Development Towards Zero Effluent Discharge

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ABSTRACT

One of the major Environmental issue which every Paper Industry facing is effluent discharge.
In line of action many of paper industries have come forward with their plans to manage **4R** in the industries to align towards zero effluent discharge in near future. Action towards "Zero Effluent discharge "initiative already addressed by CREP as well as pollution control board for paper industry.

Introduction

Now a days the sustainability of an Organization, not only depend on its financial status but on its environmental & social stability. Disposal of treated effluent issue can be managed by taking positive approach towards zero effluent discharge. Below case studies can benefit from a vast body of experience. Papermakers in India as well as research institutes should keep on working towards further optimizations.

New knowledge thus gained will always beget new questions in search of an answer - which is what progress is built on.

This paper mainly focusses on journey towards zero effluent discharge through continual improvements carried out in all the processes.

Basically, Zero effluent discharge can be achieved by adopting four "R" principles such as,

- **Reduce**
- **Reuse**
- **Recycle**
- **Recover**

Results And Discussion

Where do we begin?

Believe as we can't manage what you don't measure, means the first step is accurate measurement of sectional water consumption in the plant. In line of action, several steps has been initiated towards zero effluent discharge by optimization of water consumption, Improvement in water quality, maximize reuse , recycling of process back water, Biocides and deposit control programme and maximize supply of treated effluent for irrigation and grading to nearby farmers in parallel action by improving treated effluent quality which is suitable for irrigation.

Effluent discharge from a mill is directly related to water consumption of that plant, so different activities initiated in all processes right from building of teams, brain storming and evolving of several projects to optimize water consumption through managing 4R.

As results of stepwise addressing the all constrains of the system specific water consumption has been brought down to 19m3/MT of Paper from 35 m3/MT of Paper within a span of one year.

Subsequently the effluent discharge follows the same trend and which is being utilized for gardening of mill surroundings and for plantation by Bilt tree tech ltd, a project to promote sustainable raw material supply in future.

Disc filter size is directly proportional to the project cost & it can be optimized as per our requirement of clarified water. It is always not necessary to fed all back water through disc filter unit. During project stage, disc filter was optimized by installing a system for stock Consistency regulator with back water and rest to be fed to disc filter for filtration.

A state of art disc filter with capacity of 210 m^3 per hour processes machine backwater from various sources, which provides cloudy, clear and super clear water. It is used in disc filter showers, pulp dilution in pulpers and paper machine showers respectively. Cleaning efficiency of showers further improve by introducing deposit control programme in shower water tank.

The most of the mills equipped with disc filter are still not able to reduce its water consumption significantly; the major factor is disc filter efficiency.

It should be audited at regular intervals for its vacuum level and filtration efficiency.

In Ashti we have set a system of regular monitoring of filtrate ppm and regular boil-out of disc filter unit.

As shown in schematic diagram, in the early stages, all vacuum flume water is being collected in to a pit and recycle in to the vacuum pumps through cooling towers. Problem faced due to negative section head of flume pump. Even submersible pumps couldn't perform on consistant basis. Finally all vacuum flume water diverted to a pit with positive suction head pump which provided a consistant solution. The major challenges still too faced were scaling inside the vacuum pumps. Which is being taken care with anti scaling programme. The residual

EFFLUENT DISCHARGE,M^3/Day

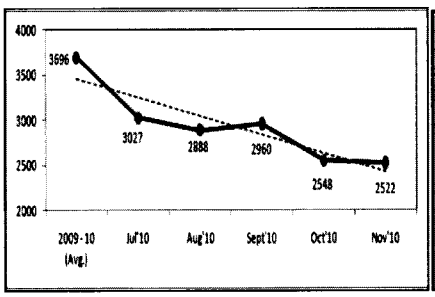

Fig-1

SPECIFIC WATER CONSUMPTION, M^3/MT:

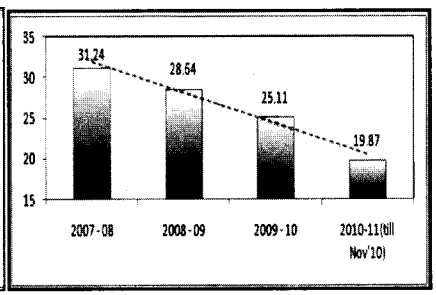

Fig-2

Ballarpur Industries Ltd.,
Unit-Ashti, Distt. Gadchiroli-442707 (M.S.)

