SCALE-GUARD™ PLUS 60116 Technology Helps Save $400K in Annual Total Cost of Operations (TCO)

NALCO Water
An Ecolab Company

CASE STUDY – PAPER

CH-1115AP

Mill Overview

Digester:	Kamyr Continuous Digester
Raw material:	SW/HW as per raw material availability and type of pulp needs
Capacity:	340 TPD
Bleaching sequence:	$D_1E_{O+P}D_2$
Paper type:	Coated/Uncoated free sheet, Wrapping Paper, and Newsprint

BUSINESS SITUATION

A 340-TPD bleached Coated and Uncoated Freesheet Kraft mill was experiencing significant problems with digester scale deposition, causing frequent shutdowns to boilout as well as lower production to meet quality specifications. The mill had been spending approximately $240,000/year on boilouts and was losing 2,000 tons per year due to the off-quality and shutdowns. The mill contacted Nalco Water for assistance to help address these problems and elevate overall production up to expected rates and quality levels.

BACKGROUND

This mill was being forced to reduce production rates and increase chemical boilout frequencies due to frequent plugging of screens in top of the Kamyr. The plugging of the screens was due to the formation of $CaCO_3$, scale in the trim and extraction zones of the digester. The scale formation was reducing circulation and extraction flows from the top zone of the digester, and was negatively affecting runnability, leading to reduced pulp production and quality. The rate of scale deposition was also forcing mill management to shut down and conduct a digester acid boilout every 120 days. As a consequence, the mill lost production for at least three days during each boilout, losing valuable production time and absorbing the added expense of boilout chemicals. Along with the lost production, safety was a major concern while carrying out each boilout and high pressure wash-up.

ANALYSIS OF BUSINESS SITUATION

Key Drivers

- Improve Runnability of Digester including chip and fiber throughput and circulation rates of pulping chemicals.
- Achieve quality specifications with increased throughput and pulping efficiency rates.

- Eliminate acid boilouts due to Calcium deposition in the Kamyr Digester.

Challenge/Opportunity

- Improve production rates and throughput to meet pulp quality and yield targets.
- Identify and eliminate scale deposition in the Kamyr Digester.
- Eliminate shutdown frequency due to scale deposition

PROGRAM DESIGN

After auditing the production system and evaluating the scale deposits, Nalco Water proposed both operational adjustments in synergy with SCALE-GUARD PLUS 60116 technology as a solution to the deposition problems. The chemical was introduced into the chip feeding line at 50–100 g per ton of chips (110–220 grams per ton of bleached pulp) and was pumped through a high pressure screw pump that was linked to the control rooms computerized system for a better control of its addition.

PROGRAM RESULTS

SCALE-GUARD PLUS 60116 technology provided significant improvements in digester runnability and reduced scale deposition rates. The Kamyr digester maintained top end circulation rates, production rates and eliminated the necessity to shut down every 120 days due to deposition. Pulp quality and extractives removal efficiency also improved, allowing for more efficiency to be gained during the bleaching process – providing additional pulp processing reducing overall operating costs by 10 percent. Addditional details on the results of this technology implementation are illustrated in Table 1.

The performance of SCALE-GUARD PLUS 60116 technology provided this customer with a number of important benefits, including:

- $400K total operational savings
- $60,000 Savings in boilout chemicals.
- 1,000 Additional tons in production gained per year
- 33% Reduction shutdown days per year.

CONCLUSION

In summary, through the implementation of a complete SCALE-GUARD PLUS 60116 Technology program, Nalco Water helped this customer significantly improve their overall total cost of operations and achieve significant financial savings. Integration of this technology program also helped the customer successfully elevate their overall production up to expected rates and quality levels.

Table 1 – *Comprehensive details on ROI calculations for SCALE-GUARD PLUS Technology.*

Parameter	Unit	Value	Comments
Data			
Pulp Production Rate (Daily)	TPD	340	
Production Days per Year	per year	350	
Days Lost for Each Boilout Shutdown	days	3	
Frequency of Boilout shutdowns per year		3	
Total Days Lost Each Year Due to Boilouts	days	6	Without SCALE-GUARD PLUS
Cost of Boilout	$ per boilout	$ 60,000.00	
SCALE-GUARD PLUS (N60116) Dosage	Kg/T of chips	0.05	
	Kg/T of pulp	0.11	Assuming pulp yield = 46%
Savings			
Days Saved from Reduced boilouts	days	3	
Extra Production Due to reduced Boilouts	TPY	1020	
Savings Using SCALE-GUARD PLUS (N60116)	$/Y	$ 357,000.00	Production (TPD)*days(/year)*profit ($/T)*days saved from reduced boilout
Savings from Reduction of Boilouts	$ per year	$ 60,000.00	
Total Savings from SCALE-GUARD PLUS (N60116)	**$ per year**	**$ 417,000.00**	

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