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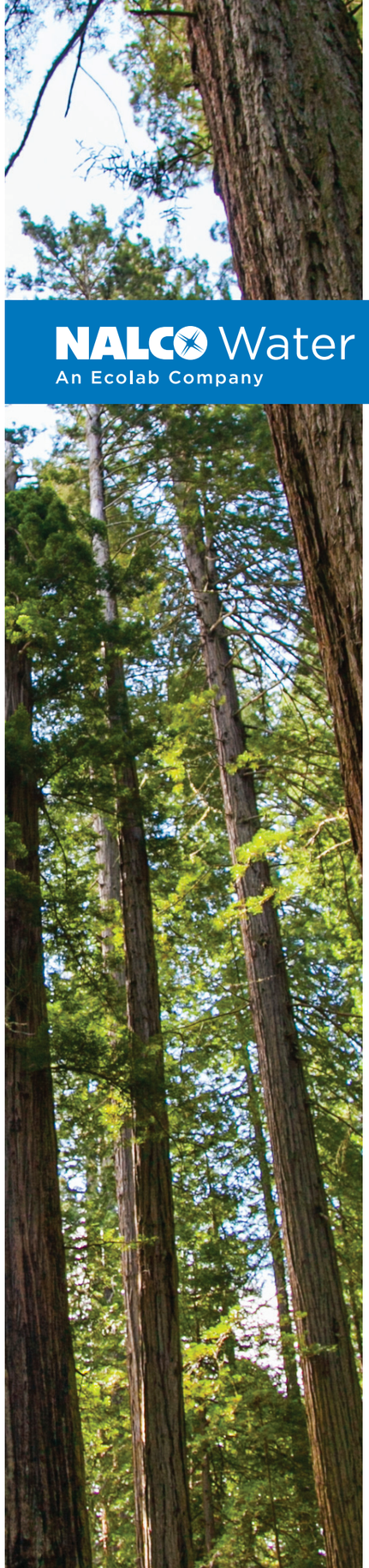

# Nalco Water SuperWash™ Program Improves a European Market Pulp Mill's Total Cost of Operation by €2.6 MM

NALCO Water
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CASE STUDY – PULP & PAPER
CH-2054E

## INTRODUCTION

A leading European producer of bioproducts and bioenergy, whose main raw material is wood from sustainably managed northern forests, had challenges meeting quality and uptime standards. This mill's bleached softwood kraft pulps, have been developed for manufacturing high-quality boards, tissue, printing papers, and specialty products.

## BACKGROUND

The pulp mill had challenges that caused a seven percent off quality product, for almost 10 years. Unsuccessful trials to solve the challenges, were made from different perspectives including equipment, mechanical, and chemical solutions that were mainly focused on the bleach plant.

Nalco Water's participation in a mill sponsored quality improvement project, provided an opportunity to audit the mill operations with a "slaker to pulp dryer" approach, and recommended a proposed path forward. Audit findings revealed that poor brown stock pulp washing and digester scale issues, created conditions leading to the off-quality issues. Nalco Water recommended implementing a SuperWash program for improved washing performance, a ScaleGuard™ program to reduce digestor scaling, and some causticizing operational improvements.

## ACTIONS

Improvements in scale control and introducing the SuperWash program, resulted in a 3% increase in prime quality tons. The SuperWash program, utilized a new formulation created to improve the value delivered to European low soap kraft mills.

| CUSTOMER IMPACT | eROI℠ | ECONOMIC RESULTS |
|---|---|---|
| Increased Machine Quality Production by 3%/yr. | ASSETS | Increased profitability by €1.7 MM/yr. ($2,000,000) |
| Reduced Chlorine Dioxide consumption by 690,000 kg/yr. | | Saved €235,000/yr. ($276,000) in bleaching chemicals |
| Reduced liquor evaporator steam by 31,100 tonnes/yr. | ENERGY | €531,000savings/yr. ($622,080) |

*eROI is our exponential value: the combined outcomes of improved performance, operational efficiency and sustainable impact delivered through our services and programs.*

The mill allowed Nalco Water to run a month-long trial to prove the technology solution on a longer run, allowing for learning and optimization of the program. The key performance indicators for the trial were pulp drainage rate, foam control, wash water usage rate, black liquor solids flow to evaporation, Chemical Oxygen Demand carry-over to the bleach plant, and pulp quality- including silicone carryover measurements.