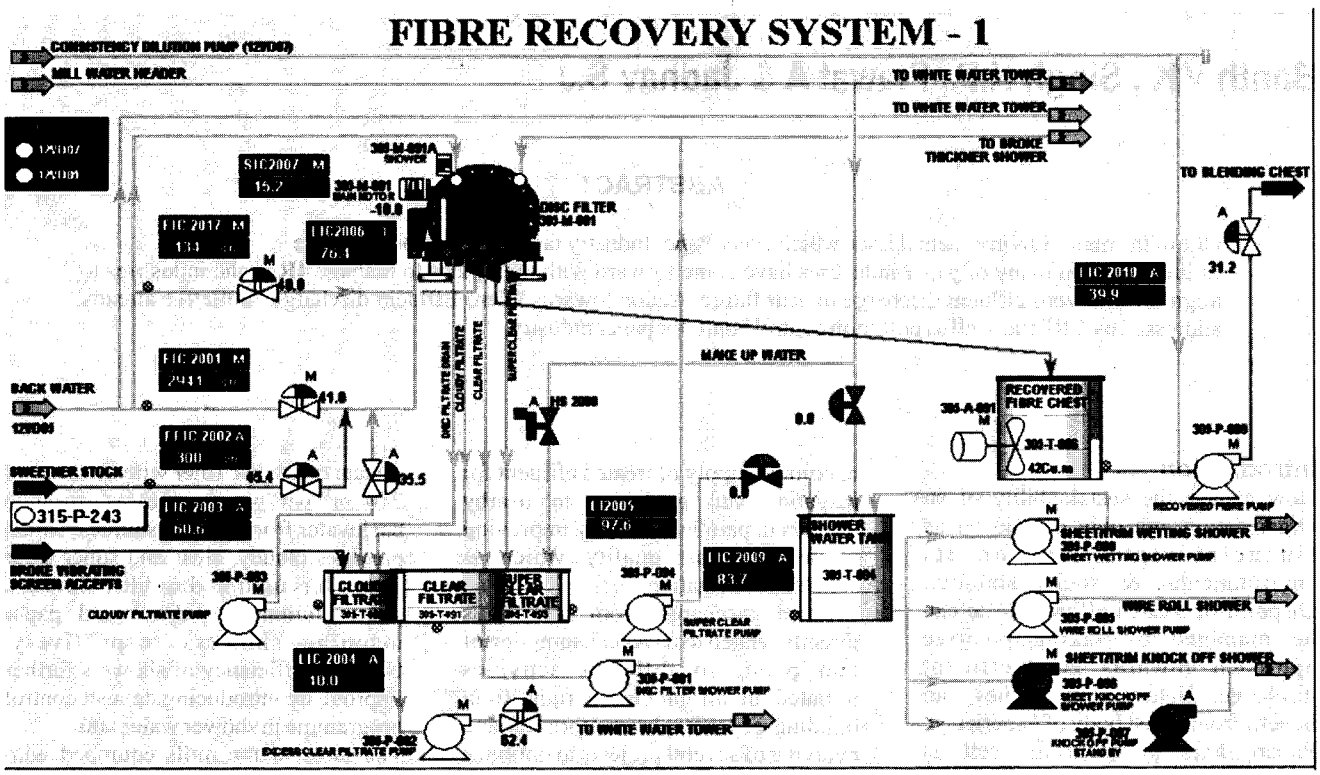

Fig-3

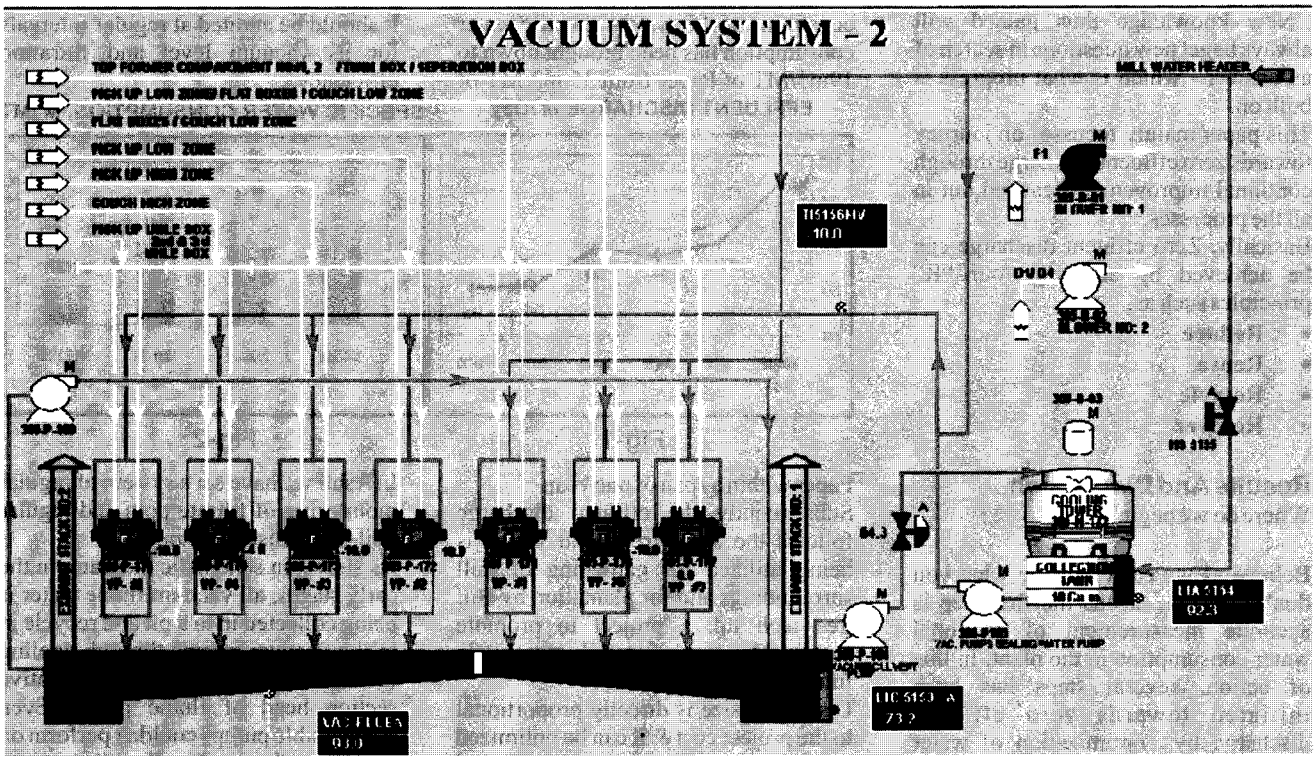

Fig-3

phasphomate level is being maintained more than 5 ppm to avoid scaling. The cost of anti-scaling programme is about Rs.15 per MT of paper.

Purging of fresh water on regular intervals will take care of sealing water solids and temperature.

