



# Wastewater Reuse at Paper Mill Reduces Freshwater Consumption by 40%



CASE STUDY - PAPER

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## BACKGROUND

A paper mill which produces tissue paper examined options for the reuse of wastewater so they could reduce their fresh water consumption and wastewater discharge.

## CHALLENGE

The paper mill withdrew from the river and treated an average of 100 m<sup>3</sup>/h (440 gpm) of water. The river water iron concentration is often high, sometimes more than 5 ppm, which had caused holes and stains on the paper machine. The mill examined the potential to reduce the fresh water consumption by treating and recycling some of the wastewater. Options for the control of iron contamination were also evaluated.

Water collected from the paper machine during paper production, called "white water", contains

significant amounts of fiber which is removed by flotation. The white water after fiber removal is called "clarified water". Some clarified water is immediately returned to the paper machine process while the rest is forwarded to waste treatment. Treated wastewater was evaluated for potential recycle to the influent water treatment system.

## SOLUTION

Initially, the paper machine process provided for the reuse of 50% of the effluent water directly back to the machine after clarification. The net effluent flow of 100 m<sup>3</sup>/h (440 gpm) was treated and discharged to the river.

The clarified water had a high concentration of organic matter that would need to be addressed to provide additional reuse capability.

### ENVIRONMENTAL INDICATORS

Reduce freshwater consumption by 40% (to 60 m<sup>3</sup>/h)



### ECONOMIC RESULTS



Future avoidance of cost for use and disposal of water

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To make it possible to reuse more of the treated wastewater, the mill modified the influent water treatment system by applying Purate™ chlorine dioxide technology as a pre-oxidant.

Chlorine dioxide is an oxidant that is capable of addressing the iron contamination of the influent river water and treating the high organic loading of the wastewater.

With chlorine dioxide treatment at the influent water plant, it was possible to replace 40% of the influent water with treated wastewater. Because the river water could have an iron concentration of up to 5 ppm and the wastewater could have a chlorine dioxide demand from 3 to 8 ppm due to the organic load, the chlorine dioxide dosage was adjusted to meet the combined demand. Residual measurements confirmed the appropriate addition rate of chlorine dioxide.

To accomplish this 40% reduction in raw water, a new line was piped from the treated water plant back to the raw water line. Chlorine dioxide was injected into the river water line approximately 200 m upstream of the wastewater tie point.

With the implementation of Purate chlorine dioxide technology for the influent water and the reuse of the treated wastewater, the performance of the paper machine exceeded mill expectations by reducing holes and stains and maintaining all other performance parameters. The mill was successful in reducing the river water consumption to 60 m<sup>3</sup>/h, a 40% reduction.

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