

Client

Broward County Water and
Wastewater Services
MBC Subconsultant to CDM

Scope of Services

Design, permitting, bidding,
and construction
administration.

Contact

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Expansion Project
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Start Date

March 2006

Completion Date

October 2011

Construction Cost

\$4.16 million

Key MBC Staff

Frank A. Brinson, P.E.

Key Features

Project included reconfiguring of transfer and high service pumping systems to provide a single point in the process for blending and four-log virus treatment, and the addition of a 9 mgd capacity anion exchange system to remove organics, disinfection by-product (DBP) precursors, and color. The anion exchange process was bid as an alternate but was removed from the project prior to award.

Water Treatment Plant 1A Four-log Virus Treatment and Anion Exchange Improvements

Broward County Water and Wastewater Services



Background

In June 2002, Broward County contracted with Camp Dresser & McKee Inc. (CDM) to provide design, bidding, and construction management services for a nanofiltration (NF) process addition to the process at the County's District 1A water treatment plant (WTP 1A), a 16 million gallon per day (mgd) conventional lime softening facility. The primary objective of the project was to maintain continued compliance with the Disinfectant/Disinfection By-product (D/DBP) Rule and improve the aesthetic quality (color) of the finished water. CDM assigned Frank Brinson, P.E., as project manager.

In characterizing the existing lime softening process during preliminary design, it was determined that the existing process was capable of meeting all of the water quality goals established for the project, with the exception of color. In light of this fact, the County requested that a treatment process alternative analysis be prepared comparing the proposed NF process with anion exchange for color removal, as an amendment to the original scope of services. This analysis concluded that anion exchange was the more cost-effective of the two options for upgrading the lime softening process to achieve the County's goals. Accordingly, the conceptual design for anion exchange process improvements at WTP 1A was developed to be implemented in lieu of the originally proposed NF improvements. In addition to the process enhancements

aimed at organics removal, the County elected to incorporate upgrades to the process to provide four-log virus treatment at WTP 1A to comply with the Federal Ground Water Rule (GWR). In March 2006, the County hired CDM as the prime consultant for design and permitting of the proposed improvements, with McCafferty Brinson Consulting, LLC (MBC) as a subconsultant to CDM to perform mechanical/process engineering services.

MBC's services included preliminary and final design, preparation of opinions of construction cost, permitting, and bidding, and construction administration services.

The Project

The scope of project included the following:

- A 9 mgd capacity anion exchange process with feed pumps, backwash, regeneration, and cleaning systems, and regeneration waste disposal. The design of the anion exchange process consisted of six 1.5 mgd nominal capacity units. The anion exchange process components were deleted from the scope of the project prior to award of the contract to the construction contractor.
- Modifications to the existing transfer and high service pumping systems to route all treated water through a single existing clearwell for blending of the anion exchange-treated water with the balance of the lime softened water, followed by four-log virus disinfection and other lime softening post-treatment to provide a consistent, stable finished water. High service pumps were re-located downstream of the on-site finished water storage facilities.
- Modifications to the finished water clearwell to include baffling, free chlorine and ammonia injection, and continuous on-line monitoring of free chlorine residual, temperature, and pH to demonstrate four-log virus treatment in accordance with the Federal GWR.

Conclusion

In May 2006, under an amendment to the original scope of work, the County requested that the project team prepare a study to evaluate compliance with the recently proposed 4-log virus inactivation/removal requirements under 62-555, FAC. Design development of the anion exchange improvements was temporarily placed on hold while the study was completed. The study and the findings were incorporated into the design. Design of the improvements was completed in February 2008. MBC provided construction administration services for the improvements under separate authorization. Substantial completion of construction was October 2011. There was approximately 3% in change orders for the projects. In 2014, MBC assisted BCWWS in obtaining the Determination of Four-Log Virus Treatment of Groundwater for WTP 1A based on the constructed improvements.