CASE STUDY 03 - Effective Biocide And Deposite Control Programme

In today's paper making one of the major issue which affects machine runnability water consumption is bacterial growth into the system and frequent acidic and alkaline boilout's and purging of system with fresh water

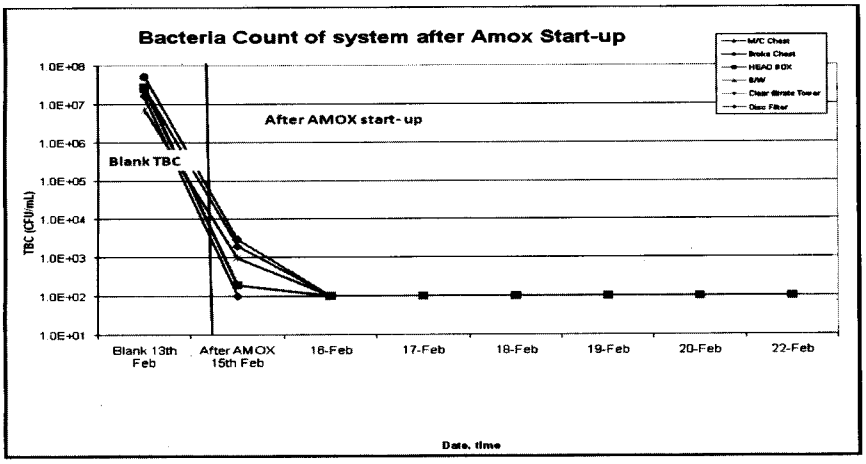

Fig- 5

are required to restore the machine efficiency. With use of $CaCo_3$ system further detoriates due to deposits. This problem requires proper attention.

Following steps adopted to overcome this constraint which resulted into better machine efficiency due to considerable reduction in bacterial and deposits growth. Frequent purging of system stopped and boil out period increased from 15 days to 30 days which finally reduce the effluent load and quality.

ClO_2 treatment of intake mill water

Treatment of mill water with ClO_2 increased the system ORP (Oxidation and reduction potential) upto 600 ppm by maintaining Free Residual Chlorine 0.4 ppm. It helped greatly to bring down total bacterial count (TBC) & system Biocide demand.

Biocide and Deposit Control Programme

Biocide programme covers, Treatment of back water and broke system, Deposit control in approach flow, Precipitated Calcium carbonate storage tower, Shower water tank and size kitchen.

By introducing complete programme system total Bacterial Count fell down noticeably.

Other Initiatives taken to curtail fresh water consumption:

- Reduction in mill water pressure from 4.0 kg/cm^2 to 3.2 kg/cm^2 by providing high pressure booster pump with a separate tank for squirt nozzles.
- Installation of high efficiency fish tail showers for fabric lubrication.
- Re-use of refiners hydraulic power pack, ASA heat Exchanger cooling water thru' cooling tower.
- Curtailing colony water supply by 5 hrs day
- Waste not taps.

Establishment Of Bilt Tree Tech. Ltd. - A State - Of - The Art Clonal Multiplication Facilities

Extensive plantation has been done under green belt development for the existing plant. Green belt has been developed and well maintained along the internal roads and mill area. The mill has made elaborate arrangement in developing green belt inside the mill under the aegis of Bilt Tree Tech. Ltd,.

We have established state of-the art clonal multiplication facilities at Bilt Ashti unit premises comprising of 32 acres of land. The proposed clonal multiplication project comprises eight glass houses and four shade houses with other related infrastructure facilities to produce five million quality clonal plants every year.

This project would supply the desired varieties of clonal eucalyptus plants to mitigate the demand of quality saplings

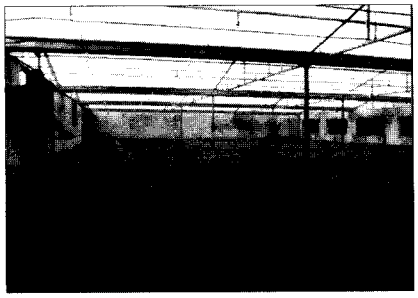

Fig- 7

Fig- 8

Fig- 9

Fig- 10

FRESH WATER REDUCTION AFTER SUCCESSFUL IMPLEMENTATION

Section	Water distribution	Before	After
		M^3/day	
Paper Machine - 4241 M3/day	H P Shower	648	648
	Sealing Water	1350	1188
	Vacuum flume sealing water	1030	200
	Cooling Tower make up	295	150
	Machine rolls and doctors lubrication	504	400
	Squirt Nozzles	20	20
	Chemical preparation	394	394
Total, m3/day		4241	3000