## RESULTS

The SuperWash brown stock wash solution provided superior drainage, foam control and operational runnability. These improvements allowed for maximum production rates while reducing silicone carry over residuals (PDMS) to non-detect levels. SuperWash consumption remained low, even at highest production rates (fig. 1).

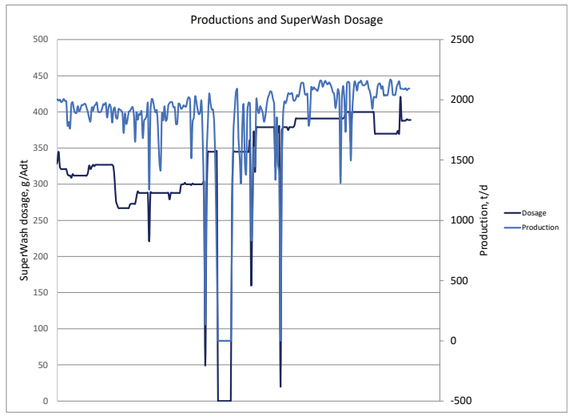


*Figure 1. Production rate and SuperWash consumption*

The superior drainage properties along with operational improvements, allowed the mill to increase the dry solids content in the weak black liquor going to evaporation (fig. 2).

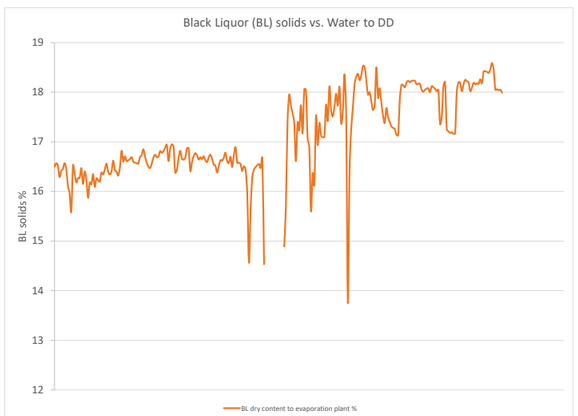


*Figure 2. Dry solids to evaporation*

The improvement in foam control, reduction in foam related runability issues, low silicone residuals, and elimination of silicone deposition, resulted in higher quality production uptime as detailed by Figure 3.

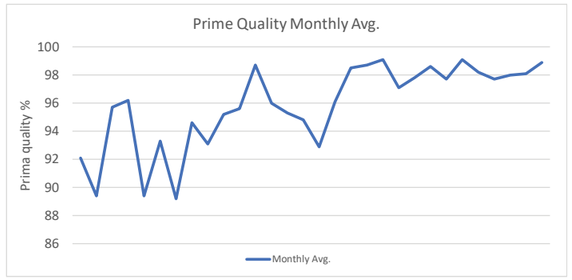


*Figure 3. Prime Quality monthly averages*

Table 1 summarizes the key process indicators followed and the gains obtained by implementing a SuperWash and ScaleGuard program to resolve this customer's quality challenges.

Table 1. Average impact of SuperWash program on the process and product quality.

| Key Performance Indicator | Impact of SuperWash |
|---|---|
| **Black liquor solids** | Increased from 16.5% to 18% |
| **Wash water usage** | Decreased by 0,5 $m^3$/Adt |
| **Bleaching chemicals** | Lower despite decreased wash water use, Reduced ~ 1kg ClO2/ton |
| **Process runnability** | Maximized production rate |
| **Prime quality** | Maintained >96% |
| **Silicone residues** | <3ppm in dried pulp sheets, Silicone absent from dirt spots, no silicone deposits found in annual outage |

## CONCLUSIONS

Using Nalco Water SuperWash technology and expertise, the customer operations were optimized with net annual savings estimated at €2.6 MM ($3 MM). The utilization of SuperWash Technology, provided the catalyst needed to improve the operations and eliminate deposition leading to higher quality pulp and more efficient operations. The environmental savings is demonstrated in eliminating the additional energy required to evaporate the solids in the black liquor. The customer is now able to improve the sustainability of its operations through optimized quality, throughput and energy usage significantly improving the Total Cost of Operation. The trust and credibility earned by Nalco Water through the prime quality project, was rewarded with a two-year supplier agreement for continuation of the programs.