

Leopold Filterworx® performance filter system in Columbus, Georgia

Retrofit significantly reduces backwash cycle interval, duration and water use for Columbus, Georgia utility

The North Columbus Resource Facility recently completed a \$12-million replacement of its settled water filtration, removing the existing Wheeler filters, their three-part media and 10-inch poured-concrete underdrains, which were no longer efficient.

Scope

Prior to the filter rehabilitation, the utility's backwash procedure consisted of a hydraulic-only backwash where the high-rate wash cycle lasted up to 20 minutes. Backwashing each dual cell filter used 150,000 to 200,000 gallons of water. The filters then operated up to an hour in rewash or filter-to-waste operation to reach the desired output of <0.09 Nephelometric Turbidity Unit (NTU).

"We originally set out to do only a filter media replacement project because 40 percent of the media was 36 years old and the other 60 percent was 26 years old," said water treatment superintendent James Stephens. "The utility decided to undertake a much more proactive program. We evaluated several types of replacements, including membrane technology, restoring conventional gravity filtration like that in place, and the option of replacing the entire Wheeler ball underdrain and media with the Leopold dual lateral system and advanced controls."

Solution

A visit to the Leopold Product Development Center convinced Stephens to recommend the Leopold system along with other upgrades. The Wheeler filters were replaced with a state-of-the-art Leopold Filterworx® performance filter system featuring Type SL® underdrains with I.M.S.® media retainers.

The new filter system also includes engineered filter media, an air-scour feature and stainless steel piping that optimizes performance and durability. The pre-engineered HDPE underdrain system employs a dual media gravelless design, yielding an increase in water depth atop the filters and adding 6 to 8 inches to the overall system freeboard.



Aerial view of the North Columbus, GA resource facility.

END USER:	Columbus, Georgia
CLIENT:	Columbus, Georgia
ORDER DATE:	2014
COMPLETION:	2014

This Filterworx system consists of 30 dual cell filters (60 cells total) with a total filtration area of 15,660 square feet. The two-part media consists of 17,128 cubic feet of silica sand (856 tons) sized from 0.45 mm to 0.55 mm, and 31,320 cubic ft. (783 tons) of filter-grade anthracite sized from 0.95 mm to 1.05 mm in a 22-inch depth. The pre-engineered underdrains are mechanically fixed and aligned end-to-end to create continuous parallel laterals in the approximate lengths of the filter cells.

Results

The upgrade reduced the filter high-rate backwash from 20 minutes down to only 5 minutes. Filter rewash time also drastically reduced, lasting 15-20 minutes on average. The backwash cycle now utilizes only about 90,000 gallons for each dual cell filter versus up to 200,000 gallons with the former system.

“Before the rehabilitation we were using 5 percent of our production water for filter backwash purposes. We are now using 1.8 percent of our production water,” Stevens said. With the Leopold filter system, the plant is saving approximately 1,000,000 gallons of water per day that was previously used for backwash purposes.

Measurable reductions have been gained not only in the intervals but also the duration of the backwash cycles, along with the processed water and contingent electricity usage. The two-part media achieves greater efficiency and volume and a more thorough backwash from the air-scour technology first introduced by Leopold in 1977.

“In addition to longer intervals between backwashes, the new filters have brought the loss of head from 2.5 feet to just a half-foot loss,” Stephens said. “Replacing only the media in the old system would have restored the desired quality but not the net gain in quantity of production.”



The Leopold Universal Type SL dual lateral filter system consists of 30 dual cell filters.

Xylem, Inc.

14125 South Bridge Circle

Charlotte, NC 28273

Tel 704.409.9700

Fax 704.295.9080

855-XYL-H2O1 (855-995-4261)

www.xyleminc.com

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