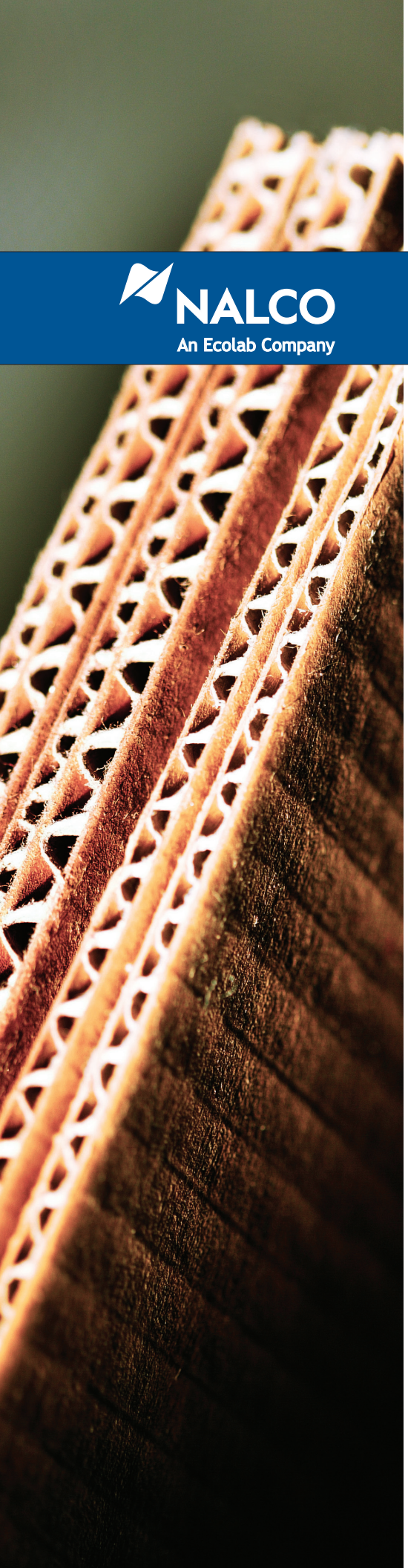

Essential Expertise in Wastewater Delivers Environmental Improvements at a Paper Mill in North America

NALCO
An Ecolab Company

CASE STUDY – PAPER

CH-1294

INTRODUCTION

A large paper mill in North America makes high quality, bleached and unbleached Kraft paperboard. The company is committed to maintaining high environmental, health and safety standards. The organization is focused on 100% compliance with all environmental laws, and has a performance goal of zero environmental incidents.

The fully integrated paper mill makes linerboard and other packaging grades. The Kraft process mill consumes 100% virgin pine and hardwood to make over 2,000 TPD of high quality board. The waste treatment plant consists of a primary clarifier, aeration basin, followed by a secondary clarifier which then discharges to a nearby river. The solids are captured and dewatered by screw presses to a concentration that allows disposal by incineration of the solids as supplemental fuel for the plant's bark boiler.

SITUATION

The mill was unable to maintain wastewater compliance due to oil leakage from the paper process. Oil was leaking from a paper machine gearbox and the bulk oil system had overflowed into the primary clarifier, impacting settling. The primary clarifier typically captures 87% of the solids, but due to the bulking issue it was operating at a much lower efficiency level. The solids were instead being carried over to the secondary system which resulted in bulking sludge and high total suspended solids being discharged to the river.

Bulking sludge is slow to settle, forming a loose, light blanket in the clarifier, spending too much time in the clarifier and not enough in the aeration basin. Both the slow rate of settling and poor blanket formation increase the time needed in the clarifier to accomplish solids/liquids separation.

Environmental Indicators	eROI	Economic Results
Improvements in performance of the wastewater treatment plant delivered, allowing consistent compliance with local environmental standards	WATER	Avoidance of $30,000 per day in regulatory fines
TSS levels reduced by 75% Enhanced site sustainability performance through improved quality of wastewater in line with company commitments Reduced chemical usage of close to 2 million pounds on an annualized basis	EARTH	Savings of up to $2.9 million on an annualized basis in chemical usage

Nalco reports eROI values to customers to account for contributions in delivering both environmental performance and financial payback.

