

Asia Pacific Integrated Freesheet Mill

Nalco Water Digester Additive Technology Delivers Savings:

\$9.50/ton of Chemicals = \$1MM (USD)

5MM kWh in Energy Savings = \$1MM (USD)



MILL OVERVIEW

Mill:	Integrated Kraft Pulp Mill
Grade:	Coated and Uncoated Freesheet
Equipment:	3 Stage Bleach Plant - D1, EOP, D2 Kamyr Digester
Production:	1,050 TPD
Species:	Bleached Soft & Hardwood

BUSINESS SITUATION

A customer in Asia Pacific was suffering from pitch deposit issues on their freesheet paper machine causing loss of production and first quality product down grade. Many suppliers had recommended solving the issue with on-machine chemical treatments with limited success. Nalco Water identified that the problem could be solved closer to the origin of the contaminants by reducing the extractives in the pulp coming to the paper machine. A complete plant audit utilizing the Mechanical, Operational and Chemical (MOC) approach was conducted that detailed the mill's operating parameters and specific chemical application points required to provide an economical solution. As part of detailing the audit findings to the customer, Nalco Water recommended using PenSurf™ Digester Additive Technology for improving extractive removal in the pulp mill.

BACKGROUND

Management of extractives begins at the digester and plays a critical role in controlling the problems they can create throughout the pulp and paper mill. Many factors impact the concentration and makeup of the contaminants including wood species, age of wood, pulping process and equipment type. Each of these factors can impact the number of extractives moving forward in the process stressing the economic performance of the operations. The aim of controlling these contaminants is to send as much extractive material to the recovery boiler rather than send it forward through the process causing system wide deposition issues and increased operational costs on the paper machine.

ANNUAL SAVINGS



ENVIRONMENTAL
RESPONSIBILITY

1,677,550 kg

of chemicals saved.

The combined savings to the mill by replacing the existing chemical program was \$9.50 per ton of pulp or up to

\$1,000,000

per year.



ENERGY

The program saved over 5 million kilowatts per year

\$1,000,000

saved



PROGRAM DESIGN

Nalco Water's audit identified that adding PenSurf Technology at 100 to 400g/ton of wood chip to the digester would significantly reduce extractives levels at the paper machine. This approach chemically modifies the structure of the extractives during the pulping process assuring they are more easily separated from the fiber allowing them to be efficiently washed out of the pulp throughout the pulp washing and screening processes. PenSurf Technology works by reducing the surface tension between the liquor and the chips allowing more thorough wetting of the chip surface and facilitating rapid penetration of the liquor into the chip. This results in a much more uniform cook and removal of extractives from the fiber.

ECONOMIC RESULTS

The combined chemical saving to the mill is \$9.50 per ton of pulp or around \$1 million a year. PenSurf Technology delivered a Return on Investment (ROI) of 670% when program costs are taken into consideration.

ENVIRONMENTAL RESULTS

The utilization of PenSurf Digester Additive Technology provided the catalyst needed to accelerate the delignification rate and avoid the generation of additional pulping chemicals required to digest the pulp. The environmental savings is demonstrated in eliminating the additional energy required to generate those chemicals on site (e.g., chlorine dioxide, white liquor, and peroxide). The equivalent energy savings created by reducing the existing chemical program equates up to 5 million kilowatts per year, resulting in \$1,000,000 in additional savings.

PERFORMANCE & CHEMICAL RESULTS

PenSurf Technology not only reduced the extractives level as measured after the brown stock washer but also delivered the following additional benefits:

- Chemical Savings (Figure 1):
 - Chlorine Dioxide and Peroxide were each reduced by 1.7 kg/t
 - White liquor usage reduction of 29 kg/t
- Brightness increased from ISO 81.7 to 86.2 (Figure 2)
- Residual Active Alkali (RAA) doubled from 6 to 12 (Figure 3)
- Kappa reduced up to 10 percent (Figure 3)

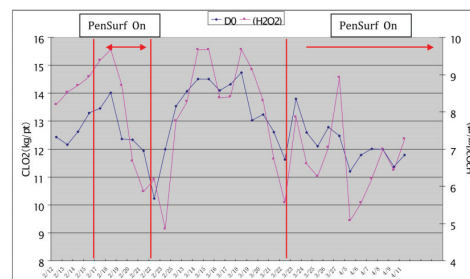


Figure 1 - Program reduced around 12 percent usage pf DP and H₂O₂.

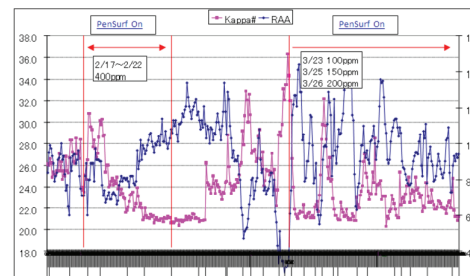


Figure 2 - ISO and NO brightness increased 6.5 percent and 12/5 percent respectively.

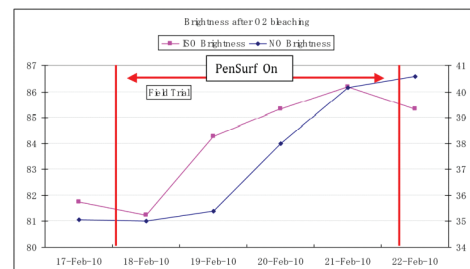


Figure 3 - With PenSurf program, system responded with a 23 percent increase in RAA & a reduction in KAPPA 10 points.

Nalco Water reports Environmental Return on Investment (eROI) values to customers to account for contributions in delivering both environmental performance and financial payback.

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