INFFLUENT REDUCTION

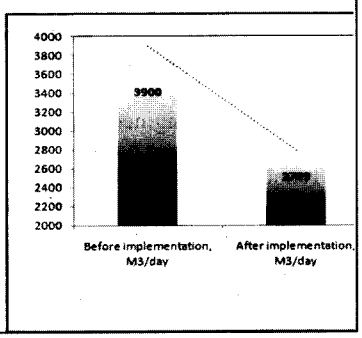

Fig-6

USAGE OF TREATED EFFLUENT FOR DEVELOPMENT OF GREEN BELT

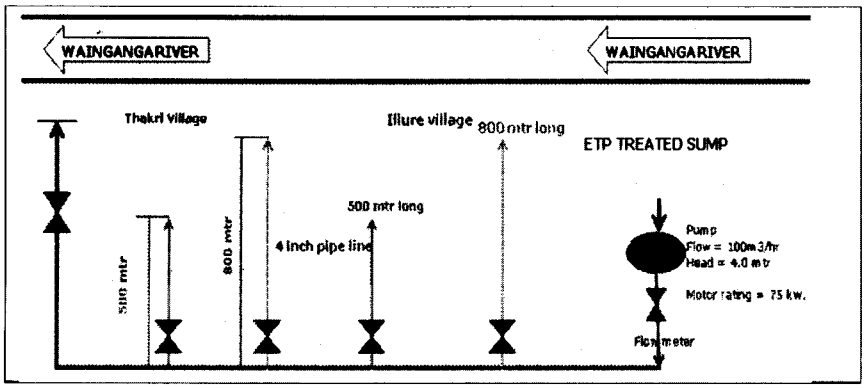

Fig- 11

by the rural farmer in Gadchiroli, Chandrapur and other adjoining districts of vidharba region of Maharashtra. It is earmarked to develop the desired gene bank in 22 acres of land and the rest 10 acres of the land would be utilized for the purpose of infrastructure development at the project site. Already, we have established such projects successfully in our units at Jeypore (Orissa), Nidigonda (Andhra Pradesh), Ballarshah (Maharashtra) & Jagadhri (Haryana)

Fibre Resource department of Bilt distributed more than 10 lakh saplings of Eucalyptus trees to the local farmers of Vidharba & Gadchiroli regions in the last 2 years. In year 2011, BTTL has targeted to distribute 18 lakh saplings of eucalyptus clone. All these saplings are distributed at the nominal cost with buyback guarantee. This program will have positive impact on socio-economics of the rural region as well as reduce the effluent discharge also.

For this area we are utilizing 800 - 1000 m^3/day of treated effluent which results in reduction of effluent discharge.

Utilization Of Treated Effluent For Irrigation

Treated effluent is being used by farmers for irrigation purpose. Rice was the major crop harvested along with moong, chana, meerchee, brinjals etc

Scheme: In order to achieve zero effluent discharge from the Mill to river and also to meet environmental compliance. We are envisaging one scheme in phase 1, so that we can lift around 2000M^3/day out of 3300M^3/Day.

Villagers and farmers shall be made aware and motivated to use the effluent water for irrigation and plantation.

Conclusion:

By implementing all above projects and carrying out modifications in the processes resulted in to significant reduction in effluent discharge

- Process water consumption reduced down to less than 3000 m^3/day from 4200 m^3/day.
- Influent to ETP reduced down to 2800 m^3/day.
- 1800 m^3/day treated effluent being utilized at mill gardening, plantation at BTTL & Irrigation to nearby farmers and planning to increase utilization of treated effluent further by 500 m^3/day.
- Further reduction of fresh water consumption by 500 m^3/day is being anticipated by working out the potential water saving areas.

Acknowledgement

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