(Continued on Reverse Side)

Bulking sludge requires more time to settle. Since installing a larger clarifier or reduced incoming wastewater flow rate are not usually options, chemical addition such as polymer settling aids or chlorine to kill filaments may temporarily fix symptoms of bulking sludge. An operator may increase recycle flow rate to prevent the clarifier from filling up with sludge, however, higher recycle rate reduces overall hydraulic residence time in the aeration basin and may exacerbate solids/liquids separation problems in the clarifier.

High effluent TSS being discharged to the river resulted in permit violation, and a fine of $30,000 per day. Therefore, when they were fined, they did not meet their goal of zero environmental incidents.

The customer called Nalco to review potential solutions to achieve environmental compliance, system assurance, and cost reduction. A cross-functional team was deployed, and during the preliminary audit, they found a quick fix was being used to improve settling. After a comprehensive assessment, the Nalco team consulted with the customer and recommended a total system solution. The team found that the process used to treat the oil leakage resulted in chemical overfeed. They were able to implement a solution using Nalco ULTIMER® 1460 to treat this more complex waste stream.

PROGRAM

Nalco ULTIMER 1460 is an innovative, patented, water-based dispersion polymer technology. ULTIMER technologies are a water-based polymer product that does not contain oil, surfactants, and Volatile Organic Compounds. These features result in a more environmentally friendly alternative to the conventional liquid emulsion products (latex technology).

ULTIMER technology has received numerous awards in the United States, including the 1999 Presidential Green Chemistry Challenge Award, 1999 R&D 100 Award and 2001 R&D Award. ULTIMER 1460 was recommended as an alternative to the products the mill was using. The ULTIMER polymer technology does not interfere with the normal functions of the organisms when dosed appropriately and helps solubilize ions in solution. The technology also provides excellent solid/liquid separation performance, thus giving excellent TSS reduction performance.

RESULTS

As shown in Figure 1, the implementation of Nalco ULTIMER 1460 reduced total dissolved solids from over 100,000 ppm to less than 25,000 ppm, or 75%, affording consistent environmental compliance. Switching to this program also eliminated the need of more than 5,000 pounds of chemical usage per day, or just less than 2 million pounds of chemical annually. The elimination of these chemicals saves the customer up to $2.9 million on an annualized basis. This solution had a dual benefit of not only chemical reduction but also reduced manpower time required for chemical handling at the waste water treatment plant.

The customer was very pleased with the results. As a result of a successful solution, the customer implemented Nalco ULTIMER 1460 program as a remedy to provide long-term process stability at their waste water treatment plant.

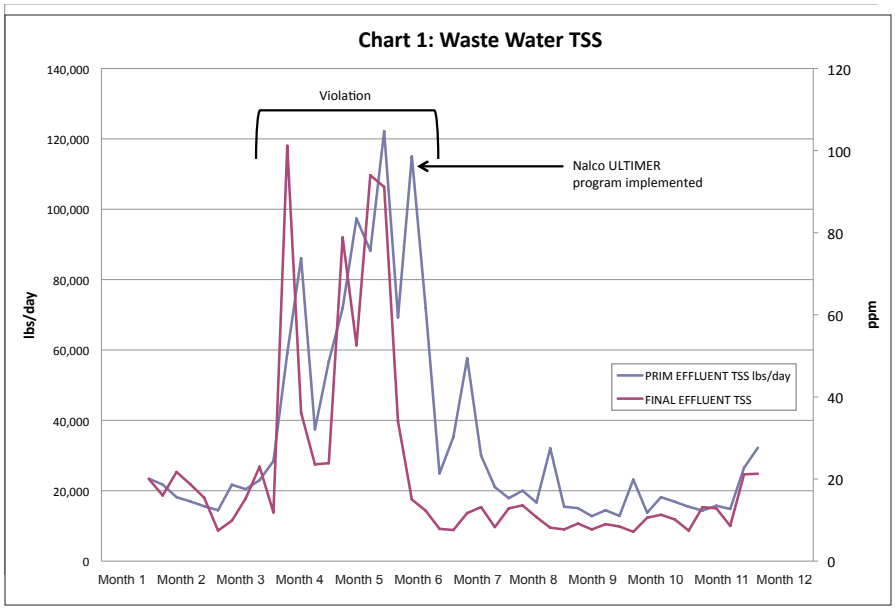

Figure 1

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eROI (Productivity, water and energy and material savings)

Savings due to (Item)	US$/year
Runnability	110,000
Fresh Water	9,000
Water Treatment	25,000
Energy	66,000
Fiber Substitution	545,000
Total	**755,000**