



# OxiPRO™ Technology for Deposit Control Helps Tissue Manufacturer Reduce Downtime and Improve Profitability by Nearly \$800,000/yr.

**NALCO** Water  
An Ecolab Company

CASE STUDY - PAPER  
CH-1266

## MILL OVERVIEW

<b>Grade:</b>	Tissue
<b>Process:</b>	LDC
<b>Furnish:</b>	Recycled
<b>Speed:</b>	5000 f/m (1530 m/m)
<b>Previous Program:</b>	Hypobromous acid
<b>Current Program:</b>	OxiPRO 60620 Technology Microbiological Control Program

CUSTOMER IMPACT	eROI™	ECONOMIC RESULTS
Reduced microbiological boil out downtime by 1.2 hrs./week, resulting in additional 158 tons/yr.		\$80,600/yr. savings
All boilouts and bleach containing wash ups of stock approach and wet end of the paper machine were eliminated.		Eliminated employee exposure to hazardous boilout chemistries.
Reduced machine breaks and machine lost time due to micro biological contamination by 6.6%, or \$819/day.		\$286,700/yr. in savings
Reduced converting waste by 1.9 tons/week which resulted in improved productivity worth \$139/day.		\$48,500/ yr. in savings
With the 100% elimination of boil outs on the machine, 640 gal (2,420 liters) of chorine based bleach was eliminated. This resulted in a direct savings of \$1,354/day		\$474,000/yr. in savings
Eliminated hypobromous micro biological control program.		\$73,900/yr. in savings

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

## BUSINESS SITUATION

A North American tissue manufacturer using 100 percent recycled fiber was experiencing significant downtime due to microbiological contamination of tanks, pumps and lines leading to the paper machine and the wet end of the tissue machine. The contamination would break loose and become part of the furnish entering the forming zone of the tissue machine and form deposits around many of the mechanical elements in the wet end of the paper machine. The contamination would result in a sheet defect, holes and web embedded slime spots that often caused web breaks between the creping doctor blade and the reel. Operators attempted to manage the biological contamination by periodically shutting the machine down and performing time-consuming wash ups and chemical boilouts of stock approach, pumps, tanks and the wet end of the tissue machine.

In order to extend the time between machine boilouts, the manufacturer started adding chlorine bleach directly to one of the fiber chests. This process helped reduce the number of breaks and waste but increased employees' exposure to hazardous chemicals, and this also increased the potential risk of corrosion, which was very costly.

In addition to costs associated with of tissue machine downtime, significant losses were incurred in the converting operation due to sheet defects and the poor quality of paper coming to the units. Additionally, all paper coming to the converting units had to be inspected and sometimes rejected due holes and breaks caused by micro biological slime.

This manufacturer challenged Nalco Water to propose an effective solution to the lost tissue machine productivity, defects in the sheet related to micro biological slime and lower productivity of the converting units.

## ANALYSIS OF BUSINESS SITUATION

### Key Drivers

- Eliminate machine boilouts due to microbiological issues.
- Eliminate machine breaks and holes in the paper due to microbiological slime.
- Maintain speed on tissue at 5000 fpm.

### Challenges/Opportunities

- The recycled furnish produced by the pulp mill and delivered to the tissue machine contributed significant organic oxidant demand. This oxidant demand often exceeded the control capability of chemical micro biological control programs. With the loss of biological control slime and associated deposits formed around the machine. A program would have to be designed that could perform well under these conditions

- The recycled furnish had a highly variable inorganic sulfite residual. Sulfite residual consumes normal materials that are used for micro biological control. The proposed program would need to be able to function in this highly variable, sulfite containing furnish.
- Successful Nalco Water OxiPRO technology programs, used with similar tissue machines, having high oxidative demand, have been very successful. Trials with OxiPRO technology were indicated and the customer was confident this program could overcome the furnish challenges at a reasonable cost and effectively meet the customer's needs.

## PROGRAM DESIGN

After a thorough audit of the process, a microbiological control program was designed and appropriate application points were identified. OxiPRO 60620 technology was identified as the best technology to be applied in an intermittent feed format. This program would pump product to the machine every four hours for 30 minutes at a time. The addition point chosen was at the machine silo.

An intermittent program of this nature has several advantages under these conditions:

1. Costs are reduced since the program only runs for 180 minutes/day.
2. The intermittent format assures high dosages that are required to eliminate slime growth.
3. The high dosages ensure that sulfite variation in the furnish does not make the program ineffective.
4. Since chemicals are fed automatically through the feed system and the feed lines are flushed after each dosage, the potential exposure of employees to microbiological control chemicals is minimized.

OxiPRO 60620 technology has proven to have these advantages in similar program installations at other mill locations:

1. Rapid microorganism killer.
2. Reduces existing slime over time, therefore no boilout would be necessary before starting a program.
3. No detrimental impact on process or functional chemistries used in the tissue making process, such as coatings and wet strength resins.

## KEY PERFORMANCE INDICATORS

- Aerobic plate counts, ORP, sulfite residuals, and ATP tests before, during and after each dosage were used to monitor the performance during startup and optimization.
- An OxiPRO technology monitor was used to measure program performance on a real time, ongoing basis.
- The number of boil outs and micro biological outbreaks would be documented.
- Boil out chemical usage would be monitored and documented.
- Bleach usage would be monitored and documented.

## PROGRAM RESULTS

The OxiPRO technology program implementation far exceeded KPI expectations. Boilouts were eliminated for a savings of \$80,600 per year. Breaks and lost time due to micro biological fouling of the process and the sheet were reduced and resulted in an increase in productivity of \$286,700 per year. Additionally, the use of bleach to reduce micro biological build up in stock approach and the wet end of the tissue machine was reduced by 92 percent. This resulted in a direct chemical savings of \$474,000 per year. With the elimination of bleach boilouts and numerous machine

wash ups employee exposure to high risk work practices and chemistries was reduced. As the tissue machine ran better with fewer breaks and sheet defects, converting was able to document increased productivity valued at \$48,500 per year.

When including the cost of the program, the net value of the OxiPRO technology system to the customer was nearly \$800,000/year.

## CONCLUSION

The results achieved by application of OxiPRO technology at this facility have demonstrated to this customer that microbiological issues can be controlled and costs significantly reduced. This manufacturer had been experiencing microbiological problems for years and was initially skeptical that improvements and savings could be achieved. The success of the OxiPRO technology program has since greatly improved the competitiveness of this manufacturer.

When dealing with boilouts, safety must always be considered. Boilout chemicals are usually strong caustic solutions that expose workers to significant risk. For this customer, the OxiPRO technology program reduced boil outs by 100 percent and reduced the use of bleach in the process by 92 percent.