioning the USVI Water Supply



SEVEN SEAS WATER GROUP  
Water-as-a-Service®



## SWRO Project Details

**Customer:** Water & Power Authority (WAPA)

**Technology:** Seawater Reverse Osmosis

**Market:** Municipal / Permanent SWRO

### *St. Thomas, U.S. Virgin Islands*

**Capacity:** 3.3 MGD (12,490 m<sup>3</sup>/d)  
Expandable to 4.4 MGD (16,275 m<sup>3</sup>/d)

### *St. Croix, U.S. Virgin Islands*

**Capacity:** 3.7 MGD (14,005 m<sup>3</sup>/d)  
• 2.2 MGD permanent facility  
• 1.5 MGD containerized solution  
Expandable to 4.7 MGD (16,275 m<sup>3</sup>/d)

## UPW Project Details

**Technology:** Electrodeionization (EDI)

**Market:** Industrial Ultra Pure Water (UPW)

**Capacity:** 850k GPD  
• 350k GPD on St. Croix  
• 550k GPD on St. Thomas

## Overview

In 2009, Seven Seas Water began its relationship with the VI Water and Power Authority (WAPA) when it won a tender to supply 500,000 gallons per day (GPD) (1,892 m<sup>3</sup>/d) of fresh water on the island of St. Croix. This would be a temporary supply, during a time frame while the Authority's thermal desalination equipment was being refurbished. When WAPA concluded that the Seven Seas solution, utilizing state-of-the-art reverse osmosis technology, could produce highly reliable quantities of water at a measurably lower cost than originally estimated, Seven Seas was asked to expand the scope of supply to 1.5 MGD (5,677 m<sup>3</sup>/d). A contract was signed and in 97 days, Seven Seas was delivering the contracted quantity and quality of water on the island of St. Croix. The company installed mobile seawater reverse osmosis (SWRO) units that not only satisfied the immediate needs in the shortest time frame possible, but also provided sufficient additional benefits that warranted pursuing a longer term; permanent SWRO solution.

In early 2011, after a rigorous bidding process, Seven Seas won another tender with WAPA; this time tasked with the responsibility to replace all of WAPA's thermal production of potable water on St. Thomas and St. Croix with SWRO, and to supply all the fresh water for WAPA to distribute, territory wide. This would include two new land based facilities, a 2.2 MGD facility on St. Croix, with the existing 1.5 MGD (5,677 m<sup>3</sup>/d) to remain in place, and a 3.3 MGD (12,490 m<sup>3</sup>/d) plant on St. Thomas.

In November 2011, while in the permitting process for the land based projects on St. Croix and St. Thomas, WAPA's thermal desalination equipment on St. Thomas was failing to keep up with demand, and the island faced critical water shortages. The Authority requested an emergency supply of 2 MGD (7,570 m<sup>3</sup>/d) of potable water from Seven Seas. As they had previously done on St. Croix, Seven Seas responded in record time, delivering eight mobile SWRO units to the Randolph E. Harley Power Plant. Within 29 days, the company was delivering 500k GPD (1,892 m<sup>3</sup>/d) to the Authority's tanks, and only 46 days from signing the emergency contract, the entire 2 MGD (7,570 m<sup>3</sup>/d) was being delivered to WAPA's distribution network.

With quick deploy containerized units in place on St. Croix and St. Thomas, WAPA and Seven Seas began coordinating efforts to build permanent facilities on both islands. On St. Thomas, construction began on the Harley Seawater Reverse Osmosis Facility in July 2011 and was commissioned in June 2013. The Harley facility is now delivering 3.3 MGD (12,490 m<sup>3</sup>/d) of potable water to St. Thomas and through an underwater pipeline to the neighboring island of St. John. On St. Thomas, the temporary units were phased out and have been shipped to other Seven Seas project locations. On St. Croix, the permanent Richmond SWRO facility was commissioned in August 2013 and delivers 2.2 MGD (8,327 m<sup>3</sup>/d) of fresh water in addition to the 1.5 MGD containerized solution.

During the construction of the SWRO projects, WAPA asked Seven Seas to build two additional water plants on each island that would provide ultra-pure water to meet power generation demands and EPA mandates on St. Thomas and St. Croix. These facilities combined produce 850k GPD (3,217 m<sup>3</sup>/d) of ultra-pure water.

## No Capital Costs

With no up-front capital required from WAPA, Seven Seas quickly responded to WAPA's requirements under a build-own-operate (BOO) arrangement. Seven Seas manages and operates the water facilities daily, guaranteeing a reliable water source at a fixed cost per gallon over the entire term of the agreement with the ability to expand at no extra cost to the Authority.

## DID YOU KNOW?

In addition to the benefit of reduced costs in operating a seawater reverse osmosis system vs. a thermal plant, the average area per unit of capacity is greatly reduced for a seawater reverse osmosis desalination facility, which frees up valuable real estate.

For this project, the average area per unit of capacity for the thermal facility was 7.31 ft<sup>2</sup> per thousand gallons of produced water per day. The average area per unit of capacity for the seawater reverse osmosis system is 3.99 ft<sup>2</sup> per thousand gallons of produced water per day.

