

Leopold I.M.S.[®] 200 Media Retainer in Wisconsin Rapids, WI

Paper Facility Increases Efficiency with Filter Rehabilitation

NewPage operates eight paper mills in the United States. The Biron mill located in Wisconsin Rapids, Wisconsin produces approximately 370,000 tons of paper each year.

Water production required from the filter plant ranges from 6-10 MGD per day with approximately 6,000 gallons of filtered water being required for each ton of paper produced. The water for use within the mill is drawn directly from the Wisconsin River where alum and polymer are added prior to an Accelerator clarifier. Chlorine is then added to the clarified water prior to entering a Leopold filtration system.

Project Background

The plant was originally designed in the 1950's with a filtration system comprised of ten filter cells. Four dual cell filters were retrofitted with Leopold clay tile underdrains in the early 1980's and these filters produced the majority of the water for the Biron mill.

In late 2012, production capacity questions issues arose with several of the clay tile filters. An investigation revealed that the gravel had been displaced in these filters allowing sand and anthracite to pass into the clay tile underdrain reducing capacity of the filter cells. Through the investigation, the process engineers at the paper mill worked to pinpoint which filters were in the direst need of rehabilitation.

The process engineers at the mill were looking for increased capacity and consistent water quality.



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Solution

Leopold proposed retrofitting two of the four dual cell filters with the Leopold Type S[®] Underdrain system utilizing the I.M.S.[®] 200 media retainer. Leopold engineers customized the filter media profile to meet the needs of the facility.

Leopold provided the Type S[®] Underdrain system and media retainer with the flexibility of using up to 33" total depth of monomedia anthracite (0.75-0.85 mm) for this hydraulic-only system. The larger anthracite served to meet the production and water quality demands of the Biron mill.

The operation staff chose to utilize 28" of the monomedia anthracite to reduce the potential for media loss. Air stubs were incorporated on the underdrain for the possibility of adding air scour to this system in the future in an effort to further increase backwash efficiency and filter run times.

"Production capacity increased immediately once the first filter was brought online."

Result

Prior to the rehab the two dual cells that were in question were producing approximately 1.2 MGD each. Following the rehab the two new dual cell filters produce the majority of the load required at the facility and are reaching capacities of up to 2.5 MGD each. This equates to >100 % capacity increase for these two (dual cell) filters. For a 10 MGD facility these filters are now able to produce half the workload required at the mill.

Along with increased capacity, the filter effluent water quality has also improved which will lead to fewer plant shutdowns caused from seal failures within the mill. Consistent water quality is important in the operations at the mill. If the filtered effluent is not held to a particular standard then issues can arise where floc or particulates plug water flow to the pump seals causing them to fail. When this failure occurs, it requires a maintenance emergency to avoid plant shutdown and system downtime.

Filter effluent turbidity from the rehabilitated filters is measuring ~0.13 NTU and Apparent Color ranges from 0-1 Pt-Co. The requirement for these filters are that of a roughing filter where water effluent turbidities of <3 NTU would be acceptable although <1 NTU is preferred. Prior to the rehab the two selected filters were producing water of >1 NTU (essentially no filtration from clarifier) as the water tended to flow through large cracks or voids in the filter media.



Old media shown prior to rehabilitation.



New Type S[®] Underdrain with I.M.S.[®] 200 media retainer.

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

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