LEOPOLD
a xylem brand

Case study

Leopold® Clari-DAF® clarification system in Carroll County, MD

Leopold Clari-DAF helps Water Treatment Plant boost capacity, improve operations, and reduce maintenance

In the last decade, the existing Freedom District Water Treatment Plant, owned by the Carroll County (MD) Bureau of Utilities, had access to plenty of source water in the 3,100-acre Liberty Reservoir. But the service area's steady growth squeezed the 3.0 million gallons per day (mgd) capacity of the water plant, with spikes in peak demand exceeding 70 percent of the plant's capacity.

Scope

To address the potential shortfall water conservation initiatives and limits on new building permits were put into play as the District began planning for an expansion project.

The old plant relied on two 2,100 gallon per minute (gpm) variable speed submersible pumps to advance water drawn from a flexible floating intake system to a vault on the shoreline of the reservoir. As with many surface water sources, the lake water presents several seasonal treatment considerations. Turbidity, which normally runs less than 5 ntu, is less a problem than the vigorous algae blooms and the lake's pronounced thermo cline, which induces seasonal mixing of Manganese, pH and TOC (total organic compounds) at the intake depth during the onset of the different seasons.

Solution

The utility's new 4.0 mgd facility incorporates creative design features and treatment technologies that not only improve daily operations but reduce maintenance and extend the life of the membrane filtration system. Foremost among these is the Leopold Clari-DAF® clarification system supplied by Xylem. The DAF (dissolved air flotation) pretreatment system improves the efficiency of the membrane filters, which safeguards against pathogens that can pass through traditional sand/diatomaceous (S/D) filter systems which the county previously employed.

The Leopold Clari-DAF system.

End user:	Carroll County, MD
Client:	Carroll County, MD
Order date:	2007
Completion:	2009

An ingenious integration of new construction and modifications to the original treatment facilities make full use of the Leopold Clari-DAF system's contaminant removal ahead of the membrane filters. The hydraulic interconnection of the existing plant both upstream and downstream avoided the much higher capital cost of building a larger standalone plant to achieve the same 7.0 mgd combined capacity. The Freedom District thereby gained the needed 7.0 mgd capacity, excluding another 1.5 mgd available from two supplementary well systems.

Results

Freedom WTP's twin Clari-DAF systems provide redundancy and optimize coagulation and flocculation in the source water, which helps maintain higher flow through the filters. The project demonstrates many of the benefits of the Leopold Clari-DAF system, including the smaller footprint, higher quality effluent water than previously sold contact clarifiers, higher potential loading rate on the membrane filters, and more concentrated sludge.

"The original plant used a solid-contact clarifier where the sludge always settled to the bottom," said Greg Wantz, plant superintendent. "The new plant's DAF clarification system causes the sludge to rise to the top, where it can be mechanically skimmed and removed much easier. The overall facility is far more operator friendly compared to what we had in the past."

The Clari-DAF pretreatment ahead of membrane filtration also extends intervals between both the backwash cycles and the frequency of chemically cleaning that takes the membrane units off line. Collectively, these reduced intervals should increase the overall life of the costly membranes.

Xylem, Inc.
14125 South Bridge Circle
Charlotte, NC 28273
Tel 704.409.9700
Fax 704.295.9080
www.xyleminc.com

www.youtube.com/leopoldwww

LCS027 • Leopold Carroll County, MD Case Study • 12/2013 • US