

Client

City of Pompano Beach
MBC Subconsultant to Prime

Scope of Services

Design, review of pilot testing, membrane selection, bidding, procurement contract administration, proof testing and performance testing review, and start-up

Contact

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Start Date

10/2006

Completion Date

09/2009

Construction Cost

\$1.6 million

Key MBC Staff

Frank A. Brinson, P.E.

Key Features

Based on raw water quality, replacement membranes were selected to optimize iron rejection while maintaining sufficient hardness to provide a stable finished water. Full-scale manufacturer proof testing was required to demonstrate satisfactory performance.

10.0 mgd Nanofiltration Membrane Element Replacement

Pompano Beach, Florida



Background

In 2002, the City of Pompano Beach installed a new 10 million gallon per day (mgd) capacity nanofiltration membrane treatment plant. The original membrane elements that were installed in the plant did not perform in accordance with the manufacturer's projected performance that was submitted when the project was bid. In particular, system operating pressure was higher than projected, and the plant experienced difficulties in making the design capacity. As a result, the City decided to procure new membranes. The City pilot tested new nanofiltration membranes to confirm that the new membranes will provide superior performance and stable operating characteristics. In addition, pilot testing included "fine tuning" of the membrane selection to optimize the City's iron removal and hardness goals. Based on the results of this testing, the City concluded that the new membrane elements would result in greatly improved performance and more cost-effective operation.

The City authorized the project team including McCafferty Brinson Consulting, LLC (MBC) to provide services associated with procurement and start-up of the plant with the new membranes. The scope of work for these professional engineering services included establishing design and performance criteria for the new membrane system, preparation of technical specifications and bidding documents, bidding services, and

services associated with membrane proof testing, installation, start-up, and operations monitoring. MBC was tasked with assistance with all of the above components of the scope of work.

The Project

The scope of the membrane procurement, loading, and start-up contract included the following:

- Manufacture, delivery, and loading of 4-inch diameter membrane elements into the City's pilot plant for proof testing of the membranes proposed to be supplied for the full-scale plant.
- Set-up and supervision of a 60-day duration proof test using the City's pilot plant and raw water supply to demonstrate satisfactory performance of the proposed membranes. The membrane element manufacturer (MEM) was responsible for periodic site visits to the pilot unit, collection of raw water, permeate, and concentrate samples, and preparation and submittal of a report on the proof-testing results.
- Manufacture, delivery, and coordination of the specified full-scale (8-inch diameter) membrane elements to populate the City's membrane plant. The specifications require that the MEM supply 1,834 membrane elements to be loaded into the membrane units.
- Set-up and supervision of a 60-day performance test for each of the five full-scale membrane units to demonstrate satisfactory full-scale operation. During each performance test, the unit will be operated continuously at capacity, within the operational limitations of the plant. The MEM will be responsible for periodic site visits to the plant, collection of raw water, permeate, and concentrate samples, and preparation and submittal of a report on the performance-testing results. A staggered start-up sequence was specified to provide sufficient time during this period to address any issues that arise. During the performance testing of the membrane units, the membrane permeate will be available to the City as finished product.
- Preparation, submittal, and approval of a report for the performance test for each membrane unit.
- Furnishing of a Membrane System Performance Warranty and specified warranty services.
- Miscellaneous training services for operation, performance monitoring, and cleaning of the membranes.

The membrane replacement contract was awarded, and the Notice to Proceed was issued to the Membrane Element Manufacture on October 24, 2007. The project was successfully completed with membrane performance and water quality specifications being met in September 2009. Loading of the membranes was coordinated with a separate contract for replacement of membrane pressure vessels.